



Ministry of Public Health and Sanitation
and
Ministry of Medical Services

National Guidelines for Quality Obstetrics and Perinatal Care

SECTION 1:

MATERNAL HEALTH

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ACKNOWLEDGEMENTS

The process of drafting the national MNH guidelines / reference manual involved a series of workshops composed of multidisciplinary teams including highly specialised and experienced personalities from a cross section of participating institutions and organisation. In order to capture current practice while avoiding bias and maintaining accuracy, the participation of many experts was imperative. It is therefore possible that some may have been left out on the list of participants. For those affected by this oversight, please accept our apologies for the omission.

We sincerely wish to thank our bilateral partners, NGOs, Training institutions, and individuals who participated in this process. A selected guidelines working group undertook the review process during which a culture of exemplary consistency, dedication and commitment evolved. In this regard the following people are particularly recognised: The late Dr Njoroge Waithaka, Dr Guyo Jaldesa, Dr Zahida Qureshi (KOGS / UON); Charlotte Warren, Charity Ndwiga (population Council); Dr Marsden Solomon (FHI); Sam Mulyanga (FCI); Roselyn Koech (Nursing Council of Kenya); Dr Joyce Lavussa, Janet Kagai (WHO); Dr Shiphrah Kuria, Dr Janet Omyonga, Ruth W. Muia, Anne Njeru, Mary Gathitu (DRH / MOPHS); Simon Mueke, Lucy Gitonga (MOMS); Margaret Njoroge (KMTC), Josephine Mutua (DTC Nairobi); Dr Gathari Ndirangu (Capacity project), Sam Mulyanga (FCI) and Dr Nancy Kidula (WHO /Jhpiego),

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Editorial support was provided by Dr Shiphrah Kuria, Dr Marsden Solomon, Dr Janet Omyonga, Dr Gathari Ndirangu, Ms Terry Wefwafwa (nutrition component), Dr Florence Murila (Newborn care) and Dr Herman Wenyanaga (TB component); with Dr Nancy Kidula (ACCESS Uzima) as the chief editor.

In order to capture current evidence based and emerging issues, a wide array of documents have been perused and used as references especially for those elements of the guidelines that are new and emerging and have not been classically included in previous versions of this document. The standard template used was the National guidelines for Obstetric and Perinatal care -2004 and the EOC guidelines for Kenya. A lot of the standardised regimens have been drawn from available WHO guidelines on the selected issues. All participating organisations shared their materials on various areas in MNH and these have been useful in determining the content of this document.

The first section of the consolidated MNH guidelines comprises the guidelines for maternal health. Section 2 comprises the guidelines for Newborn Health. Special and sincere acknowledgements go to WHO MPS program and USAID ACCESS Uzima program for supporting the development and finalisation of these guidelines.

Dr Isaac Bashir
Head- Division of Reproductive Health

Dr Santau Migiro
Head- Division of Child and Adolescent Health

FOWARD

The Millennium Development Goal number 5 is to improve maternal health with a target of reducing MMR by 75% between 1990 and 2015. For this to be attained there is need for a 5.5% decline in MMR annually from 1990. However, globally the reported annual percentage decline in MMR between 1990 and 2008 was only 2.3%. Among countries with an MMR ≥ 100 in 1990, it is evident that 30 countries have made insufficient or no progress. This list includes 23 countries from sub-Saharan Africa (*WHO...Trends in Maternal mortality 1990-2008*). Sadly Kenya is among these countries with an MMR of 488 per 100,000 live births, with some regions reporting MMRs of over 1000 per 100 000 live births. (*KDHS 2008/09*)

The United Nations Secretary-General in 2010- launched the Global Strategy for Women's and Children's Health, which is a catalyst for renewed and enhanced commitment by all partners for adequate financing and policy to improve women's and children's health. These commitments will support the following elements to accelerate progress towards MDG 5: Country-led health plans, a comprehensive, integrated package of essential interventions and services, Health systems strengthening, Health workforce capacity building, and coordinated research and innovation.

The five Strategic Thrusts of the Ministries of Health (K) defined as the priority areas for health services, include equitable access to health, improving quality of care, efficiency, effectiveness and responsiveness of health services. The National Reproductive Health Policy's priority actions for maternal and newborn health also echo the ministries' goals and objectives of increasing the health workforce trained in provision of maternal health services and increasing the proportion of deliveries conducted by skilled attendants. Kenya has also developed the national RH training plan whose goal is to ensure that health personnel have the knowledge, technical skills and positive attitude, to handle reproductive health issues within a comprehensive and integrated system

The development of this reference manual is in response to the need for emerging, updated evidence based interventions that have proved successful when applied throughout the continuum of care of the woman's pre conception, pregnancy, childbirth and the postpartum period. Both the obstetrical and medical conditions and the complications that would affect a woman during this period have extensively been described along with the management of the same. It is hoped that this document which is designed to equip all Health care providers with maternal healthcare Knowledge, skills and positive attitudes at all levels of service delivery implementation will go a long way in accelerating reduction of maternal and newborn morbidity and mortality and get the country on track to attaining MDG 5.

Dr Anna Wamae
Head – Department of family Health
Ministry of Public Health and Sanitation
Republic of Kenya

ACRONYMS

AFASS	-Acceptable, feasible, Affordable, Sustainable, Safe
AMTSL	-Active management of Third Stage of labour
ANC	-Antenatal Care
APH	-Ante partum Hemorrhage
ARV	-Antiretroviral Therapy
BF	-Breast feeding
BP	-Blood Pressure
CCC	-Comprehensive Care Clinic
CHW	-Community health Worker
C/S	-Caesarean Section
COCs	-Combined Oral Contraceptives
CPR	-Contraceptive Prevalence Rate
CT	-Counseling & Testing
DBP	-Diastolic Blood Pressure
DCAH	- Division of Child and Adolescent health
DOT	-Directly Observed Treatment
DRH	- Division of Reproductive Health
DTC	- Decentralised Training Centre
EOC	- Essential Obstetric Care
ESAR	-Eastern & Southern African Countries
FANC	-Focused Antenatal care
FBOs	-Faith based organizations
FCI	-Family Care International
FGC	-Female genital Cutting
FHI	-Family Health International
FS	-Female sterilization
HAART	-Highly Active antiretroviral Therapy
Hb	-Haemoglobin HTSP-Health Timing and Spacing of Pregnancy
IYCF	-Infant and Young Child Feeding
IUCD	-Intrauterine Contraceptive Device
KAIS	-Kenya AIDS Indicator Survey
KDHS	-Kenya Demographic and Health Survey
KEPH	-Kenya Essential Package for Health
KMTC	-Kenya Medical training College
KNH	-Kenyatta National Hospital
KOGS	- Kenya Obstetrical and Gynecological Society
LAM	-Lactational Amenorrhea
LBW	-Low Birth Weight
LLITN	-Long Lasting Insecticide Treated Net
MEC	-Medical Eligibility criteria
M&E	-Monitoring and evaluation
MMR	-maternal mortality ratio
MNH	-Maternal and Newborn Health
MOMS	-Ministry of Medical services
MOPHS	-Ministry of Public Health and Sanitation
OF	-Obstetric Fistula
PIH	-pregnancy Induced Hypertension
PMTCT	-prevention of Mother to Child transmission
PNC	-Postnatal care
POC	-Products of Conception
POPs	-progesterone only pills
PPH	-Post partum hemorrhage
RHL	-Reproductive Health library
S/S	-Symptoms and Signs
TB	-Tuberculosis
WHO	-World Health Organization

HOW TO USE THIS GUIDE

DEFINITION OF TERMS

Guidelines are systematically developed statements which assist in decision making about appropriate health care for specific conditions. They are not intended to dictate an exclusive course of management or treatment. They are based on available research or evidence.

Most of the management techniques suggested in this document are already in practice. However ***it is important to screen the entire document topic by topic and ask yourself whether this is what you have been practicing***. In so doing you will standardise your practice with the guide. You might find some of the management techniques new. This will give you an opportunity to update yourself or to seek appropriate support and /or update from your supervisor. At that stage you can then judge when the guide is most useful to you depending on the facilities available at your station and your competency to manage the conditions you may encounter. In most cases we have attempted to guide you on making the correct diagnosis as well as the standard management for the condition. Some of the information has been presented in flow charts for easy reference.

In using this guide, it is important to remember that this is a living document. New evidence may come into the health system as to the best management approach. The MOH will try as best as it can to disseminate any new information through appropriate fora.

In the application of these guidelines ***irrespective of your qualifications*** you will be asking yourself some questions down a **decision action pathway**. To manage any condition encountered the following are the key questions on the pathway:

Question1: What is the problem?

Problem solving begins with understanding the problem. If you are sure of the diagnosis, you can proceed to the next question. If in doubt refer to the guidelines or consult your superior and reappraise your diagnosis. If this does not help you, **REFER** to the next level. Remember that if you not know the diagnosis (you do not know the problem you are dealing with) it may cost the mother's or baby's life.

Question2: Given my knowledge, skills and the facilities available in my service delivery point, am I able to manage according to specific problem guidelines?

This question only applies if you are sure of your diagnosis. In which case refer to the guidelines and manage the patient as per recommendations if you have the facilities and skills to do so. If you do not have the facilities or doubt your competencies, refer the patient to the next level. Delay in referral in the absence of competencies or systems to support management of the patient may result in maternal or neonatal death.

Question 3: Is my management leading to success?

As you manage the patient continuously evaluate the result of your management. If it is effective, continue; otherwise refer to the guidelines for further information. In the absence of observable success with your management, consult your superior or refer to the next level. Remember to judge your success against time taken to the next referral level in case a need arises. It is better to refer early than be faced

with an anticipated emergency or which you have neither the competencies nor the facilities to manage. This delay may be fatal to the mother and /or the baby.

Always remember that **TIME** is an important factor in the practice of Obstetrics. ***Referral needs to be timely.*** You must always match the time against the distance to the next level and the urgency required given the problem encountered.

This guide also serves other important purposes. By referring to this guide you may have an idea of the most likely mode of management at the next station in order to correctly advice the patient and her relatives thereby assist them to be better prepared both psychologically and financially

Again obstetrics can have some life threatening conditions that may not allow adequate time for referral in case of difficult terrain and vast distances. In such a situation, the guide will assist the midwife play the role of doctor in order to execute a life saving procedure. For instance a midwife may need to fix an Intravenous infusion on a bleeding patient to minimise the effects of hypovolaemic shock during transportation.

AVAILABILITY, USE AND REVIEW OF THESE GUIDELINES

- This document must be available for reference and other uses in every reproductive health service providing and training facility
- This document may be used in both pre service and in-service training of MNH service providers
- The document is recommended for use
 - In Reproductive Health training institutions
 - At all level of Reproductive Health service delivery
 - By all cadres of RH service providers including health administrative staff and other support personnel
- It is recommended that this document is reviewed every 3 years so as to keep up with the rapidly growing evidence base and best practice in MNH
- ***This document should not stand alone. It does not have ALL the information available. Neither does it cover ALL possible management approaches. It should therefore be used alongside other reference materials and job aids.***

Unit 1: Overview of MNH services in Kenya

Content outline

1. Introduction
2. Situation analysis
3. Status of interventions
4. The Kenya MNH Model
5. Policies and guidelines
6. Minimum package of MNH services by level
7. Systems support for MNH services (coordination, supervision, standards, HRH, HMIS, M&E)
8. Quality of MNH care (Service charter in relation to MNH, human rights, etc)

Introduction

In most cases, pregnant women and their families anticipate a healthy pregnancy, safe delivery, and a normal healthy baby that grows up well. However, this is not always the case as many women and newborns suffer morbidity and mortality within the course of pregnancy and childbirth. A mother's death is a tragedy unlike others, because of the deeply held feeling that no one should die in the course of the normal process of reproduction and because of the devastating effects on her family and the community.

With today's knowledge and technology, the majority of the problems that threaten the world's mothers and newborns can be prevented or treated. Most of the millions of untimely deaths that occur as well as the suffering that accompanies ill health are avoidable. In this regard, we need to take into account the inseparable duo of mother and baby – in terms of time, causes and places of death, and the health system ability to serve the mother and newborn with appropriate effective care.

For centuries, care for pregnancy, childbirth and young children was regarded as a domestic affair, the realm of mothers and midwives. In the 20th century however, the health of mothers and children was transformed from a purely domestic concern into a public health priority with corresponding responsibilities for the state. In the opening years of the 21st century, the Millennium Development Goals place it at the core of the struggle against poverty and inequality, as a matter of human rights. This shift in emphasis has far-reaching consequences for the way the world responds to Maternal and Newborn Health. Kenya like many other countries is signatory to many international conventions that recognize Safe motherhood as a human right.

An increasing number of countries have succeeded in improving the health and well-being of mothers, babies and children in recent years, with noticeable results. However, the countries with the highest burden of mortality and ill-health have made little progress to date. In some, the situation has actually worsened in recent years. Progress has therefore been patchy and unless it is accelerated significantly, there is little hope of reducing maternal mortality by three quarters and child mortality by two thirds by the target date of 2015 – the targets set by the Millennium Declaration.

The reasons for this are complex and vary from one country to another. They include the familiar, persistent enemies of health (– poverty, inequality, war, civil unrest, and the destructive influence of HIV/AIDS –), but also the failure to translate life-saving knowledge into effective action and to invest adequately in public health and a safe environment. This leaves many mothers and children, particularly

the poorest among them, excluded from access to the affordable, effective and responsive care to which they are entitled.

"Not simply because these are women in the prime of their lives... not simply because a maternal death is one of the most horrible ways to die... But above all, because almost every maternal death is an event that could have been avoided and should never have been allowed to happen."

MAHMOUD FATHALLA at the **SAFE MOTHERHOOD TECHNICAL CONSULTATION IN SRI LANKA 1997**

Evidence has shown that there are 2 key interventions that improve maternal health and reduce maternal mortality, namely: Skilled attendance at delivery (skills, numbers, enabling environment) and availability of Emergency Obstetric Care. Universal access to family planning has also been shown to reduce maternal morbidity and mortality as well as improve child survival.

The difference in **maternal mortality** between the industrialized and the developing world is greater than any other development indicator. Every country must therefore prioritize Maternal and newborn health as part of the development agenda and poverty reduction strategies.

SITUATION ANALYSIS

Maternal and newborn conditions account for a substantial part of the health gap between the developed and developing countries. Of the estimated 536,000 maternal deaths that occurred in 2005 globally, 99 percent (533,000) occurred in developing countries with Sub-Saharan Africa having the highest MMR at 900 maternal deaths per 100,000 live births. The adult lifetime risk of maternal deaths is highest in Africa (1:26), as compared with developed countries (1: 7300) (WHO, 2007).

In Kenya, complications of Pregnancy, Childbirth and the puerperium are the leading causes of inpatient morbidity and mortality in females over 5 years of age (Facts and figures 2009). Maternal mortality levels in Kenya have remained unacceptably high at 488 per 100,000 live births, with some regions reporting MMRs of over 1000 /100 000 live births. The neonatal mortality rate is 31 per 1,000 live births (KDHS 2008 /09). Currently in Kenya, neonatal mortality contributes to 60% of all infant mortality cases in Kenya.

Maternal Mortality

"A maternal death is defined as the death of a woman while pregnant or within 42 days of termination of the pregnancy, irrespective of the duration and site of pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes."

Causes of maternal mortality maybe direct or indirect

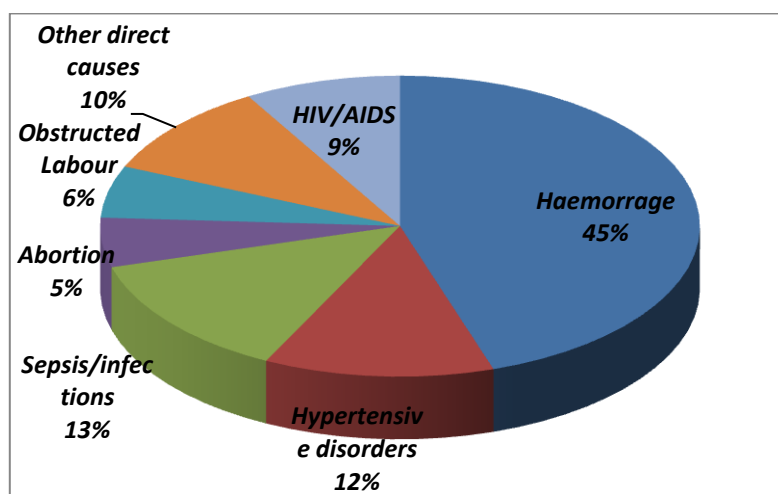
Direct Causes of Maternal Death

These result from obstetric complications of pregnancy, labour and the puerperium and from interventions or any after effects of these events. The Five major causes of direct maternal deaths in order of frequency are: Haemorrhage, Sepsis, Hypertensive disorders, Complications of abortion and obstructed labour

Indirect causes of Maternal Deaths

They result from previously existing disease or disease that develops during pregnancy which was not due to direct obstetric causes, but which was aggravated by physiologic effects of pregnancy. The major causes of indirect maternal deaths in our set up include Malaria, HIV/AIDS, and anaemia.

Causes of Maternal Mortality in the African Region



Source: UNDP, WHO, UNFPA, World Bank (2006). Causes of maternal death. A systematic review. The Lancet 2006;367:1066-74

Approximately 13 percent of all maternal deaths occur among adolescents mainly as a result of complications of unsafe abortion (WHO 2008).

Causes of Maternal Mortality in Kenya

Reporting of the cause of maternal death is incomplete in the HMIS. Overall, the lead causes appear to be antenatal and postnatal haemorrhage. Also common were eclampsia, sepsis, ruptured uterus and obstructed labour. (*Kenya Health situation and trends 1994- 2010*)

Maternal Morbidity

For every woman who dies another 30 suffer long term injuries and illness due to pregnancy and childbirth related complications. Maternal morbidity is any symptom or condition resulting from or made worse by pregnancy. Severe maternal morbidity (Near Miss) is defined as: “any pregnant or recently delivered woman (within six weeks after termination of pregnancy or delivery), in whom immediate survival is threatened and who survives by chance or because of the hospital care she receives.”

Table 1: Maternal conditions most frequently reported in studies included in the WHO/HRP systematic review. (2005)

Morbidity	No of studies	%
Hypertensive disorders of pregnancy	885	14.9
Stillbirth	828	13.9
Preterm delivery	489	8.2
Induced abortion	400	6.7
Hemorrhage (antepartum, intrapartum, postpartum, unspecified)	365	6.2
Anemia	267	4.5
Placenta anomalies (praevia, abruptio, etc.)	245	4.1
Spontaneous abortion	235	4.0
Gestational diabetes	224	3.8
Ectopic pregnancy	146	2.5
Premature rupture of membranes	140	2.4
Perineal laceration	139	2.3
Uterine rupture	116	2.0
Obstructed labor	102	1.7
Depression (postpartum, during pregnancy)	96	1.6

Puerperal infection	86	1.5
Violence during pregnancy	77	1.3
Urinary tract infection	66	1.1
Malaria	54	0.9
Other conditions	973	16.4
Overall	5933	

Newborn Mortality

Global and regional:

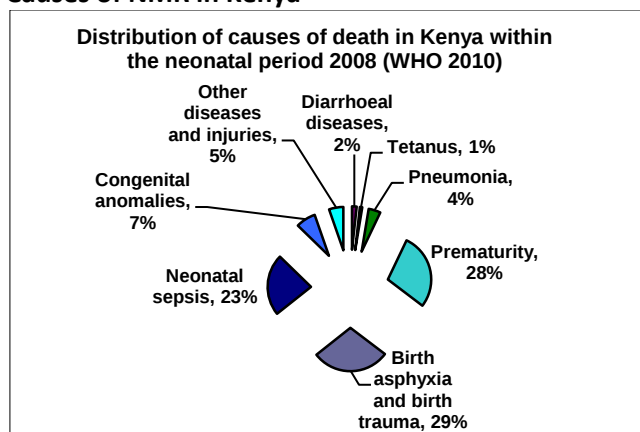
Maternal health is inextricably linked with the survival of the newborn: The adverse events surrounding pregnancy, labour and delivery such as lack of antenatal care, and lack of skilled attendance at delivery, and lack of postnatal care among others are major contributors to perinatal and newborn morbidity and mortality.

Every year four million babies die in the first four weeks of life (the neonatal period), many others are stillborns. Three quarters of neonatal deaths occur within the first week of life and the highest risk of dying is within the first 24 hours. Almost all (99%) neonatal deaths occur in low and middle income countries.

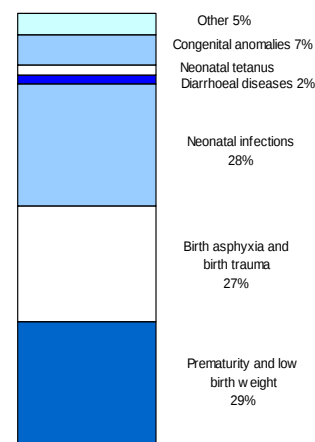
The top three causes of newborn death in Africa are severe infections (28%), Birth asphyxia (27%), and prematurity (29%). They are highlighted in the bar chart below (World Health statistics 2010).

Causes of Newborn mortality in Kenya are highlighted below with asphyxia and birth trauma accounting for 29%, prematurity 28%, and sepsis 23%. (Kenya health situation and trends 1994-2010)

Causes of NMR in Kenya



Causes of NMR in Africa



Current trends show that the infant and U5MR in Kenya are declining, while the NMR has stagnated and accounts for 60% of all infant mortality rate (*KDHS 2008 /9*). Addressing newborn mortality in Kenya is likely to result in attainment of MDG 4

Underlying causes of Maternal & Neonatal Mortality

The three delays

There are three distinct levels of delay which contribute to maternal morbidity and mortality: (Thadaseus and Maine, 1994):

1. **Delay** in deciding to seek appropriate care. This could be due to: socio-cultural barriers, Failure to recognize danger signs, failure to perceive severity of illness, *and cost considerations*

2. **Delay** in reaching an appropriate health care facility.

This is due to: long distance to a facility, poor condition of roads, lack of transportation and cost considerations

3. **Delay** in receiving adequate emergency care at the facility.

This may be due to: Shortage of staff, supplies and basic equipment; unskilled personnel, user fees among others.

Timeliness of interventions is imperative if adverse maternal and newborn outcomes are to be averted.

Status of Interventions to Reduce Maternal Morbidity and Mortality

Approximately 9 out of 10 (92%) of all pregnant women in Kenya attend antenatal care at least once from a health care provider and 56% make four or more ANC visits. However, only about 44% of all deliveries are attended to by a skilled health provider. In fact since 1990, delivery by skilled attendants has progressively declined in Kenya. Majority of births are therefore occurring at home with no skilled care (KDHS, 2008/9).

Trends in Skilled Birth Attendance during delivery (MOH facts and figures 2009)

Attendant during delivery	1993 KDHS	1994 WMS II	1998 KDHS	2003 KDHS	2006 KIHBS	2008-09 KDHS
Doctor	12.3	14.9	12.3	11.4	10.5	43.8
Nurse/Midwife	33.1	34.2	32.0	30.2	28.5	
Untrained TBA	12.4	0.0	9.9	28.0	27.4	56.2
Trained TBA	8.7	26.5	11.3		11.7	
Self	10.1	8.6	10.2	8.0	7.3	
Other	23.4	15.8	24.3	22.4	14.6	
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

Among women who deliver outside the health facility, a vast majority (6 out of 10) do not receive postnatal care. Only 42 percent attend postnatal care within two days of delivery, (KDHS 2008/9). This is despite the fact that majority of maternal deaths occur during the postpartum period.

Utilisation of Health Services:

The Kenya Service Provision Assessment 2010 indicated that some 74 percent of all facilities (excluding stand-alone VCT facilities) offer ANC (compared with 79 percent in 2004), 59 percent offer PNC compared with 35 percent in 2004), and 69 percent provide TT vaccine (compared with 84 percent in 2004). Fifty-six percent of facilities offer all three services (compared with 33 percent in 2004).

Thirty percent of facilities provide services for normal deliveries, a decline from 38 percent in 2004. Only 5 percent of facilities provide caesarean section services, similar to 7 percent in 2004. Half of hospitals (a decline from 76 percent in 2004) provide the service. Overall, half (49 percent) of all facilities have transportation support for maternity emergencies (KSPA 2004, KSPA 2010)

Overall, during the three months preceding the survey, only a very small proportion of facilities (3 percent) had applied or carried out all six signal functions of Basic Emergency Obstetric Care; and only 3% of the hospitals had carried out all eight signal functions that constitute Comprehensive Emergency Obstetric Care. This is a significant decline from 2004 and corroborates the fact that Kenya still is far from attaining universal coverage of MNH care (*KSPA 2004, KSPA 2010*).

Results from the Kenya AIDS Indicator Survey (2007) reveal that the HIV prevalence rate among adults is 7.8 percent while that among pregnant women is higher at 9.7 percent. The PMTCT programme is well entrenched in the health system; by 2009, the PMTCT coverage rates were as follows: Counselling 95%, Testing 90%, and ARV coverage 71%. A major challenge to attaining universal coverage is that PMTCT services are offered in the MCH clinics where less than half of the eligible population attend consistently.

Family Planning is known to be a cost effective strategy to enhance maternal and newborn health, reduce maternal and newborn mortality and is one of the prongs of PMTCT. However in Kenya, contraceptive prevalence stands at 46 percent, unmet need among married women aged 15-49 stands at 26 percent and the total fertility rate is 4.6. Discontinuation is a major challenge in Kenya with nearly 40 percent of users discontinuing their family planning method within 12 months. Family planning utilisation is poorest among adolescents- whose CPR is only 22.5%. A higher percentage of urban women use contraceptives compared to their rural counterparts. There are also regional disparities with the North Eastern province having a CPR of only 4%. Some of the reasons for the low CPR include: low level of education in women, Shortage of FP commodities, unskilled personnel, myths and misconceptions and negative attitudes of service providers (*KDHS 2008/9*).

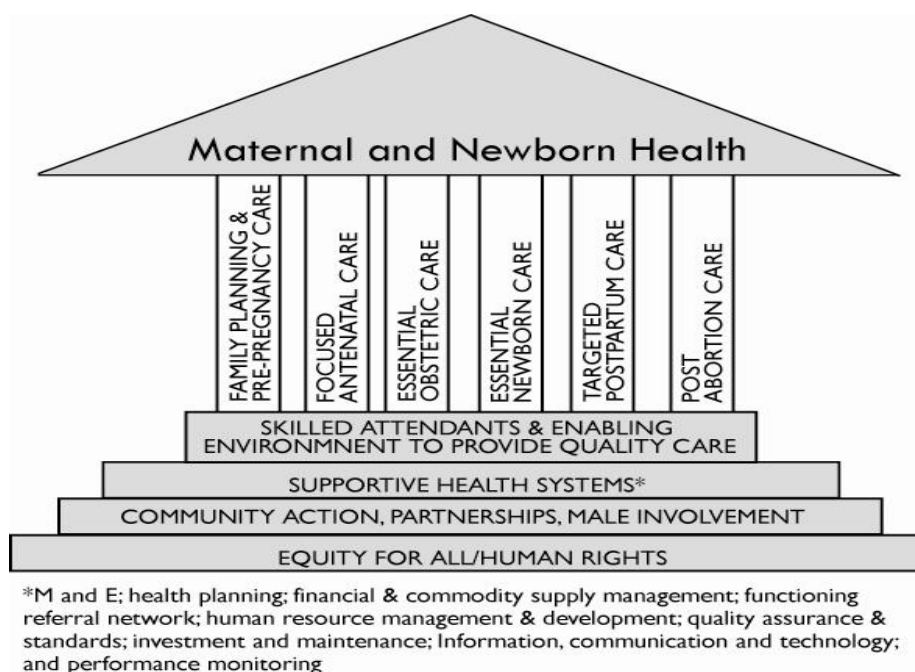
Availability of service providers with MNH competencies is grossly limited. To achieve the MDG 5 the country needs a minimum of 4 service providers /1000 population. However in Kenya the Nurse to population ratio is only 1.2 /1000 while the doctor to population ratio is 0.2 / 1000. (*Economic survey 2009*). This is further complicated by inequitable distribution of the available service providers and deficient MNH competencies.

Type of Health Personnel	2007	2008	No. per 100,000 population
Doctors	6,271	6,623	17
Dentists	931	974	3
Nursing officers	12,198	14,073	37
Enrolled Nurses	31,917	31,917	83
Clinical Officers	5,797	5,035	13
<i>Source: Economic Survey 2009</i>			

The Kenya Maternal and Newborn Health model

The six pillars of Maternal and Newborn Health in Kenya include pre-conceptual care and family planning, focused antenatal care, essential obstetric care, essential newborn care, targeted post-partum care, and lastly post-abortion care. These services are underpinned by the foundation of skilled attendants and a supportive & functional health system. The Kenya MNH model recognises the potential role communities have in the promotion of their own health. It reiterates the importance of strengthening the interface between the community and health services, as well as promoting the human rights approach to health service delivery. These elements are also identified by the National Health Sector Strategic Plan II 2005-2010 as key areas of focus.

The Kenya Maternal and Newborn Health model (2009)

**Maternal and Newborn Health (MNH) Pillars**

1. **Family planning** and pre-pregnancy care– To ensure that individuals and couples have the information and services to plan the timing, number and spacing of pregnancies.
2. **Focused Antenatal Care** – To prevent complications where possible and ensure that complications of pregnancy are detected early and treated appropriately.
3. **Essential Obstetric Care** – To ensure that essential care for the high-risk pregnancies and complications is made available to all women who need it.
4. **Essential Newborn Care** – To ensure that essential care is given to newborns from the time they are born up to 28 days in order to prevent complications that may arise after birth.
5. **Targeted Postpartum Care**– To prevent any complication occurring after childbirth and ensure that both mother and baby are healthy and there is no transmission of infection from mother to child.
6. **Post Abortion Care** – to provide clinical treatment to all women and girls seeking care, for complications of incomplete abortion and miscarriage as well as counselling and contraceptives.

(Note that HIV PMTCT services are now integrated into ALL the pillars of MNH and clean and safe delivery is part of Essential Obstetric Care)

Skilled Attendance

Evidence has shown that there are 2 key interventions that improve maternal health and reduce maternal mortality, namely: Skilled attendance at delivery (skills, numbers, enabling environment) and availability of Emergency Obstetric Care.

Skilled attendant

The emphasis for improving maternal health must be on *training and deploying an adequate number of skilled health workers* to provide antenatal, intrapartum and postnatal care. The term "*skilled attendant*" refers exclusively to people with midwifery skills (e.g. doctors, midwives, nurses, clinical officers) who have been trained to proficiency in the skills necessary to manage normal deliveries and diagnose or refer obstetric complications. Consequently, it is recommended that all health centres and dispensaries that provide delivery services to expectant women should be adequately staffed with a skilled birth attendant. The required number and mix is outlined in the Norms and Standards for service delivery. Midwives should also be able to conduct deliveries in the woman's home, and refer early when necessary. Training and deployment of health care providers at appropriate service delivery levels helps increase access to maternal health services, especially life-saving services.

Enabling Environment

To ensure effective and efficient service delivery, the skilled attendant requires an enabling environment. There is need for appropriate infrastructure as well as ensuring that the continuum of care is connected by an effective referral system, and supported by adequate supplies, equipment, drugs, good management and supportive supervision. Please refer to the MNH model for other elements of supportive health systems. (See Annex for list of essential MNH equipment, drugs and supplies)

Coordination of MNH services

The coordination of MNH services nationally is part of the core mandate of the Division of Reproductive Health Ministry of Public Health and Sanitation. Within the Ministry of Medical services, the Division of Obstetrics and Gynaecology oversees these services with support from the Division of Paediatrics. This is in line with the National Health policy framework, Vision 2030, the National Health Sector Strategic Plan, and the Reproductive Health Policy.

Quality of MNH care

The quality of MNH care is achieved and maintained by adhering to Quality Assurance standards. This is being carried out through the employment of specific Quality Improvement approaches such as: the Service Charter, Client Oriented Provider Efficiency (COPE), Performance Improvement Approach (PIA), Kenya Quality Model (KQM), Standard Based Management and Recognition (SBM-R); etc. The above quality improvement approaches and tools complement support supervision.

To track performance and evaluate the outcomes of delivery of MNH services, a minimum set of indicators have been described in the Reproductive Health M&E framework and the Kenya MNH Road Map. They can be found in the M&E Chapter of these guidelines.

Referral Systems

A key aspect in ensuring a good maternal health service is a functional referral system. Access to a telephone and/or vehicle, with emergency funds or fuel to transfer urgent cases day or night is extremely important. Good record keeping and use of detailed referral letters will assist in reducing delay in the care for women with obstetric emergencies and severely ill newborns.

Effective communication between health care providers at both the community level and at the point of referral is essential for management of obstetric emergencies and for ensuring continuity of care.

The referring unit should be aware of the capacity of the referral point to manage the client being referred.

The referral system can be strengthened through active supportive supervision, regular feedback on cases, continuing education and formal in-service update sessions.

Consultations between Dispensaries, Health Centres and the hospitals including the use of telemedicine and other modern technologies facilitates patient management, and reduces unnecessary referrals and delays. For further reading, please refer to the National Referral Guidelines 2009.

Community Action, Partnerships

Involving community members (particularly women and their families, health care providers, and local leaders) in efforts to improve maternal health helps to ensure programme success; Community education about obstetric complications and when and where to seek medical care is important to ensure birth planning/ use of birth preparedness cards, early recognition of complications and prompt care-taking behaviour

Male involvement and participation

Previously MNH issues have been considered to be women issues; however it is evident that for successful programme implementation, male participation is imperative. However, studies have shown that male involvement in MNH results in good outcomes for both mother and baby. Male involvement and participation is critical in addressing the first and second delay. In the Kenyan context, men have the resources and are the main decision makers in the families and communities on issues relating to MNH.

Equity for All

Rights based perspective helps legitimise prioritisation of women's health. It focuses attention on social, economic and geographic inequities. Strong political support and national ownership are essential to create enabling policies to attract resources for maternal and newborn health and to ensure those resources reach groups with the highest maternal mortality and morbidity.

Reproductive Rights

Health care providers should appreciate that most maternal and neonatal deaths are avoidable, and therefore maternal and newborn health must be given its due prominence. Safe Motherhood is a basic human right as women are entitled to enjoy a safe pregnancy and childbirth.

THE SAFE MOTHERHOOD INITIATIVE

Maternal and newborn morbidity and mortality have been recognised internationally as public health priorities. The Global Safe Motherhood Initiative launched in Nairobi in 1987 aimed at reducing the burden of maternal deaths and ill health in developing countries.

The Safe Motherhood Initiative differed from other health initiatives in that it focused on the well being of women as an end in itself. In the SMI, the prevention of the death of a pregnant woman is considered to be the key objective, not because death adversely affects children and other family members but because women are intrinsically valuable (Thaddeus and Maine 1994). It underscored the fact that Safe motherhood is a basic human right.

Summary of SMI Events:

Year	Event	Summary
1987	International Safe Motherhood Conference(Nairobi, Kenya) –Safe motherhood Initiative launched	Goal : 50% reduction in 1990 levels of maternal mortality by 2000 (and 75% reduction by 2015)
1987-1997	Safe Motherhood Initiative	Involved: • Enhanced Advocacy for Safe Motherhood • Determine the Magnitude of the problem • Institution of Effective interventions, • Identify constraints to implementation, • Address barriers to access
1997	Safe Motherhood Technical Consultation(Colombo, Sri Lanka)	Ten key messages were formulated

International Conference for Population and Development (ICPD):

The 1994 International Conference on Population and Development in Cairo recommended to the international community a set of important population and development objectives. The Programme of Action was striking for the attention it devoted to the issue of women's health. It also included goals with regard to education, especially for girls, and for the further reduction of infant, child and maternal mortality levels. The 1994 ICPD Program of Action later called for a paradigm shift in policies and strategies from a single focus on Family planning to the provision of comprehensive and quality reproductive health services.

For Kenya, the ICPD recommendations were then translated into the National Reproductive Health Strategy (NRHS 1997 – 2010) and implementation plan whose goal was to reduce maternal, perinatal and neonatal morbidity and mortality.

Another event that followed the ICPD was the Millennium Declaration in 2000 and the development of goals (MDGs) with indicators. A major contribution towards the achievement of the MDGs is the commitment of governments in developing countries and the international community, who have adopted the MDGs as their framework for development and cooperation.

Millennium Development Goals

In September 2000, leaders from 189 countries including Kenya adopted the Millennium Declaration, pledging to eliminate poverty and create a climate for sustainable development. Eight Millennium Development Goals were established to create a framework for implementing the Declaration. All MDGs are relevant to the health sector

Achieving MDG5 will require political, social, legal and economic actions as well as scaling up technical strategies that are evidence based.

National Reproductive Health Policy 2007

The goal of the RH policy is to enhance the Reproductive Health status of all Kenyans through:

- Increased equitable access to RH services
- Improved quality, efficiency and effectiveness of service delivery at all levels
- Improved responsiveness to clients needs

The main objective for Safe Motherhood in this RH Policy is to reduce maternal, perinatal and neonatal morbidity and mortality in Kenya

National Reproductive Health Strategy (NRHS): 2009- 2015

This is a revision of the NRHS 1997-2010 and includes issues and challenges that had not been incorporated in the original strategy. The revision was also necessary in order to align it to the National RH Policy - 2007.

The overall goal of the strategy is to facilitate the operationalisation of the National RH policy by ensuring that the interlinkages between RH and all other sectors of development are properly identified and effectively addressed through a multisectoral approach. It is also intended to aid the Division of RH in resource mobilization.

The National Health Sector Strategic Plan (NHSSP II)-2005-2010

The aim of NHSSP II is to reverse the decline in the health status of Kenyans through an efficient, high quality health care system that is accessible, equitable and affordable for every Kenyan household. A major feature of the NHSSP is the introduction of the Kenya Essential Package for Health (KEPH), which focuses on the health needs of individuals through the six stages of the human life cycle. The strategic plan emphasizes strong community involvement in health care through the community Strategy.

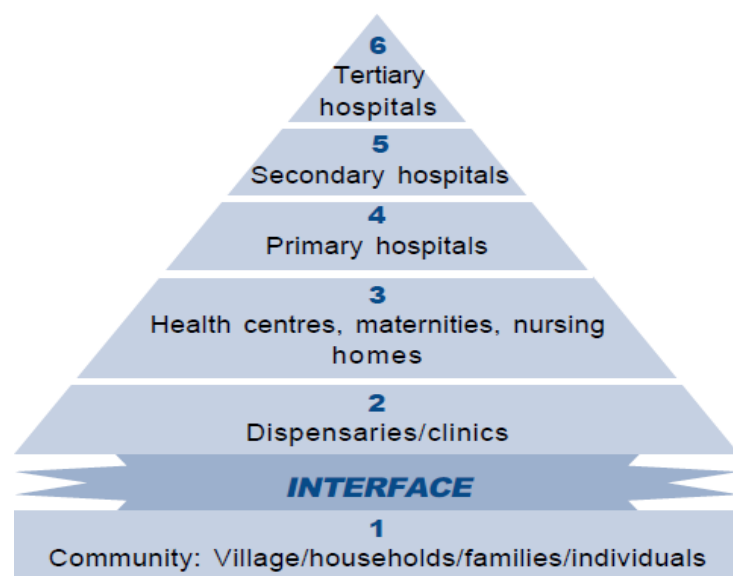
The KEPH Life-Cycle Cohorts

They are delineated in the NHSSP II as follows

- Cohort 1:-Pregnancy, delivery and the newborn child (up to 2 weeks of age)
- Cohort 2:- Early childhood (3 weeks to 5 years)
- Cohort 3:- Late childhood (6-12 years)
- Cohort 4:- Adolescence (13-24 years)
- Cohort 5:- Adulthood (25-59 years)
- Cohort 6:- Elderly (60 years and over)

Levels of Care in KEPH

The KEPH approach is not only limited to a definition of the target groups in terms of life-cycle cohorts. It also defines where the health services will be delivered. Under KEPH, promotive, preventive and curative services are provided at six levels of care. (See pyramid below)



The interface refers to the relation between the community aspirations and expectations at one Side and the objectives of the health services to attain greater coverage and community involvement and empowerment at the other side

The Annual Operational Plans (AOPs) translate Kenya Essential Package for Health and the National Health Sector Strategic Plan II 2005-2010 into ‘actionable’ operational plans.

AOPs also improve the planning process within the Ministry in particular highlighting the need for

- Improved coordination and decision-making
- Elimination of duplication of activities and
- More efficient use of available resources

The Community Strategy

The community-based approach, as set out in this strategy, *is the mechanism through which households and communities take an active role in health and health-related development issues.* Initiatives outlined in the approach target the major priority health and related problems affecting all cohorts of life at the community and household levels – level 1 of the KEPH-defined service delivery.

Vision 2030

Kenya Vision 2030 is the country’s new development blueprint covering the period 2008 to 2030. The vision is based on three “pillars” namely; the economic pillar, the social pillar and the political pillar. Health is part of the social pillar.

To improve the overall livelihoods of Kenyans, the country aims to provide an *efficient and high quality health care system with the best standards.* This is in order to reduce health inequalities and improve indicators in key areas where Kenya is lagging, especially in lowering infant and maternal mortality.

Specific strategies include: provision of a robust health infrastructure network; improving the quality of health service delivery to the highest standards and promotion of partnerships with the private sector.

In addition the Government has put in place health financing mechanisms to make quality MNH services affordable and accessible to all especially the poor and vulnerable women. These include the provision of free MNH /FP services at the lower levels, National Health Insurance Fund (NSSF), Health Sector Support Fund (HSSF), Hospital Management Support Fund (HMSF), FIF, Voucher system /Output Based Aid (OBA). The government is also encouraging initiatives that promote community based health financing.

The National Road Map for accelerating the attainment of MDGs related to Maternal and Newborn Health in Kenya. (2008-2015)

The MNH Road Map was developed by MNH partners and adopted by African union countries as a response to declining maternal and newborn indicators in Sub Saharan Africa. AU countries thereafter adapted and domesticated the generic Road Map. It is a health sector strategy for reducing maternal and perinatal morbidity and mortality by providing efficient and high quality MNH services that are accessible, equitable, acceptable, and affordable for all Kenyans.

The Kenya MNH Road Map’s key strategies include; improving availability of, access to, and utilisation of quality Maternal and Newborn health care; reducing unmet need through expanding access to good quality family planning options for men, women and sexually active adolescents; strengthening the referral system; advocating for increased commitment and resources for MNH and FP services; strengthening community based maternal and newborn health care approaches; strengthening the monitoring and evaluation system for MNH and operations research.

Emergency Obstetric Care

Emergency Obstetric Care refers to a set of minimal health care elements, which should be availed to all women during pregnancy and delivery. It includes both life saving and emergency measures e.g. Caesarean section, manual removal of placenta, etc, as well as non-emergency measures (e.g. use of the partograph to monitor labour, active management of the third stage of labour, etc.). Emergency Obstetric Care functions are generally categorized as **Basic Emergency Obstetric Care (BEmOC)** and **Comprehensive Emergency Obstetric care (CEmOC)**.

The signal functions to identify BEmOC and CEmOC are:

Basic Emergency Obstetric Care includes:

- 1 Administration of IV antibiotics.
- 2 Administration of magnesium sulphate.
- 3 Administration of parental oxytocics.
- 4 Performing manual removal of the placenta.
- 5 Performing removal of retained products.
- 6 Performing assisted vaginal delivery (e.g. by vacuum extraction).
- 7 Performing newborn resuscitation

Comprehensive Emergency Obstetric Care includes all the seven above, PLUS:

- 8 Performing surgery (Caesarean section), including provision of emergency obstetric anaesthesia.
- 9 Administration of blood transfusion.

CLIENT AND PROVIDERS RIGHTS

Program managers and service providers are under obligation to fulfil clients' Reproductive Health rights. The achievement of this goal is directly related to the availability, accessibility, acceptability and quality of reproductive health information and services.

Clients Rights include:

1. Right to Information
All members of the community have a right to information on the benefits of reproductive health including Maternal and Newborn health for themselves and their families. They also have a right to information on how to access the services.
2. Right to Access
All members of the community have a right to receive services from reproductive health / MNH programs, regardless of their socio-economic status, political affiliations, religious beliefs, ethnic origin, marital status or geographical location. Access includes freedom from barriers such as policies, standards and practices, which are not scientifically justifiable.
3. Right of choice
Individuals and couples have the right to decide freely where to obtain RH /MNH services.

4. Right to safety

Clients have a right to safety in the practice of MNH

5. Right to Privacy

Clients have a right to privacy while holding conversation with service providers and while undergoing physical examination.

6. Right to Confidentiality

The client should be assured that any information she/he provides or any details of the service received will not be communicated to other parties without her/his consent.

7. Right to Dignity

Reproductive Health /MNH clients have a right to be treated with courtesy, consideration, and attentiveness and with full respect of their dignity regardless of their level of education, social status or any other characteristics, which would single them out or make them vulnerable to abuse.

8. Right to Comfort

Clients have a right to comfort when receiving services. This can be ensured by providing quality services in hygienically safe and conveniently located service delivery sites.

9. Right to Continuity of Care

Clients have a right to receive services and reliable supply of RH /MNH commodities and drugs for as long as they need them.

10. Right of Opinion

Clients have a right to express their views freely on the services they receive.

PROVIDERS' RIGHTS

Outlined below are some needs of Providers, which if met will contribute to facilitating the provision of quality services that in turn address the rights of their clients.

1. Training

To continuously have access to the knowledge and skills needed to perform all the tasks required of them.

2. Information

To be kept informed on issues related to their duties

3. Infrastructure

To have appropriate physical facilities and organization to provide services at an acceptable level of quality.

4. Supplies
To receive continuous and reliable supplies and materials required for providing reproductive health services at acceptable standards of quality.
5. Guidance
To receive clear, relevant and objective guidance.
6. Back up
To be reassured that whatever the level of care at which they are working they will receive support from other individuals or units.
7. Respect
To receive recognition of their competence and potential, and respect for their human needs.
8. Encouragement
To be given stimulus in the development of their potential, initiative and creativity.
9. Feedback
To receive feedback concerning their competence and attitudes as judged by others.
10. Self-expression
To express their views freely, concerning the quality and efficiency of the reproductive health program.

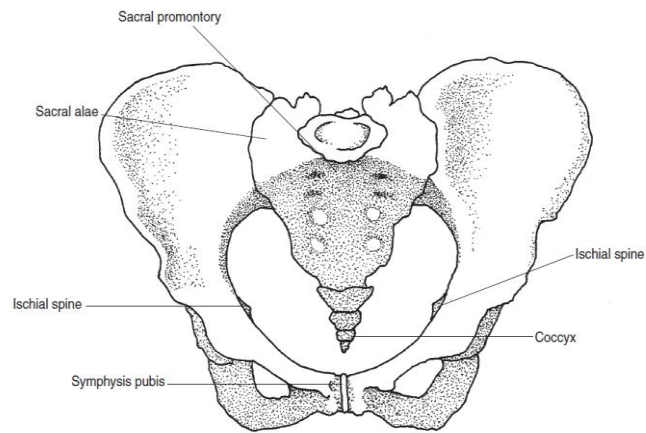
Unit 2:**FUNCTIONAL ANATOMY AND PHYSIOLOGY RELEVANT TO MATERNAL AND NEWBORN HEALTH****Pelvic inlet:**

Figure 1.1: Normal female pelvis

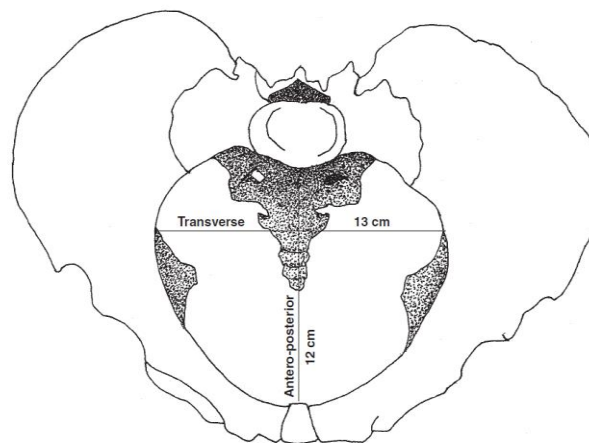
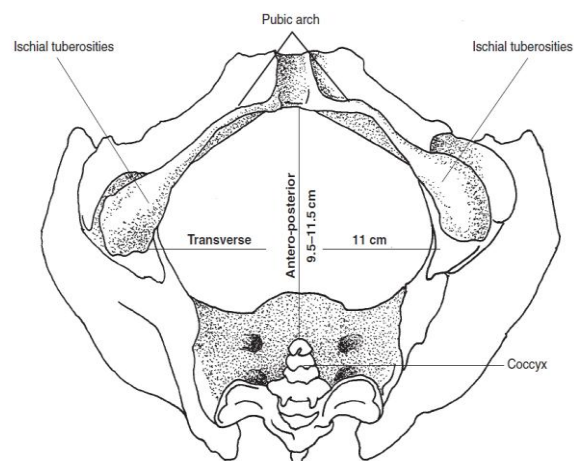


Figure 1.2: The pelvic inlet

Pelvic outlet

ANATOMY OF THE PELVIS

The Pelvic canal through which the foetus must pass during child birth consists of the brim, cavity and outlet

The Pelvic Brim (inlet)

The pelvic brim is bounded at the back by the promontory and the alae of the sacrum, and in front by the pubic bones. In the normal female pelvis, the brim is round except where the sacral promontory projects into it

The two most important diameters of the pelvic brim are:

- I. The anteroposterior (AP*) diameter from the upper border of the symphysis pubis to the sacral promontory. The normal AP diameter measures 11- 12 cm
- II. The transverse diameter is the widest part of the brim. It measures 13cm

The Pelvic cavity:

The pelvic cavity is a curved canal between the inlet and the outlet. In the normal female pelvis, the cavity is circular in shape and curves forwards. All diameters measure approximately 12 cm

The Pelvic Outlet:

The pelvic outlet is diamond shaped and is bounded anteriorly by the pubic arch which in the normal female pelvis forms an angle of 90° . Laterally the pelvic outlet is bounded by the ischial tuberosities. The smallest diameter is between the two ischial spines which project into the outlet. The posterior landmarks of the pelvis are the coccyx and the sacrotuberous ligaments. During birth however the coccyx bends backwards to increase the diameter of the pelvic outlet.

The most important diameters of the pelvic outlet are:

- I. The transverse diameter which is measured between the two ischial tuberosities and is normally 10.5 -11 cm
- II. The antero posterior diameter measured from the apex of the pubic arch to the sacrococcygeal joint and is normally approximately 13cm

PELVIC VARIETIES:

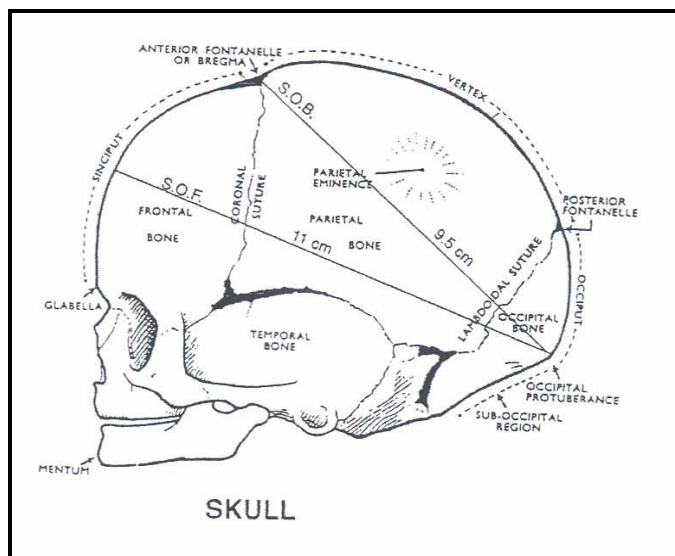
The classification of pelvic types which is commonly used (Caldwell and Moloy 1938) is based on the variations in the posterior and anterior segments. They include

1. Gynecoid Pelvis: refers to a normal female pelvis with rounded brim, spacious segment, non prominent ischial spines and wide inter spinous and intertuberous diameters
2. Android Pelvis: resembles the normal pelvis with wedge shaped inlet, narrow fore pelvis and short inter spinous and intertuberous diameters. It favours occipital posterior engagement of the head
3. Anthropoid Pelvis: It has a long narrow oval inlet, long narrow sacrum and a narrow sub pubic angle. It is usually seen in tall women. Head engagement is usually occipital posterior

Delivery in both android and anthropoid pelvis provides mechanical problems from the brim to the outlet because the sidewalls are parallel.

The pelvis grows gradually until late 20s. A young adolescent less than 20 years becoming pregnant will not acquire full development of the pelvis and is more liable to prolonged labour due to CPD.

Anatomy of the Foetal skull



Significance of the foetal skull

- It is the largest and hardest part of the foetus
- It has to pass through a bony birth canal
- If the midwife knows the landmarks of the foetal skull, he/she can detect abnormal presentation and positions
- Knowledge of the diameters of the foetal skull helps in the reduction of maternal and foetal mortality and morbidity rate since malpositions can be diagnosed and managed early

DIVISIONS

The foetal skull is made of the vault, face and base. The vault is the most significant in relation to labour because it undergoes changes; for example moulding involves this part of the skull. It is made up of five bones namely: 2 frontal bones, 2 parietal bones, and 1 occipital bone. The bones are separated by sutures, which are membranous spaces. These are the: frontal, sagittal, coronal and lambdoidal sutures. The places where these sutures meet are called fontanelles, the important ones being the anterior and posterior fontanelles. The position of the sutures and fontanelles in relation to the different areas of the pelvis indicate the position of the head during labour.

REGIONS OF THE SKULL

Significance

Knowledge of the regions of the foetal skull helps the midwife/ health worker to state precisely what area of the skull is presenting over the lower uterine pole during labour. Some presentations are associated with prolonged and obstructed labour.

There are four regions:

Vertex: This is the area of the skull bounded by the anterior fontanelle in front, the posterior fontanelle behind and the two parietal eminences on either side. It presents when the head is well flexed.

Sinciput or brow: This is the area from the orbital ridges to the coronal suture and the anterior fontanelle.

(At the centre of this area is the forehead). It presents when the head is deflexed, and leads to prolonged and obstructed labour.

Occiput: This is the area below the lambdoidal suture and posterior fontanelle. It is the first part of the head to be delivered in a vertex presentation i.e. it escapes under the pubic arch.

Face: This is the part of the skull from the orbital ridges to the chin or mentum. It presents when the head is extended.

IMPORTANT DIAMETERS OF THE FOETAL SKULL

Significance

Knowledge of the diameters of the skull guides the midwife/ health worker as to the favourable and unfavourable diameters the foetus may present during labour.

1. **Sub-occipito-bregmatic diameter:** Equals 9.5 cm. It follows a line drawn from the middle of the anterior fontanelle to the under surface of the occipital bone just where it joins the neck. It presents when there is full flexion resulting in vertex presentation
2. **Sub-occipito-frontal diameter:** Extends from under the occiput to the centre of the brow or sinciput. Measurement =10 cm. Presents when the head is almost fully flexed (e.g. occipito - posterior or occipito lateral positions).
3. **Occipital –frontal diameter:** Equals 11.5 cm. It follows a line extending from a point just above the root of the nose to the most prominent portion of the occipital bone. It presents when there is deficient flexion (deep transverse arrest)
4. **Mento -vertical diameter:** Equals 14cm. It extends from the point of the chin to the centre of the posterior fontanelle. It presents when there is partial extension (brow presentation)
5. **Sub mento-bregmatic diameter:** Equals 9.5cm. It is from below the chin to the centre of the anterior fontanelle. Presents when the head is fully extended (face presentation)

Relevance of the Foetal skull in Obstetrics

Antenatal Period:

- Pregnancy dating
- Monitoring Foetal wellbeing e.g. IUGR and congenital abnormalities (the foetal skull is a common site for congenital and acquired foetal abnormalities)
- Identification of multiple gestation
- Identification of malpresentation

Intrapartum Period

- Plays a critical role in the progress of labour (cervical dilatation and descent of head)
- It is an early indicator of possible CPD hence avoid obstructed labour
- Assists to identify malpresentations and malpositions
- Acts as a safer leverage for assisted vaginal deliveries (vacuum and forceps)

Moulding of the Foetal Head:

Under the pressure of strong uterine contractions, cranial bones (parietal and frontal) overlap one another at the major sutures. This process is referred to as moulding. Moulding describes the degree of apposition and overlap of the foetal skull bones

Classification of moulding

- 1st degree: Sutures apposed – No overlap
- 2nd degree: Sutures overlapped, but reducible
- 3rd degree: Sutures overlapped but not reducible

These changes are frequently accomplished without obvious detriment, however when the distortion is marked as in third degree moulding, it may lead to tentorial tear, laceration of foetal blood vessels and intracranial haemorrhage. This degree of moulding is a sign of severe obstruction.

CAPUT SUCCEDANUM (CAPUT)

Caput succedaneum is a diffuse swelling of the scalp in a newborn caused by pressure from the uterus or vaginal wall during a head-first (vertex) delivery. It is caused by the mechanical trauma of the initial portion of scalp pushing through a narrowed cervix. The swelling may be on any portion of the scalp, may cross the midline (as opposed to a cephalohematoma), and may be discoloured because of slight bleeding in the area. Moulding of the head is common in association with a caput succedaneum. Physical examination confirms that the swelling is a caput succedaneum. No testing is necessary. No treatment is necessary, and it usually heals spontaneously within a few days. Complete recovery can be expected, with the scalp regaining its normal contour. Possible Complications include Jaundice which is a result of the bruise breaking down into bilirubin.

Prevention

A caput succedaneum is more likely to form during a prolonged or difficult delivery. This is especially true after the membranes have ruptured, thus removing the protective cushion of the amniotic sac. Vacuum extraction can also increase the chances of a caput succedaneum.

However, a caput succedaneum is sometimes identified by prenatal ultrasound even before labour or delivery begins. It has been found as early as 31 weeks of gestation. More often than not, this is associated with either premature rupture of the membranes or too little amniotic fluid (oligohydramnios). All other things being equal, the longer the membranes are intact, the less likely a caput is to form.

Nevertheless, a caput succedaneum can form before or during birth even in the absence of any identifiable risk factor. Good prenatal care and management of labour and delivery can reduce the chances of this minor problem.

MATERNAL PHYSIOLOGICAL CHANGES DURING PREGNANCY

Pregnancy is associated with various physiological, biochemical, and anatomic changes that may be local or systemic. These alterations maintain a healthy environment for the foetus without compromising the mother's health; although, sometimes there may be some discomfort to the mother.

Gastrointestinal Tract

During pregnancy, nutritional requirements, including those for vitamins and minerals, are increased, and several maternal alterations occur to meet this demand. The mother's appetite usually increases, so that food intake is greater. Some women however have a reduced appetite or experience nausea and vomiting. These symptoms may be related to rising levels of human Chorionic Gonadotrophin (hCG) and this is normal.

Oral Cavity:

Salivation may seem to increase due to difficulty in swallowing associated with nausea. This is prevalent mainly in the first trimester and should reduce with time.

Tooth decay during pregnancy, is not due to lack of calcium in the teeth. Indeed, dental calcium is stable and not mobilized during pregnancy as is bone calcium. If the pH of the oral cavity increases, tooth decay may occur. Pregnant women are therefore encouraged to maintain good oral hygiene.

The gums may become hypertrophic hyperaemic and friable; this may be due to increased systemic oestrogen. Vitamin C deficiency can also cause tenderness and bleeding of the gums. The gums should return to normal in the early puerperium.

Gastrointestinal Motility

Gastrointestinal motility may be reduced during pregnancy due to increased levels of progesterone, which in turn decrease the production of motilin, a hormonal peptide that is known to stimulate smooth muscle in the gut. This leads to a feeling of bloatedness which is common among pregnant women. Transit time of food throughout the gastrointestinal tract may be so much slower that more water than normal is reabsorbed, leading to constipation.

Stomach and Oesophagus

Gastric production of hydrochloric acid may be increased leading to hyperacidity (heart burn). Oesophageal peristalsis is decreased, accompanied by gastric reflux because of the slower emptying time and dilatation or relaxation of the gastro-oesophageal sphincter. Gastric reflux is more prevalent in later pregnancy owing to elevation of the stomach by the enlarged uterus.

These alterations as well as lying in the supine position, make the use of anaesthesia more hazardous because of the increased possibility of regurgitation and aspiration.

Small and Large Bowel and Appendix

During pregnancy, the large and small bowels are displaced upward and laterally, the appendix is displaced superiorly in the right flank area. These organs return to the normal positions in the early puerperium. As noted previously, motility and gastrointestinal tone are decreased.

Gallbladder

Gallbladder function is also altered during pregnancy because of the hypotonia of the smooth muscle wall. Emptying time is slowed and often incomplete. Bile can become thick, and bile stasis may lead to gallstone formation.

Liver

There are no apparent morphologic changes in the liver during normal pregnancy, but there are functional alterations. Serum alkaline phosphatase activity can double, probably because of increased placental alkaline phosphatase isoenzymes. Thus, a decrease in the albumin/globulin ratio occurs normally in pregnancy. This needs to be taken into consideration when interpreting LFT results.

Kidneys and Urinary Tract**Renal Dilatation**

During pregnancy, each kidney increases in length by 1-1,5cm, with a concomitant increase in weight. The renal pelvis usually dilates. The ureters dilate, elongate, widen, and become more curved. Thus there is an increase in urinary stasis; this may lead to infection and may make tests of renal function difficult to interpret.

Renal Function

The glomerular filtration rate (GFR) increases during pregnancy by about 50% .The renal plasma flow rate increases by as much as 25-50%. Urinary flow and sodium excretion rates in late pregnancy can be altered by posture, being twice as great in the lateral recumbent position as in the supine position.

Even though the GFR increases dramatically during pregnancy, the volume of the urine passed each day does not increase. Consequently the serum urea and creatinine levels are reduced

The increase in GFR coupled with the impairment of tubular reabsorption capacity for filtered glucose leads to glycosuria. Increased levels of urinary glucose also contribute to increased susceptibility to urinary tract infection (UTI).

Normally there is little change in Proteinuria during pregnancy; and therefore if more than 500mg/24h is lost, a disease process should be suspected e.g. pre eclampsia/ eclampsia

Water Retention

Fluid retention, swelling or 'edema' affects about 65% of healthy pregnant women with a normal blood pressure. While it can occur at any time in the pregnancy, it more commonly happens in the last 3 months of the pregnancy. This is because by about 32 weeks, the blood circulating in the woman's body has increased by up to 50%. It typically involves the lower extremities but occasionally appears as swelling or puffiness in the face or hands.

- **Etiology**

The most common cause of edema in pregnancy is Physiologic edema. This is due to an increase in the total amount of body fluid and a lower concentration of protein to keep the fluid in the blood vessels. It may also result from hormone-induced sodium retention. Pedal edema may also occur when the enlarged uterus intermittently compresses the inferior vena cava during recumbency, obstructing outflow from both femoral veins.

Pathologic causes of edema are less common but often dangerous. They include deep venous thrombosis (DVT), preeclampsia, renal disease and cardiac disease in pregnancy. Extensive, cellulitis, which usually causes focal erythema, may resemble general edema

Physiological oedema is a diagnosis of exclusion. (Physical examination aims to rule out the pathologic causes). Physiologic oedema tends to worsen during the day especially when the patient is ambulant. It is

reduced by lying in the left lateral decubitus position, elevating the lower extremities, and using compression stockings. Pathological oedema on the other hand, usually persists, even after elevating the feet.

Bladder

As the uterus enlarges; the urinary bladder is displaced upward and is flattened in the anterior-posterior diameter. Bladder vascularity increases and muscle tone decreases, thereby increasing its capacity up to 1500ml. Pressure from the uterus leads to increased in urinary frequency. This effect increases as pregnancy advances.

Hematologic System

Blood Volume`

The blood volume increases progressively until term by about 45-50% and is higher in multiple pregnancies. This increase is needed for extra blood flow to the uterus, extra metabolic needs of foetus and increased perfusion of other organs, especially kidneys. The increased volume also compensates for maternal blood loss during delivery.

Red Blood Cells

The red blood cell mass increases by about 33%, however the plasma volume increases earlier and faster than red blood cell volume. This leads to physiologic anaemia in pregnancy. The hematocrit (PCV) then stabilizes or may increase slightly near term.

Iron

With the increase in red blood cells, the need for iron for the production of haemoglobin naturally increases. If supplemental iron is not added to the diet, iron deficiency anaemia will result. Maternal requirements can reach 5-6mg/d in the latter half of pregnancy. If iron is not readily available, the foetus uses iron from maternal stores. Thus, the production of foetal haemoglobin is usually adequate even if the mother is severely iron deficient; and therefore anaemia in the newborn is rarely a problem. Instead, maternal iron deficiency more commonly may cause preterm labour and late spontaneous abortion, increasing the incidence of foetal wastage and maternal morbidity.

White Blood Cells

The total blood leukocyte count increases during pregnancy from a pre-pregnancy level of 4300-4500/ml to 5000-12000/ml in the last trimester. The polymorphonuclear leucocytes are the main contributors to this increase. Lymphocyte and monocyte numbers stay essentially the same throughout pregnancy. This should be taken into account when interpreting results of WBC counts in pregnancy.

Clotting Factors

During pregnancy, levels of several essential coagulation factors increase. There are marked increases in fibrinogen and factor VIII. Factors VII, IX, X, and XII also increased but to a lesser extent.

Fibrinolytic activity is depressed during pregnancy and labour, although the precise mechanism is unknown. Plasminogen levels increase concomitantly with fibrinogens levels, causing equilibrium of clotting and lysing activity.

Understanding these physiologic changes is necessary to manage two of the more serious problems of pregnancy – (that is haemorrhage and thromboembolic disease both caused by disorders in the mechanism of haemostasis).

Cardiovascular System

Position and Size of Heart

As the uterus enlarges and the diaphragm becomes elevated the heart is displaced upward and somewhat to the left with rotation on its long axis, so that the apex beat is moved laterally. Cardiac capacity increases by 70-80mL; this may be due to increased volume or hypertrophy of cardiac muscle. The size of the heart appears to increase by about 12%

Cardiac Output

Cardiac output increases approximately 40% during pregnancy, reaching its maximum at 20-24 weeks gestation and continuing at this level until term. The increase in output can be as much as 1.5L/min over the non pregnant level and is higher in multiple pregnancy. Cardiac output is very sensitive to changes in body position. This sensitivity increases with advancing gestation. In a pregnant woman lying flat on her back, the uterus impinges upon the inferior vena cava, thereby decreasing venous return to the heart leading to supine hypotension syndrome. Clients in advanced pregnancy are therefore discouraged from lying in this position.

Blood Pressure

Systemic blood pressure declines slightly during pregnancy. There is a little change in systolic blood pressure, but diastolic pressure is reduced (5-10mmHg) from about 12-26 weeks. Diastolic pressure increases thereafter to pre-pregnancy levels by about 36 weeks. (It is important to know the pre-pregnancy diastolic BP in order to accurately diagnose hypertensive disease in pregnancy). The elevated venous pressure returns toward normal if the woman lies in the lateral recumbent position.

The obstruction posed by the uterus on the inferior vena cava and the pressure of the foetal presenting part on the common iliac vein can result in decreased venous return to the heart. This decreases cardiac output, leads to a fall in blood pressure, and contributes to oedema in the lower limbs

Peripheral Resistance

$$\text{Peripheral resistance} = \frac{\text{blood pressure}}{\text{Cardiac output.}}$$

Peripheral resistance declines because of decreased blood pressure and increased cardiac output.

Effects of the Labour on the Cardiovascular System

When a patient is in supine position, uterine contractions can cause a 25% increase in maternal cardiac output, a 15% decrease in heart rate, and a resultant 33% increase in stroke volume. However when the labouring patient is in the lateral recumbent position, the hemodynamic parameters stabilize, with only a 7.6% increase in cardiac output, a 0.7% decrease in heart rate, and a 7.7% increase in stroke volume. These significant differences are attributable to inferior vena cava occlusion caused by the gravid uterus. During contractions, pulse pressure increases 26% in the supine position but only 6% in the lateral recumbent

position. Central venous pressure increases in direct relationship to the intensity of uterine contraction and increased intra abdominal pressure. Additionally, cardiopulmonary blood volume increases 300-500mL during contractions. At the time of delivery, hemodynamic alterations vary with the anaesthetic used.

Pulmonary System

Anatomic and Physiologic Changes

Pregnancy produces anatomic and physiologic changes that affect respiratory performance. Early in pregnancy, capillary dilatation occurs throughout the respiratory tract, leading to engorgement of the nasopharynx, larynx, trachea and bronchi. This causes the voice to change and makes breathing through the nose difficult. Respiratory infections and preeclampsia aggravate these symptoms. Chest X-rays reveal increased vascular markings in the lungs.

As the uterus enlarges, the diaphragm is elevated as much as 4cm, and the rib cage is displaced upward and widens, increasing the lower thoracic diameter by 2cm and the thoracic circumference by up to 6cm. Elevation of the diaphragm does not impede its movement. Abdominal muscles have less tone and are less active during the pregnancy, causing respiration to be mainly diaphragmatic.

Lung Volumes and Capacities

Alterations occurring in lung volumes and capacities during pregnancy include the following: Dead volume increases owing to relaxation of the musculature of conducting airways. Tidal volume increases gradually (35-50%) as pregnancy progresses. Total lung capacity is reduced (4-5%) by the elevation of the diaphragm. Functional residual capacity, residual volume, and respiratory reserve volume all decrease by about 20%. Larger tidal volume and smaller residual volume cause increased alveolar ventilation (about 65%) during pregnancy. Inspiratory capacity increases by 5-10%.

Functional respiratory changes include a slight increase in respiratory rate, a 50% increase in minute ventilation, a 40% increase in tidal volume, and a progressive increase in oxygen consumption of up to 15-20% above non pregnant levels by term. With the increase in respiratory tidal volume associated with a normal respiratory rate, there is an increase in respiratory minute volume of approximately 26%. As the respiratory minute volume increases, “**hyperventilation of pregnancy**” occurs, causing a decrease in alveolar CO₂. This decrease lowers the maternal blood CO₂ tension; however alveolar oxygen tension is maintained within normal limits. Maternal hyperventilation is considered a protective measure that prevents the foetus from the exposure to excessive levels of CO₂.

Effects of Labour on the Pulmonary System

There is a further decrease in functional residual capacity (FRC) during the early phase of each uterine contraction, resulting from redistribution of blood from the uterus to the central venous pool. Because this decrease in FRC occurs without a concomitant change in dead space, there is little residual dilution and, therefore, presumably more efficient gas exchange.

Metabolism

As the foetus and placenta grow and place increasing demands on the mother, phenomenal alterations in metabolism occur. The most obvious physical changes are weight gain and altered body shape. Weight

gain is due not only to the uterus and its contents but also to increase breast tissue, blood and water volume in the form of extra vascular and extracellular fluid. Deposition of fat and protein and increased cellular water are added to the maternal stores. The average weight gain during pregnancy is 12.5Kg.

During normal pregnancy, approximately 1000g of weight gain is attributable to protein. Half of this is found in the foetus and the placenta, with the rest being distributed as uterine contractile protein, breast glandular tissue, plasma protein, and haemoglobin.

Total body fat increases during pregnancy, but the amount varies with total weight gain. During the second half of pregnancy, plasma lipids increase, but triglycerides, cholesterol and lipoproteins decrease soon after delivery. The ratio of low density lipoproteins to high density lipoproteins increases during pregnancy.

Reference

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UNIT 3: MATERNAL NUTRITION**CONTENT OUTLINE**

1. Introduction
2. Situation Analysis
3. Nutrition in Pre-conceptual period
4. Nutrition in Pregnancy
 - Nutritional Recommendations
 - Micronutrients in pregnancy
 - Consequences of malnutrition in pregnancy
5. Feeding during labour and delivery
6. Nutrition in Postpartum period
7. Essential Nutrition Actions
8. Nutrition care in pregnancy related complications and in special cases

1. INTRODUCTION

Maternal nutrition is critical to both mother and child. It lays the fundamental foundation for the successful outcome of pregnancy. Interventions to improve mothers' nutritional status should start long before pregnancy. Poor nutritional status before and during pregnancy has been associated with intrauterine growth retardation (IUGR), low birth weight (LBW) and premature delivery. Anaemic women are more likely to deliver low birth weight infants. Low folic acid levels are associated with an increased risk of low birth weight and birth defects. Vitamin A deficiency in pregnant women has been associated with an increased risk of stillbirth and low birth weight.

Maternal nutrition is critical in lactation performance. Health practitioners/educators can positively influence attitudes toward breastfeeding during the prenatal period. The need for health practitioners to promote, protect and support breastfeeding as the healthiest choice for both infant and mother is well recognized and should be a point of focus in the prenatal and postnatal care.

2. SITUATION ANALYSIS

- The average Body Mass Index (BMI) of Kenyan women (15-49 years) is 23. 3.8% of women are moderately and severely thin with BMI <17 and 25% are overweight or obese with BMI of >25(KDHS, 2008-09)
- 46% of women received Vitamin A postpartum(KDHS, 2008-09)
- 42% of women are anaemic with a prevalence of 55% among pregnant women (Mwaniki et al., 1999)
- 60% of pregnant women were reported to be taking iron supplements(KDHS, 2008-09)
- Exclusive breastfeeding rates have improved from 2.7% to 32 % (KDHS, 2003,2008-09)
- Prevalence of Vitamin A Deficiency (VAD) is high among pregnant women, being between 8 % and 24 %(GOK,1999)
- 98% of women who had a birth 5years before the survey live in households with adequately iodized salt(KDHS, 2008-09)

3. NUTRITION IN THE PRE–CONCEPTION PERIOD

Pre-pregnancy nutrition is as important as nutrition during pregnancy. It influences a woman's ability to conceive, determines the foetal growth and development and as such the size of the foetus and its overall health as well as the health of the mother. A woman's body provides the environment for conception and development of the foetus; therefore her nutrition influences the health of that environment. Many women however often do not suspect they are pregnant during the first few weeks after conception. Malnutrition prior and around pregnancy makes the placenta fail to develop fully and therefore it cannot optimally nourish the foetus. A well nourished woman before conception begins her pregnancy with a reserve of several nutrients so that the needs of the foetus can be met without jeopardizing her health. Underweight and overweight women experience more complications during pregnancy than normal women.

Underweight women risk delivering preterm and low birth weight infants. Obese women have an increased risk of complications such as hypertension, gestational diabetes and higher risk of caesarean sections since they tend to deliver larger birth weight babies. Low birth weight (LBW) is a major underlying cause of infant mortality and other developmental and learning disorders in children. Full term infants weighing less than 2500 grams are referred to as small for gestational age (SGA) and this is due to intrauterine growth retardation (IUGR). Deficiencies of some nutrients such as calcium, iron, vitamin D and folic acid as well as the use of certain drugs and alcohol have detrimental effects embryonic growth even before a woman realizes she is pregnant.

Pre-pregnancy BMI influences gestational weight gain and favourable pregnancy outcome. It is recommended that more emphasis be placed on preconception and early pregnancy nutrition due to the following reasons:

- In Kenya, 17-18% of all births are to women under the age of 20 years. This is a time of rapid physical growth with nutritional requirements increasing significantly to support growth and development. The additional energy and nutrient demands of pregnancy place adolescents at nutritional risk.
- Prevention of stunting in girl children during the first two years can help break the cycle of malnutrition and improves their chances of surviving the delivery. Stunted women are at risk of obstructed labour because of the disproportion between the size of the baby's head and the maternal pelvis.
- Approximately 50% of cases of neural tube defects may be prevented with adequate intakes of folic acid from the pre-conception period and throughout the early months of pregnancy.
- Birth weight is closely associated with child survival, well-being, and growth. Nutrient stores built up in adolescence determine the nutrition of the mother when she enters pregnancy during and between pregnancies. This in turn impacts on birth weight and child survival
- Efforts to improve eating patterns and achieve healthy weights can be implemented, in part, through school-based nutrition programs and integration of nutrition and health promotion counselling into primary health care services.

4. NUTRITION IN PREGNANCY

Pregnancy is a critical period in the life cycle due to the many body changes in both the mother and the foetus. Optimal maternal nutrition is critical for foetal growth and for a successful delivery. Dietary counselling and supporting interventions through Focused Antenatal Care (FANC) are an essential package for improving nutrition during pregnancy. Poor nutritional status during pregnancy on the other hand has been associated with IUGR, LBW, premature delivery, birth defects and stillbirths. This is worsened by dietary practices that increase nutritional risk at the time of pregnancy e.g. change from the traditional diet (high fibre low fat) to highly refined foods, adherence to a vegetarian diet and rigid dieting /eating disorders such as anorexia and bulimia.

Pregnancy demands additional nutrients due to the physiological changes that occur. Weight gain is one of the obvious changes that occur during pregnancy. Adequate weight gain is essential for foetal growth and desired weight gain is based upon pre-pregnancy weight using BMI criteria and pre-conceptual nutritional status of the woman. Maternal weight should be routinely monitored throughout pregnancy and the baseline measurement should be taken if possible. Women may lose weight especially in the first trimester due to nausea and vomiting. Underweight women are advised to gain more weight during pregnancy to avoid giving birth to pre-term and low birth weight babies while overweight women are advised to limit weight gain during pregnancy. The following table shows the expected weight gain based on pre-pregnancy body mass index.

Recommended weight gain during pregnancy

BMI Index (BMI pre-conception)	Appropriate weight to gain
Underweight(BMI<18.5)	12.5-18 kg
Normal weight (BMI 18.5-24.9)	12-15 kg
Overweight (BMI 25-29.9)	7-11.5 kg
Obese (BMI >30)	6 kg
Twin pregnancy	16.0-20.5
Adolescent pregnancy	Upper end of recommended values

Source: WHO (1998)

Both total weight gain and patterns of weight are important indicators of pregnancy outcomes. Weight in pregnancy should be gained gradually. Excessive weight gain is gaining more than one kilogram of body weight in a week (>1kg/week) while inadequate gain is gaining less than one kilogram of body weight in a month (<1kg/month) especially in the third trimester.

NB. Weight gain alone should not be used as the basis of estimating the nutritional risk but should be combined with other indicators like dietary intake, medical history and biochemical profile.

4.1 GENERAL NUTRITION REQUIREMENTS IN PREGNANCY

Indicators of good nutritional status during pregnancy include:

- Weight gain: between 11.5–16 kg for the duration of pregnancy
- Haemoglobin level $\geq 11\text{g/dl}$
- Absence of clinical signs of micronutrient deficiencies

ENERGY AND PROTEIN REQUIREMENTS IN PREGNANCY

During pregnancy the needs for energy and protein are increased in order to meet the demands for adequate maternal gestational weight gain, as well as the growth and development of the foetus. Energy is needed to meet the increased basal metabolism and there is normal accumulation of fat as the energy reserves.

Maternal stores of nitrogen are increased in pregnancy hence increased need for protein especially for women with low BMI < 18.5. A 10% increase of protein equivalent to 60 gm /day is required for: Tissue growth; nitrogen balance; growth of foetus; enlarged mammary glands, uterus and placenta; increased circulating blood volume and plasma proteins; formation of amniotic fluid; reserves for labour, delivery and lactation.

Rich dietary sources of proteins include milk, eggs, soy beans, meat - which provide High Biological Value (HBV) protein. Vegetable proteins except soy bean provide low biological value proteins. A proper dietary balance is necessary to ensure sufficient intake for adequate growth without drawing from the mother's own tissues to maintain her pregnancy.

Energy and protein requirements in pregnancy

Pregnancy	Healthy pregnant and lactating women		
		Energy requirements	Protein requirements
	Total nutrient requirements	36-40kcal/kg/day	0.8-1.0g/kg/d
	First trimester	+150kcal/day	+0.7g/day
	Second trimester	+300kcal/day	+3.3g/day
	3 rd trimester	+300kcal/day	6g/day
Adolescent in pregnancy		40-43 kcal/kg/d	1.5g/kg/day add extra as per the trimester
Lactation	First 6mths then decrease gradually	+500kcal/day	+17.5g/day for the first 6mths of lactation +13g/day for next six months and 11g/day thereafter
	*Underweight women	+650kcal/day	+21g/day

(*This includes women whose weight gain during pregnancy was lower than expected weight gain for BMI)

Frequency of Meals

- Pregnant women should increase their nutrient intake by taking an extra meal in addition to the 3 regular meals.
- It is recommended that pregnant women have snacks between meals to meet their daily energy requirement. The table below shows a list of available snacks that can be used by the pregnant women.

List of locally available Snacks (300kcal) including fruits for Pregnant Women

(1 Cup = 200ml)

SNACKS	FRUITS
Chapati with oil (1)	Orange (1 medium size),
Mandazi (2)	Guava (2 medium size),
Sweet potato (1)	Mango (1 small or ½ of a medium size),
Scone/bun (2)	Papaya (1/5 of a medium size),
Bread (3 slices)	Banana (1 big size or 3 small)
Ugali (1cup)	Water melon 2 small slices
Potatoes(small) (3 pieces)	Berries 1 cup
Porridge thick(2 cups)	
Arrow roots (2) medium size	
Roasted Groundnuts -1 packet	
Roasted simsim	
Milk(Fresh/Fermented) 2 cups	

4.2 MICRONUTRIENT REQUIREMENTS FOR PREGNANT AND LACTATING MOTHERS

During pregnancy there is an increased need for micronutrient requirements. All major and trace minerals and vitamins have a role in maternal health. The pregnant and lactating mothers needs extra folic acid and vitamin B₁₂ due to the great increase in blood volume /cells and the rapid growth of the foetus. Iron demands increase as the body conserves more than usual during pregnancy and the growing foetus draws on maternal iron stores. Minerals involved in building the skeleton- calcium, magnesium and phosphorus are also in great demand. A normal adult woman would require 800mg calcium, 280mg magnesium and 800mg of phosphorus whereas in pregnancy the needs are higher.

Micronutrients are required by the body for production of enzymes & hormones; formation of brain cells; regulation of physical growth & development; regulation of the immune system and reproductive system; and for strengthening of the muscular and the nervous system.

The following micronutrients play a critical role in pregnancy.

4.2.1 IRON

Iron helps in the formation of blood. It is essential for many enzymes that are required for metabolism of glucose and fatty acids. It plays a vital role in body's immune system as well as in the synthesis of hormones and neurotransmitters. Women of reproductive age and infants have the highest need for iron. Extra iron is needed for haemoglobin synthesis during pregnancy. The RDA doubles to 30mg/day, especially in the 2nd and 3rd trimesters. Inadequate iron is the commonest cause of anaemia.

Consequences of Iron Deficiency Anaemia

- Anaemic women are more likely to die from blood loss during delivery and in the post partum period
- Obstetric haemorrhage is the leading cause of maternal death in developing countries, accounting for approximately 34% of all maternal deaths
- Severe anaemia can lead to heart failure or circulatory shock at the time of labour, delivery and postpartum
- Anaemic women are also more susceptible to puerperal infection

Risk factors to iron deficiency anaemia include:

- Inadequate consumption, or low intake of heme iron
- High consumption of staples with low bio available iron
- Inadequate intake of foods that enhance iron absorption from diet, such as Vitamin C
- Consumption of foods high in phytate or phenolic compounds that inhibit iron absorption (legumes, cereals, coffee, tea, sorghum and millet)
- Parasitic infestation such as hookworms, ascaris and schistosomiasis
- Malaria in pregnancy
- Chronic infections such as TB and HIV
- Heavy blood loss prior to or during pregnancy
- High consumption of cow's milk. (Cow's milk contains high amounts of calcium which inhibit the absorption of iron).
- Restricted food intake

Symptoms of iron deficiency anaemia include:

- Dizziness
- Irritability
- Shortness of breath
- Decreased appetite (especially in children),
- headache - frontal
- Hypothermia
- Lack of energy or tiring easily (fatigue)
- Increased heart rate (tachycardia)
- Abnormal pallor or lack of skin colour
- Sore or swollen tongue
- Brittle nails
- Enlarged spleen

Dietary Management

- Health/Nutrition education and information.
- Encourage consumption of foods rich in iron, folic acid, proteins and other nutrients needed for blood production.
 - Animal sources – Red meat, Liver, Kidneys, fish, poultry, eggs
 - Plant source – legumes (cow peas, kidney beans, Soya beans) fortified cereals, dark green leafy vegetables such as black night shade (managu), amaranth (Terere), spinach, stinging nettle (Thabai) and kales (sukuma wiki). *Note that Iron from plant sources is not readily bio available as they contain phytates, oxalates and malic acid which inhibit iron absorption.*
- Provide foods rich in Vitamin B₁₂, Folic acid, Vitamin E and C
- Reduce intake of beverages that contain phenolic compounds and tannin such as tea leaves, wheat bran
- Discourage drinking of tea or coffee with meals

Factors that influence iron availability:

- **Inhibitors:**
 - The practice of taking tea, coffee, chocolates with or immediately after food. They have polyphenols such as tannins that bind iron.
 - It is recommended not to take beverages with or soon after eating.
 - Legumes also have tannins and hence their use in composite flours is discouraged.
 - Vegetables have oxalates which too act as inhibitors while cereals have phytates.
- **Enhancers:**
 - Mixing of foods with Vitamin C rich foods (oranges, lemon, tangerines, Guavas, pineapples, Berries).
 - Serving of heme and non heme source of iron at the same time.
 - Fermentation, sprouting/germinating, malting of cereals enhances availability of iron and should be encouraged.
 - Cooking methods: Soaking before cooking of cereals and legumes reduces the phytic effect.
 - Cooking eggs softly avails more iron for use.

Points to cover during counselling session to improve adherence to iron supplementation:

Iron is normally obtained through food in the diet or as supplementation. The ANC counselling should include:

- The importance of taking iron tablets in pregnancy.
- Taking iron tablets from first month or first contact
- When to take iron tablets.
- How to take iron tablets.
- Recommended drinks to take with iron tablets.
- Foods and drinks to avoid while taking iron tablets.
- Side effects of iron tablets such as nausea and vomiting.
- Management of the side effects of iron tablets.
- Client's concerns of the perceived negative effects of the tablets.
- How to store iron tablets.
- Where to return for more tablets.

Prevention of Iron Deficiency:

The following public health interventions have been shown to increase availability of iron and prevent iron deficiency during pregnancy and in the postpartum period:

- Dietary improvement through consumption of iron rich foods
- Exclusive breast feeding
- Fortification of foods
- Supplementation of vulnerable groups
- Intestinal worm control
- Malaria and other disease control
- Use of Family planning

4.2.2 ZINC

Zinc is the essential trace mineral occurring in the body in larger amounts than any other trace element because it is present in all tissues. Zinc promotes normal growth and development. It is a major component in body enzymes, hormones, genetic material proteins. It promotes wound healing and maintains an effective immune system. It is essential for sperm production and the development of sex organs.

Zinc requirements are highest in the third trimester when the foetus acquires two-thirds of its zinc stores. The RDA for zinc is 15gm/day for pregnant women, 25% higher than for non pregnant women. Inadequate zinc status in pregnancy increases the risk of delivering low birth weight infants.

Diets that are very high in calcium, fibre or phytates may decrease zinc absorption. Routine iron and folate supplementation may also impair zinc absorption. Therefore, good dietary sources of zinc as well as dietary habits should be reinforced.

Food sources:

- Organs (Offal, liver, Kidneys), red meat (Beef, lamb) white meat (fish and chicken)
- Eggs and dairy products
- Nuts and seeds e.g. pumpkin seeds, water melon seeds, simsim seeds

- Legumes and cereals (although their phytate levels reduce the amount of Zinc available for absorption).
- Note that fermentation and germination /sprouting increases the bioavailability of Zinc.

Health and economic impact of Zinc Deficiency

Zinc deficiency increases the risk of the following conditions /complications:

- Pre-eclampsia,
- Anaemia,
- Miscarriage,
- Preterm labour and delivery
- Foetal growth restriction,
- Early rupture of the membranes,
- Perinatal morbidity and Neonatal death.

4.2.3 IODINE

Iodine is essential for the functioning of the thyroid gland and for normal mental and physical development. The body needs iodine to prevent goitre, cretinism and low intelligence.

Pregnant women and young children have special needs for iodine. Iodine deficiency is the main cause of preventable brain damage globally. Iodine deficiency also causes cretinism, congenital anomalies, stillbirths and abortions. It also contributes to increased prenatal mortality and infant mortality.

The RDA for a pregnant woman is 175mg/day and this covers for the extra demands of the foetus. Use of iodized salt is highly recommended.

Health and economic impact of Iodine Deficiency Disorders

- Increased risk of spontaneous abortions, stillbirths and impaired foetal brain development
- Goitre and cretinism
- Reduced mental capacity and productivity.

Causes of iodine deficiency:

- Consumption of diets low in Iodine
- Low consumption of iodine fortified foods such as iodized salt
- Anti-nutrient factors such as goitrogens that bind iodine
- Poor storage of iodized salts

Food sources: Iodized salt, sea/marine fish (shellfish and sardine), lobsters, oysters and crabs, seaweed and plants growing in iodine rich soils.

Preventive Measures

- Promote use of iodized salt

4.2.4 Vitamin A

Vitamin A is an essential nutrient which is required in small amounts for epithelial cell integrity, effective immune system function and normal functioning of the visual system. It is also necessary for maintenance of cell function and for growth and reproduction.

Improving Vitamin A status among pregnant women dramatically reduces maternal mortality, foetal growth retardation and is necessary for embryo development and spermatogenesis.

Health and economic impact of vitamin A deficiency

Vitamin A Deficiency:

- is associated with an increased risk of night blindness, which causes corneal scarring and in severe cases blindness and death
- Increases vulnerability to infections and leads to increased risk of maternal mortality and miscarriage
- Impairs immune system thereby increases risk of infections
- Results in Low Birth Weight and Vitamin A deficient infants
- Is associated with inadequate pregnancy weight gain
- Results in low Vitamin A concentration in Breast Milk

Food sources:

- Animal sources (liver, eggs)
- Plant source- Dark green leafy vegetables (Amaranth, spinach, kales, Black night shade, comfrey); yellow/orange fruits (Mango, passion, pawpaw, oranges); avocado; orange-fleshed vegetables (sweet potatoes, pumpkin, carrot, tomatoes, and sweet pepper)
- Fortified foods (fats and oils, margarines)
- Absorption of provitamin A may be low in diets low in fat.

The table below shows a supplementation schedule for some micronutrients.

Micronutrient supplementation for pregnant and lactating mothers

Micronutrient	Target group	Dosage	Frequency	Timing and schedule
	Pregnant	-	-	-
Vitamin A	Lactating	200,000IU	Single dose	At delivery (should be given within 4 weeks of delivery)
Folic acid	Pregnant lactating	400 µg or 0.4mg	Daily throughout pregnancy	From first month of pregnancy or on 1 st contact
Iron	Pregnant	60mg	Daily throughout pregnancy (critical for the first 90 days of pregnancy)	From first month of pregnancy or on 1 st contact
	Adolescent and adults including pregnant women with anaemia	120mg	Daily	3 months

4.2.5. CALCIUM

Calcium is needed during pregnancy to promote adequate mineralization of the maternal skeleton & teeth; for normal blood clotting mechanism; normal muscle action and rapid foetal mineralization of skeletal tissue especially in the 2nd and 3rd trimester.

The RDA for pregnant women is 1200mg/day. During pregnancy, approximately 25-30 g of calcium is transferred to the foetus. Most of this is acquired during the third trimester, when calcium is deposited into the foetal skeleton at a rate of about 330 mg per day.

Deficiency of Calcium may lead to the mother suffering from osteoporosis and osteomalacia. In infants Calcium deficiency may lead to reduced birth weight and neonatal hypocalcaemia.

To meet the recommended calcium requirements in pregnancy, women should be counselled to:

- Consume small amounts of milk with snacks.
- Drink fermented milk.

Dietary sources of calcium include:

- Milk, yogurt and cheese and sardines (small fish eaten with bones).
- Whole enriched cereal grains and green leafy vegetables.

4.2.6 Folic Acid

The body needs folic acid for the production, repair, and functioning of DNA - our genetic map and a basic building block of cells. Folic acid is particularly important for the rapid cell growth that occurs during pregnancy.

Its deficiency is associated with an increased risk of neural tube birth defects. These birth defects occur early in gestation, before pregnancy is apparent.

Women of childbearing age should consume a diet rich in folic acid daily.

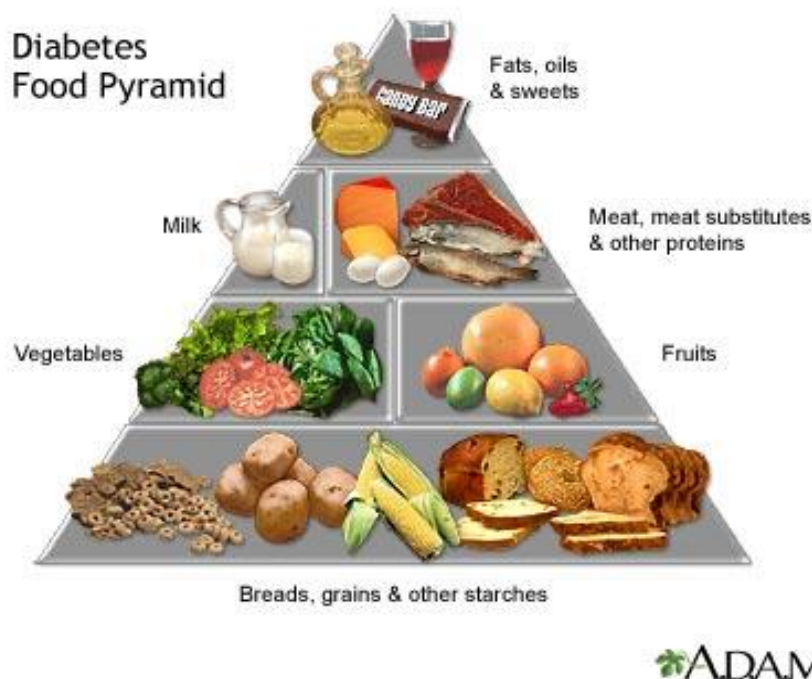
Food sources:

Folate is present in a variety of foods such as green leafy vegetables, liver, fruits and pulses. The richest sources are spinach, kidney beans, groundnuts, kidney and liver.

Some general nutrition recommendations for pregnant women

- Weight gain: 12–16 kg throughout the course of pregnancy
- Daily additional energy intake: 300kcal/day
- Diversified diet, to ensure variety in the food choices using the locally available foods(see Food pyramid below)
- Iron and folic acid supplementation: 60mg of iron and 400 µg folic acid every day
- Daily consumption of iodized salt
- Prevention and treatment of malaria
- De-worming (Mebendazole given during 2nd trimester)
- Adequate rest

The food guide Pyramid adapted from the A.D.A.M diabetes food pyramid below



Ante Natal Nutrition Counselling

The following should be done during the ANC visits:

- Assess the nutritional status of all pregnant women
- Treat, educate and provide nutrition counselling
- Encourage male /family involvement
- Discuss benefits of exclusive breastfeeding for six months and continued breastfeeding for two years and beyond, to the baby and to the mother
- Provide additional counselling for the partner/spouse and other family members if possible on:
 - Breastfeeding to ensure a social support system for the mother once she delivers
 - Reduced workload to reduce physiological stress on the woman
- Identify a support system to follow up pregnant women through delivery into the first weeks of the post partum period
- Carry out follow up sessions.

ANC providers should follow the **Guidelines in the Baby Friendly Hospital Initiative** (i.e. Ten steps to successful breastfeeding) and the **National Policy on Infant and Young Child Feeding** which includes HIV and Infant Feeding guidelines.

a) Nutritional Assessment

Physical Assessment

- Anthropometric measurements:
 - Weight gain during pregnancy during every antenatal visit.
 - Mid-upper-arm circumference (MUAC) can be measured of pregnant and lactating women. MUAC of less than 23cm indicates nutritional risk.

Dietary Assessment

- Eating patterns: foods regularly consumed, frequency of meals
- Foods available and affordable
- Food intolerance and aversions
- Dietary problems
- Hygiene in food preparation and handling practices.
- Psychosocial factors contributing to inadequacy of intake, such as social isolation, depression, stigma.
- Fatigue and physical activity.
- Use of vitamin and mineral supplements and alternative practices.

b) Medical History

- Gastro intestinal problems (e.g., diarrhoea, abdominal pain, nausea, vomiting)
- Pattern of bowel movements (constipation)
- Presence of opportunistic infections
- Concurrent medical problems (e.g. diabetes, hypertension, malaria)
- Physical condition (examination)
- Medication Profile
 - Medication taken
 - Side effects of medications: Negative effects on food intake or malabsorption of nutrients

c) Biochemical profile

- Blood sugar
- Evaluation of anaemia (iron, B12, and folate status)
- Urinalysis (for proteinuria)

d) Psychosocial

- Living environment and functional status (income, housing, amenities to cook, access to food, attitude regarding nutrition and food preparation)

4.3 CONSEQUENCES OF MALNUTRITION DURING PREGNANCY

Maternal malnutrition increases morbidity and mortality in women.

Malnourished women are at increased risk of maternal complications and death.

Maternal malnutrition also results in the following risks to the foetus /infant:

- Intra-uterine growth retardation, low birth weight and prematurity
- Birth defects
- Cretinism
- Brain damage
- Increased risk of infection
- Increased risk of foetal, neonatal, and infant death

Indicators of malnutrition in pregnant women include:

- Weight gain ≤ 11.5 kg
- Weight gain $\leq 500\text{gm/month}$ in the 1st trimester and $\leq 1\text{kg/month}$ in the 2nd and 3rd trimester of the pregnancy
- Mid-upper arm circumference (MUAC) < 23 cm

- Haemoglobin level < 11g/dl
- Presence of goitre
- Presence of clinical signs of micronutrient deficiencies

5.0 NUTRITION CARE DURING LABOUR AND DELIVERY

Labour and delivery is a period of high energy expenditure. At this time, the woman needs energy which should be provided in the form of light foods and drinks that are high in energy such as **yoghurt, milk, fruits, soup and fruit juice**. Restricting food and fluids can be distressing to the labouring women. Higher intake of fluids helps prevent dehydration and is associated with shorter duration of labour and reduced need for augmentation of labour with oxytocin.

Following a normal delivery a woman may be hungry and should have access to food. Maternity units should therefore ensure that some food is available for women who deliver at night.

5.1 Skin to skin contact

Ensure uninterrupted unhurried skin to skin contact between the mother and the unwrapped baby. This should start immediately - even before cord clamping or as soon as possible after birth. Arrange that this skin to skin contact continue for at least one hour after birth.

Skin to skin contact is beneficial in that it:

1. Calms the mother and the baby and helps to stabilise the baby's heart beat and breathing
2. Keeps the baby warm with heat from the mothers body/fathers body (the involvement of the fathers in caesarean section cases is being encouraged where possible)
3. Assists with metabolic adaptation and blood glucose stabilisation in the baby
4. Reduces infant crying thus reducing stress and energy use
5. Enables colonisation of the baby with the mother's normal body bacteria
6. Facilitates bonding between the mother and the baby
7. Allows the baby to find the breast and promotes self attachment which is more likely to result in effective suckling

5.2 Early initiation of breastfeeding

Ensure there is rooming in: Keep the baby with the mother in the same bed for unlimited breastfeeding / breastfeeding on demand

Give no pre-lacteal feeds: Give no water, glucose, teas or any fluids to the baby.

The mother should be supported to attach and position the baby to initiate breastfeeding within 1 hour of delivery.

Benefits of Early Initiation

- It facilitates milk production.
- It helps in the release of oxytocin which helps the uterus to contract and controls post partum haemorrhage.
- The baby gets colostrum which has the following benefits:
 1. **Rich in Antibodies** - protects against allergy & infection
 2. **Has many white cells** - protects against infection
 3. **Is a purgative** - clears meconium thus helping to prevent jaundice
 4. **Has growth factors** - helps intestine to mature, prevents allergy and intolerances
 5. **It is rich in Vitamin A** – prevents and reduces severity in case of infection

6.0 POSTNATAL PERIOD

This is a crucial stage for both the mother and the baby. Adequate nutrition for the mother should be maintained to ensure that the mother remains healthy and to enhance lactation performance.

Lactation is a physiological condition that places extra demand on the mother hence the need for nutrition support and care. In addition, breastfeeding is a learned behaviour that needs a supportive environment at the facility, home and at the community level.

6.1 Nutritional needs during lactation

The mother should do the following:

- Eat at least 2 additional servings of staple foods per day to supply the extra 300 – 600 calories needed
- Eat at least 3 additional servings of calcium rich foods (milk and milk products, fish, salmons and sardines (Omena) to supply the extra 1200 mg of calcium needed
- Include a variety of fluids such as milk, water and fruit juices
- Eat smaller frequent meals if unable to consume larger amounts in fewer meals
- Avoid alcohol and tobacco, which decrease milk production
- Avoid excessive consumption of caffeinated beverages

6.2 During discharge

- Mothers should be counselled on:
 - Taking an extra meal and snacks rich in energy, protein and micronutrients;
 - Timing of meals, preparation and storing of foods;
 - The use of locally available and affordable foods;
 - What extra food portions are.
- Ensure that the mother is able to breastfeed:
 - Emphasis should be made on exclusive breastfeeding for 6 months and find out if they have any difficulties in breastfeeding
 - Observe the baby breastfeeding and assess a breastfeed
 - Check positioning and attachment and teach/reinforce correct positioning and attachment
 - Show the mother how to identify signs of effective breastfeeding
 - Counsel on demand feeding
 - Teach all mothers expression of breast milk, storage of breast milk and cup feeding
 - Counsel the mother on preventing and managing sore/cracked nipples and engorgement
 - Refer the mother to breastfeeding support groups
- Give all mothers Vitamin A 200,000 IU on discharge and record in the mother child booklet
- Advise on adequate rest and avoidance of stress
- Involve the family members(spouse/partner, mother in law, grandmother) to support the mother

6.3 Points to be emphasised during postnatal visits

- Exclusive breastfeeding for 6 months
- Ask if there are any breastfeeding difficulties
- Check for correct attachment and positioning
- Give Vitamin A 200,000IU before 4 weeks if not given

7.0 ESSENTIAL NUTRITION ACTIONS

Nutritional Assessment	Essential Nutrition Actions Message for HIV-negative Pregnant Women
Pre-pregnancy BMI is normal and weight gain is regular (500gm/m in the 1 st trimester and 1kg/month in the 2 nd and 3 rd trimesters)	▪ Eat three meals and one snack every day. ▪ Rest more during pregnancy. ▪ Increase daily consumption of fruits and vegetables, animal products, and fortified foods.
If anaemic	▪ Consume a daily dose of 120 mg iron plus at least 400 µg folic acid for 3 months along with orange, pineapple, or citrus juice. Restrict consumption of tea, coffee, and cocoa.
No sign of micronutrient deficiency	▪ Take 60 mg of iron and 400µg of folic acid every day for 180 days along with orange, pineapple, or citrus juice. Restrict consumption of tea, coffee, and cocoa. ▪ Take presumptive treatment for hookworm. ▪ Use insecticide-treated nets. Take anti-malarial drugs. Seek treatment for fever.
If weight gain is less than 1kg/month during the second and third trimester	▪ Eat more than three meals and one extra snack per day. ▪ Rest more.

8.0 COMMON NUTRITION RELATED CONCERNS IN PREGNANCY

8.1 Nausea and vomiting

- Fifty to eighty percent of pregnant women experience nausea and vomiting; about one percent suffer severe symptoms. The condition is linked to hormonal changes, but the exact causes are not well understood.
- Always ask pregnant women if they are suffering from nausea and vomiting and take immediate action to help them manage the condition through dietary modification, lifestyle changes and, if necessary, approved anti-nausea medication.
- Even mild cases require monitoring until symptoms subside. Women with severe nausea and vomiting (hyperemesis gravidarum) are at risk for dehydration, electrolyte imbalances, abnormal metabolism and weight loss. The severity of the condition will dictate the course of therapy.
- Emphasize eating foods that are well tolerated.
- Treatment for serious nausea (hyperemesis gravidarum) and vomiting often requires hospitalization and interventions such as intravenous fluid replacement therapy, total parenteral nutrition and anti-nausea medication.

Practical Considerations: Offer the following tips to help relieve nausea and vomiting:

- Eat small meals frequently, every two to three hours; do not skip meals; avoid hunger.
- Have a snack before bedtime or during the night.
- Try eating a piece of bread or a few crackers before getting up in the morning to quell nausea.
- Get out of bed slowly; avoid sudden movements.
- Avoid high fat and fried foods; eat lower-fat meats, poultry and fish; use skim or low-fat milk products; try carbohydrate-rich foods such as fruit, fruit juice, breads, cereals, rice, potatoes.
- Drink fluids between rather than with meals to avoid stomach fullness at meal times.

- Avoid strong food smells and cooking odours by eating cold foods, opening windows to freshen the air, avoiding coffee, garlic and other spices and having others cook when possible.
- Avoid highly seasoned foods.
- Avoid brushing your teeth immediately after eating; avoid brushing your tongue.
- Keep well rested; avoid fatigue.
- Avoid cigarette smoking.

8.2 Heartburn

The hormone progesterin produced by the placenta causes muscles in both the uterus and the intestinal tract to relax. This leads to heartburn as stomach acids slip through the lower oesophageal sphincter into the oesophagus. Thirty to fifty percent of pregnant women experience heartburn. Gastric reflux is more likely to happen during pregnancy because the enlarging uterus presses on the stomach and can force stomach contents up into the oesophagus. Heartburn is a serious problem only if it discourages pregnant women from eating. Relief from heartburn is often achieved through simple dietary and lifestyle changes.

Practical Considerations

For women suffering from heartburn offer the following management tips

- Eat small, lower-fat meals frequently. Dietary fat lowers the oesophageal sphincter tone, already reduced or relaxed by the hormonal changes associated with pregnancy.
- Eat slowly, chew food well, avoid tension while eating
- Drink fluids between meals rather than with meals to avoid stomach fullness
- Avoid spicy foods that seem to exacerbate heartburn
- Avoid lying down for at least one to two hours after eating to minimize reflux
- Elevate the head of the bed
- Avoid bending and stooping after eating
- Avoid eating and drinking, except for water, before bedtime
- Wear loose-fitting clothing
- Do not take antacids without consulting a physician

8.3 Constipation

Constipation affects 11 to 38 percent of pregnant women. Constipation during pregnancy is linked to several physiological changes associated with pregnancy as well as an eating pattern low in fibre and liquids. Hormonal changes relax the gastrointestinal tract, decreasing motility and increasing the transit time of waste through the colon. Increases in progesterone levels also promote increased absorption of water from the colon, a factor linked to constipation. The enlarging uterus contributes to constipation by putting pressure on the colon, sometimes displacing it and making bowel movements more difficult. Decreased physical activity, extra bed rest and iron supplements may also contribute to this common discomfort. Dietary and lifestyle changes usually correct it.

Practical Considerations

To relieve the discomfort of constipation advise pregnant women to:

- Increase fibre intake by eating more whole grain breads and cereals; vegetables; and fruit and legumes such as beans, split peas and lentils.

- Drink between 8 and 12 cups of fluid every day in the form of water, milk and juice. Warm or hot fluids may be particularly helpful.
- Maintain an active lifestyle, for example, by walking or swimming regularly.
- Avoid all laxatives unless one is recommended by a physician. Some types of laxatives are contraindicated during pregnancy.

8.4 Pica

Pica is an abnormal craving or compulsion to eat non-food substances of little or no nutritional value. During pregnancy the most common substances craved for are dirt, soil, stones, clay and laundry starch; freezer frost, burnt matches, charcoal, and cigarette ashes are also associated with pica. Pica probably results more from cultural influence and learned behaviour than from a need for specific nutrients like iron and zinc.

Consumption of non-food substances during pregnancy poses risk to both the mother and the foetus. They should be monitored closely for iron deficiency and poor foetal development. Pica is a concern because non-food items may displace nutritious foods and toxic or parasitic substances may be consumed. Worn down teeth, bowel obstruction and constipation are other possible side effects. Women who practice pica are often ashamed of the compulsion and hesitate to admit it.

Practical Considerations

- Ask pregnant women if they have cravings for non-food items such as dirt or clay.
- Advise women you suspect may be eating non-food substances of the potential risks.
- If the behaviour persists, monitor iron status, maternal health and foetal development carefully.

8.5 Lack of appetite

This is a common condition in pregnancy which can lead to inadequate intake of food at a time of increased nutrient need.

Practical Considerations for pregnant women with loss of appetite

- Eat small frequent meals spaced throughout the day (5-6 meals per day)
- Schedule a regular eating time
- Eat protein from animal or plant source with snacks and meals whenever possible
- Drink plenty of liquids, preferable in between meals
- Take walks before meals to stimulate appetite
- Choose and prepare food that look and smell good for you
- Use spices such as onions, garlic, cinnamon, and ginger to stimulate appetite, improve flavour and digestion
- Eat with others as this makes food more enjoyable

9.0 NUTRITION CARE IN PREGNANCY COMPLICATIONS

9.1 Gestational diabetes

Hormones synthesized by the placenta antagonize the action of insulin. This can precipitate gestational diabetes. Hence pregnancy is considered a diabetogenic state. All pregnant women should have their urine or blood glucose levels monitored regularly. Potential diabetics should be subjected to an oral glucose

tolerance test. If diabetes or glucose intolerance is detected a special diabetic diet and sometimes insulin injections are recommended.

Regular physical activity is recommended for pregnant women with gestational diabetes. Gestational diabetes usually disappears after the infant's birth but it is linked to development of diabetes later in the mother's life, especially if she fails to maintain a desirable body weight.

If not well controlled, diabetes increases the risk of maternal morbidity and mortality. It should be noted that expectant mothers whether diabetic or not should take the same amount of calories. If diabetic, refer for appropriate management while taking into account the calorie and protein requirement during pregnancy.

Infants born of mothers with diabetes have a higher risk of developing low blood sugar levels during the first 3 days of life which can result in damage to the major organs, and even death. They are also at risk of increased congenital malformations and neonatal jaundice. They should therefore be monitored carefully after birth and appropriate interventions instituted.

The aim of nutrition counselling in gestational diabetes is to:

- Provide appropriate energy and nutrients for the health of the mother as well as the growth and development of the foetus
- Attain and maintain blood glucose levels as close to normal as possible
- Attain optimum blood lipids and blood pressure control and so reduce the risk of macro vascular disease
- Achieve optimum metabolic control
- Prevent and treat diabetic related complications
- Promote physical, social and psychological well being.
- Achieve and maintain optimal metabolic and physiologic outcomes
- Provide relief from symptoms
- Individualize meal plan according to a person's lifestyle and based on usual dietary intake
- Integrate diet, activity and pharmacological management of the condition

Nutritional management in gestational diabetes:

A good pregnancy gestational diabetes diet supplies you with essential nutrients without overloading your system with too much sugar. The calories need to come from proteins and carbohydrates, but not sugar.

- **Eat three small meals and two or three snacks** at regular times every day. Eat a variety of foods to get all the nutrients you need. Avoid feasting and fasting in a diabetes pregnancy diet. Eat at the right time every day. Sticking to the timings is important. Avoid overeating.
- **DO NOT DIET or try to lose weight during pregnancy.** Do not skip meals or snacks. Eat small, frequent meals throughout the day.
- **Try to eat a consistent amount of carbohydrate** during each meal and snack. **Eat less carbohydrate at breakfast than at other meals** because this is when insulin resistance is the greatest. A snack prior to bed helps in preventing hypoglycaemia or low blood sugar levels.
- **If you have morning sickness,** eat 1-2 servings of crackers, cereal or pretzels before getting out of bed. If you take insulin and have morning sickness, make sure you know how to treat low blood glucose.

- **Choose foods high in fibre** such as whole-grain breads, cereals, cassava, yams, green bananas, fruits and vegetables etc.
- **Eat foods with less sugar and fat** and avoid fatty, fried and greasy foods. Avoid foods with added sugar, such as honey, jellies, jams, sodas, biscuits, cakes, ice cream and molasses.
- **Drink at least 8 cups (or 64 ounces) of liquids per day.** Water is the best option as it contains no sugar to counteract the goals for keeping glucose amounts intact. Avoid alcoholic beverages during pregnancy. Limit caffeine to no more than 300 mg. per day.
- **Make sure you are getting enough vitamins and minerals in your daily diet.** Choose at least one source of Vitamin C, one source of folic acid, and one source of Vitamin A every day.
- **Eat and drink at least 4 servings of dairy products and calcium-rich foods a day** to help ensure that you are getting 1200 mg. of calcium in your daily diet. Eat at least three servings of iron-rich foods per day to ensure you are getting 30 mg. of iron in your daily diet.
- The use of non-nutritive or artificial sweeteners approved by the Food and Drug Administration is acceptable during pregnancy. These FDA-approved sweeteners include aspartame and acesulfame-K. **The use of saccharin is strongly discouraged during pregnancy because it can cross the placenta and may remain in foetal tissues.**

9.2 Toxaemia (pre-eclampsia)

This is acute hypertension with proteinuria or oedema or both after the 20th week of pregnancy. If the mother is suffering from toxaemia, refer for nutritional management of toxaemia patient while taking into account the nutrient requirements during pregnancy.

The aim of the diet should be to;

- Maintain adequate nutrition
- Restrict fat and sodium intake
- Ensure optimal protein intake in the absence of renal disease

Nutritional management

- Manage the calorie content in the diet if the patient is overweight in an effort to reduce excessive weight gain
- Regulate fat intake. Encourage intake of unsaturated fats (oils). . Fats should be 20% of total caloric intake
- Restrict alcohol intake
- Restrict sodium by encouraging choice of foods low in sodium , limit the amount of salt added to food, restrict the use of processed foods and use of sodium containing spices
- Avoid stimulants e.g. caffeine and spirits
- Avoid cigarette smoking, which may lead to atherosclerosis
- In case of overt oedema it may be necessary to restrict fluid intake
- Encourage physical activity for those leading a sedentary lifestyle. Physical activity has measurable biological effects affecting cholesterol levels, insulin sensitivity and vascular reactivity.

9.3 HIV and AIDS

In a HIV positive pregnant mother, it is important to control symptoms, support the immune system and lower the viral loads in the blood.

Nutrition supports the immune system thus preventing onset of opportunistic infections. The role nutrition plays will vary along the disease continuum, with consideration given to the patient's age, behaviour, current medication, drug history, socioeconomic status, and associated health concerns.

Nutrition and HIV/AIDS are strongly interdependent. Malnutrition can both contribute to and result from the progression of HIV.

HIV weakens the immune system, which in turn leads to more infections. Infections increase energy needs and at the same time cause anorexia. Heightened infections (in number and severity) lead to loss of appetite, resulting in inadequate food intake, and eventually malnutrition. This creates a vicious cycle with malnourished persons having greater risk of infections and thereby increased vulnerability to HIV.

An effective nutritional care and support programme will improve the quality of life of the pregnant HIV positive mother by:

- Maintaining body weight and strength
- Providing the nutrients needed by the growing foetus
- Replenishing lost vitamins and minerals
- Improving the function of the immune system and the body's ability to fight infections
- Prolonging the period from infection to the development of the AIDS disease
- Improving response to treatment; reducing time and money spent on health care
- Keeping HIV-infected people active, allowing them to take care of themselves, their family and children; and
- Keeping HIV-infected people productive, able to work, grow food and contribute to the income of their families

Nutrient requirements for People Living with HIV (PLHIV)

Energy needs

There is increased nutrient needs due to:

- Increased resting energy equilibrium (REE)
- Viral load (body trying to cope with illness/inflammation)
- Opportunistic Infections that increase energy demand
- Malabsorption of nutrients

The recommended amount of energy increments in HIV positive pregnant/lactating women is 10% for the asymptomatic mother and 20-30% for the symptomatic mothers. This is in addition to extra energy, proteins and micronutrients required by pregnant or lactating mothers. In case of fever and multiple infections, consider addition of 10% on the calorie requirement.

The protein and fat needs for the HIV infected pregnant mother are the same as those recommended for a healthy non-HIV infected mother.

Summary of Critical Nutrition Interventions for pregnant/ lactating PLHIV

1. Advise the client to have periodic nutritional status assessments, especially of their weight, every 2nd month for symptomatic clients and every 4th month for asymptomatic clients
2. Educate and counsel PLWHA of the increased energy needs for their disease stage, and the need to consume a balanced diet. Clients with severe malnutrition should be supported with therapeutic supplementary foods.
3. Educate and support clients to maintain high levels of sanitation, food hygiene, and water safety at all times.

4. They must practice positive living behaviours including practicing safer sex avoiding or moderating use of alcohol, cigarettes and non-prescription drugs.
5. Educate and support clients to carry out physical activity or exercise in order to build muscles and increase appetite and improve health.
6. Drink plenty of clean safe water (filtered and boiled or treated) and use clean safe water to swallow medicines and prepare juice.
7. Counsel PLWHA to seek prompt treatment for all opportunistic infections and symptoms, and especially those that may interfere with food intake.
8. Those on medicine, including ARVs, should be informed about managing the drug food interactions and side-effects that can be managed by food and nutrition interventions.

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PRECONCEPTION CARE

Content Outline

1. Definition of pre conception care
2. Why is preconception care a public health concern?
3. Reproductive health risks
4. Preconception care protocol
5. Interventions: (Health education and counselling, Specific interventions)
6. Pre conception care service delivery areas
7. Creating linkages with other disciplines to promote pre-conception care

Definition of pre-conception care

This is a set of interventions that identify and modify biomedical, behavioural, and social risks to a woman's health and future pregnancies. It includes health promotion, prevention and management of any pre existing conditions; emphasizing health issues that require action before conception or very early in pregnancy for maximal impact. The target population for pre conception care is women of reproductive age (WRA – 15 to 49 years), although men are also targeted by several components of pre conception care. (*Recommendations to improve pre conception health and health care- CDC*)

Objectives of Pre conception Care:

1. To provide Health promotion and education to improve knowledge attitudes and behaviours of men and women with regard to pregnancy
2. To provide Evidence - based Screening for pregnancy risks
3. To provide Interventions to address identified risks and conditions
4. To Achieve universal coverage of Essential Obstetric Care

Why is pre conception care a public health concern?

Despite advances in maternal and newborn health care, poor birth outcomes continue to be a problem in Kenya. Newborn mortality now contributes to 60% of all infant mortality rate (KDHS 2009); with prematurity, asphyxia and infection accounting for the majority of the deaths. Postpartum haemorrhage contributes to 34% of maternal mortality ratio (KDHS 2009); HIV prevalence in WRA has increased to 9.2 %; among youth 15 to 24 years women are 4 times more likely to be infected with HIV than men (KAIS 2007). This is also the group of women with highest total fertility rate.

Among women of reproductive age, risks associated with poor pregnancy outcomes e.g. malaria and anaemia remain prevalent; smoking, alcohol use and drug abuse are on the increase. Events in childhood / adolescence e.g. malnutrition, stunting, obesity may also lead to poor obstetric outcomes later. All of these factors could be addressed with proper health interventions prior to conception.

Although the recommended timing of the first ANC visit is before 16 weeks, most women present when it is too late to prevent the majority of serious maternal and newborn health problems. The foetus is most susceptible to developing certain problems in the first 4-10 weeks of intrauterine life. At this time many women are not even aware that they are pregnant and they are therefore unable to recognise and address

the risks to their own and their baby's health, hence, the need for interventions to begin before conception. (*National Centre on Birth Defects and Developmental Disabilities April 12, 2006*)

Reproductive Health risks include the following:

Age of the couple

Very young (16yrs and below); Elderly (35 yrs and above)

Parity

Primigravida; Grand multiparity (gravida five and above); Short pregnancy interval (less than 2 years)

Nutritional status

Under nutrition, obesity, malnutrition

Low Socio-economic status

Previous adverse pregnancy outcome

Recurrent spontaneous abortions, Stillbirths, Early neonatal deaths (first one week)

Previous baby with congenital abnormalities

Medical conditions such as

Anaemia, Malaria, HIV/AIDS, Tuberculosis, STIs/RTIs, cardiac disease, Diabetes

Sickle cell disease, Asthma, Hypertension (Pre and post conception)

ABO and Rhesus incompatibility, Breast cancer, cervical cancer, renal disease

Obstetric Complications such as

Previous obstetric Haemorrhage; previous C/S scars, previous preterm labour,

Previous PET / eclampsia

Substance abuse

Smoking; Alcohol or Drug abuse; Intake of prescription or over the counter drugs that are known to be teratogens.

Gender based violence

FGM, Early marriage, Physical / psychological abuse, Sexual violence

Negative cultural practices

Food restrictions, Health seeking behaviour

PRECONCEPTION CARE PROTOCOL

History taking should be comprehensive and include

1. Family history: hereditary conditions, Medical conditions, congenital abnormalities
2. Medical history: Diabetes, hypertension, HIV, TB, RT cancers e.g. Breast cancer, cervical cancer
3. Surgical history : Previous myomectomy, C/section, Obstetric fistula repair
4. Obstetric/gynaecological history: Pregnancy wastage, previous preterm deliveries, STI/RTI, menstrual disorders, prolonged sub fertility
5. Environmental history: exposure to radiation, Chemical
6. Occupational history : type of work and length of working hours as in long distance drivers, athletes, bicycle riders
7. Nutritional history : diet
8. Male partner history: mumps, STIs/HIV, substance abuse, tight clothing (around scrotum)

Physical examination

This should encompass a general examination (head to toe) to include vital signs, weight; e.t.c.

The systemic examination of the thyroid, heart, breasts, abdomen, pelvis and other relevant systems will be based on the history obtained from the woman.

Investigations

Minimum investigations should include: Full blood count, random blood sugar, Syphilis test, HIV test, Blood group and rhesus, Urinalysis

Additional investigations are based on the history and examination

Interventions:

- **Health education and counselling**

1. Psychosocial counselling
2. Family planning: Each woman, man, and couple should be encouraged to have a reproductive life plan including healthy timing and spacing of pregnancy
3. Life styles issues
 - a. Nutrition: Assess dietary status and advice on healthy nutrition.
 - b. Weight: Check BMI, Advise on weight gain or loss where BMI in <20 or >30
 - c. Substance abuse such as alcohol, hard drugs, tobacco, traditional medications, herbs
 - d. Timing of intercourse: Check that the couple understands the ovulatory cycle and can determine the most fertile days relative to the woman's cycle. Advice that for conception to occur, intercourse should occur regularly (two to three times a week and should cover the most fertile time.)
 - e. Regular exercises
 - f. Adequate rest
 - g. Spiritual nourishment
4. Prenatal diagnosis: Educate women about options for prenatal diagnosis including genetic counselling (Down's syndrome, sickle cell disease, thalasaemia, medical conditions); and virologic screening (TORCHES)
5. Discourage over the counter drugs and use of teratogenic medications

- **Other Specific interventions**

Prophylaxis

Folic Acid

- ❑ Women who are trying to conceive should take folic acid supplements (400mcg) daily to reduce the risk of neural tube defects. This should begin 3months before pregnancy. Women with a history of neural tube defects or epilepsy should take 5mg daily.

Iron, Zinc, Vitamin A 10,000 IU, Iodine and Calcium may be taken during the preconception period depending on the health status of the patient and any underlying medical conditions or risks.

Management of Pre-existing medical problems

- ❑ Stabilise medical conditions and ensure that medical control is optimal
- ❑ Check that any drugs or treatments used are safe for use in pregnancy and do not affect sperm function(cytotoxic and radiation, smoking and alcohol etc)
- ❑ Where appropriate, refer women for specialised care.

PRE CONCEPTION CARE DELIVERY AREAS

It is important that these services are not stand alone, but are rather integrated into other services and programmes; such as: Family planning services, Antenatal care services, Child welfare clinic, Postpartum care, Outpatient services, Youth friendly sites, Comprehensive care clinics, Specialised clinics, School health programmes, VCT centres, and other specific service sites that target men

Creating linkages with other disciplines to promote pre-conception care

- Create awareness for other professionals e.g.,
 - Physicians to educate diabetics, cardiac patients, and other's with medical conditions; paediatricians; nutritionist etc
- Community awareness and participation
 - Schools, Women's groups, Public barazas, , faith based institutions, youth clubs, etc
 - Linkages with other programmes (HIV, Child health, vaccines), Other sectors /Ministries (Education, Gender, Agriculture, Culture and Social services) and other stakeholders

Focused Antenatal Care

Outline

1. Background
 - a. Definition of antenatal care.
 - b. Aim of antenatal care
 - c. The risk approach
 - d. Focused antenatal care
 - e. The objectives of focused antenatal care
2. Management
 - a. Schedule of visits
 - b. Contents of visits
3. Summary of Mother and Child Health booklet

Background

Definition of antenatal care

Antenatal care (ANC) is health care given to a pregnant woman from conception to the onset of labour.

Aim of antenatal care

To achieve a good outcome for the mother and baby and prevent any complications that may occur in pregnancy, labour, delivery and the post partum period

The approach

The risk approach to antenatal care has not resulted in significant improvement in maternal survival. Life threatening complications of pregnancy are difficult to predict with any degree of certainty. Health care providers must, therefore, consider the possibility of complications in every pregnancy and prepare clients accordingly.

While risk assessment can help direct counselling and treatment for individuals, it is important to understand that most women who experience complications have no 'risk factors' at all.

Every pregnant, delivering or postpartum woman is at risk of serious life threatening complications!

FANC: Focused antenatal care

Women can benefit from just a few antenatal visits, as long as those visits are thorough. Focused or targeted ANC refers to a minimum number of four comprehensive personalised antenatal visits, each of which has specific items of client assessment, education and care to ensure prevention or early detection and prompt management of complications. The focus is on birth preparedness and on individuals in readiness to handle complications. Always view each visit as if it were the only visit the woman may make. Many women cannot come for 4 visits

Antenatal care should be simpler, safer, friendly and more accessible. Women are more likely to seek and return for services if they feel **cared for and respected** by their providers. This personalized approach requires health care providers to use excellent interpersonal skills **since listening to client's concerns is just as important as giving advice**. It respects clients' right to **dignity, privacy, confidentiality, full and accurate information**.

The objectives of focused antenatal care are:

- Early detection and treatment of problems
- Prevention of complications using safe, simple and cost-effective interventions
- Birth preparedness and complication readiness
- Health promotion using health messages and counseling
- Provision of care by a skilled attendant

Schedule of Visits

It is recommended that the pregnant woman should attend a **minimum of four** comprehensive personalized antenatal visits spread out during the entire pregnancy during which specific focused activities are carried out to guide the woman along the path of survival, as follows:

- First visit less than 16 weeks
- Second visit 16 - 28 weeks
- Third visit 28-32 weeks
- Fourth visit 32 – 40 weeks

Depending on individual need, some women will require additional visits.

The first visit:

Content of the first visit

a) Obtain information on:

- **Personal history**
 - Name
 - Age (date of birth)
 - Physical address and telephone number
 - Marital status
 - Educational level: primary, secondary, university
 - Economic resources: employed? Type of work, position of patient and husband/guardian
 - Tobacco use (smoking or chewing habit) or use of other harmful substances?

- **History of present pregnancy**
 - Date of last menstrual period (LMP); certainty of dates (by regularity, accuracy of recall and other relevant information including contraceptive history). Determine the expected date of delivery based on LMP and all other relevant information. Use 280-day rule (LMP + 280 days). Some women will refer to the date of the first missed period when asked about LMP, which may lead to miscalculation of term by four weeks
 - Quickening if applicable
 - Any unexpected event (pain, vaginal bleeding, other: specify)
 - Malaria attacks
 - Habits: smoking/chewing tobacco, alcohol, drugs (frequency and quantity)
- **Obstetric history**
 - Number of previous pregnancies (Gravida and Parity)
 - Date (month, year) and outcome of each event (live birth, stillbirth, neonatal death, abortion, ectopic, hydatidiform mole)
 - Specify (validate) preterm births
 - Specify type and gestation of any abortion, and management if possible (MVA, D&C)
 - Birth weight of previous pregnancies (if known)
 - Sex of the baby / babies
 - Puerperium (eventful or uneventful)
 - Periods of exclusive breast-feeding: when? For how long?
 - Special maternal complications and events in previous pregnancies; Specify which pregnancy, validate by records (if possible):
 - recurrent early abortion
 - induced abortion and any associated complications
 - thrombosis, embolus
 - hypertension, pre-eclampsia or eclampsia
 - placental abruption
 - placenta praevia
 - breech or transverse presentation
 - obstructed labour, including dystocia
 - third-degree tears
 - third stage excessive bleeding
 - puerperal sepsis
 - Gestational diabetes.
- **Obstetrical operations:**
 - caesarean section (indication, if known)
 - forceps or vacuum extraction
 - manual removal of the placenta
 - destructive procedures (craniotomy, decapitation)
- **Special perinatal (foetal, newborn) complications** and events in previous Pregnancies; specify which pregnancy, validate by records (if possible):
 - twins or higher order multiples
 - low birth weight: <2500 g
 - intrauterine growth restriction (if validated)

- rhesus-antibody affection (hydrops)
- malformed or chromosomally abnormal child
- macrosomic (>4500g) newborn
- resuscitation or other treatment of newborn
- perinatal, neonatal or infant death (also: later death)

- **Medical history**

- Specific diseases and conditions:
 - tuberculosis, heart disease, chronic renal disease, epilepsy, diabetes mellitus
 - RTIs
 - HIV status, if known
 - other specific conditions depending on prevalence in the region, e.g. hepatitis, malaria, sickle cell trait
 - operations other than caesarean section
 - blood transfusions
 - Rhesus D negative antibodies
 - current use of medicines: specify
 - Period of infertility: when? duration, cause(s)
- Any other diseases, past or chronic; allergy

b) Perform physical examination

- General appearance
- Head to toe examination
- Measure blood pressure, pulse, temperature
- Record weight (kilograms) and height (metres) to assess the mother's nutritional status
- Check for signs of anaemia: pale complexion, fingernails, conjunctiva, oral mucosa, tip of tongue and shortness of breath
- Examine the chest, including breast exam and heart auscultation
- Measure uterine size (fundal height)
- Signs of previous caesarean section (scar)
- Foetal presentation and heart sounds if applicable
- Inspection of the external genitalia to assess for abnormalities:
 - FGM status: - If type III discuss the possibility of de-infibulation (opening up either antenatally or during labour)
 - Varicosities, warts, discharge

c) Perform the following tests:

- Urine: multiple dipstick test for proteinuria, acetone and sugar for all women and urinalysis for bacteriuria
- Blood: syphilis (VDRL or RPR)
- Blood-group typing (ABO and rhesus)
- Haemoglobin (Hb)
- Counselling and testing for HIV
- Sputum for AFB if indicated

d) Implement the following interventions:

- Iron and folic acid supplements to all women
- If test for syphilis is positive: treat
- Tetanus toxoid (See the 5 TT schedule as per the Kenya guidelines)
- Refer woman when complications arise that cannot be managed at that facility, e.g.:
 - Severe anaemia, Hb <7.0 g/ml
 - Antepartum Haemorrhage
 - High blood pressure (>140/90 mm Hg)
 - Intra-uterine growth restriction / IUCD
 - Underweight, use mid upper arm circumference(MUAC)
 - Polyhydramnios
 - Tuberculosis
 - Opportunistic infections / AIDS
- If the first visit is **after 16 weeks**, give:
 - In malaria endemic areas: sulfadoxine/pyrimethamine (IPT), three tablets once to be taken at the facility under supervision(DOT)
 - Mebendazole 500mg stat

e) Assess the need for specialised care

Determine whether the woman is in need of special care and/or referral to a specialized clinic or hospital. The following conditions might require specialised care:

- Diabetes
- Heart disease
- Renal disease
- Epilepsy
- Drug abuse
- Family history of genetic disease

f) Development of an individual birth plan

- Assist the pregnant woman to develop an **Individual Birth Plan (IBP)**. Encourage the male partner to be involved in the health care of the mother-to-be and his baby and they should know:
 - The Expected Date of Delivery (EDD)
 - The danger signs in pregnancy, childbirth and the postpartum period.
 - The danger signs for the newborn.
 - She should decide on who will be the skilled attendant at her delivery and where
 - She should be advised to identify a birth companion
 - What transport she will use before, during labour and after delivery if complications arise
 - How she will raise funds for transport, delivery charges and for essential items/supplies
 - Identification of possible blood donors in case of haemorrhage
 - Her postpartum contraception plans and subsequent reproductive goals
 - A decision maker is identified in case of emergency
- Where women have a **bad obstetric history** like previous caesarean section, stillbirth, retained placenta / PPH, the woman should be advised to deliver at a facility that can provide Comprehensive Emergency Obstetric and Newborn Care (CEONC)
- Where **multiple pregnancy** has been diagnosed, the woman should be referred immediately to a CEONC facility for confirmation of the multiple pregnancy and planning for the delivery

Birth Plan and emergency preparedness checklist

- Is the EDD known?
- Has a skilled professional birth attendant been identified?
- Has a facility been identified?
- Has a birth companion been identified?
- Has a decision maker been identified?
- Are emergency funds identified?
- Who is the custodian of the emergency funds?
- Has financial support been identified?
- Has means of transport been identified?
- Has a blood donor been identified

g) Advice on complications and danger signs

- Counsel on possible complications during pregnancy, labour and postpartum period
 - Danger signs in pregnancy
 - Bleeding per vagina
 - Bleeding
 - Drainage of liquor
 - Severe abdominal pains
 - Severe headaches
 - Generalized body swelling
 - Reduced foetal movements
 - Convulsions
 - Danger signs in labour
 - Labour pains for more than 12 hours (sun rise to sunset)
 - Excessive bleeding
 - Ruptured membranes without labour for more than 12 hours
 - Convulsions during labour
 - Loss of consciousness
 - Cord, arm or leg prolapse
 - Danger signs in postpartum period (mother)
 - Excessive bleeding
 - Fever
 - Foul smelling discharge
 - Abdominal cramps or pains
 - Painful breasts or cracked nipples
 - Mental disturbances
 - Extreme fatigue
 - Facial or hand swelling
 - Headaches
 - Convulsions
 - Painful calf muscles

- Danger signs in postpartum period (newborn)
 - Fast breathing (more than 60 breaths/minute)
 - Slow breathing less than 30 breaths per minute
 - Severe chest in-drawing - Grunting
 - Umbilicus draining pus /redness extending to skin
 - Floppy or stiff
 - Fever (temp 38 degree c and above)
 - Convulsions
 - More than 10 skin pustules
 - Bleeding from stump/cut
- Give advice on whom to call or where to go in case of any of the above complications / emergencies

h) Health promotion, questions and answers, and scheduling the next appointment

- Advice on personal hygiene, rest, nutrition, family planning, malaria, worm infestations, HIV/AIDS and PMTCT.
- Give advice on safer sex. Emphasize the risk of acquiring or transmitting HIV or STIs without the use of condoms
- Advise women to stop the use of tobacco (both smoking and chewing), alcohol and other harmful substances
- Counsel on breast-feeding of the last born child; when to stop breast-feeding, generally until seven months gestation (but avoid breastfeeding if there is history of habitual abortion)
- Counsel on exclusive and early initiation of breast-feeding (alternative options will be discussed in other chapters)
- Counsel on the signs of labour (contractions, vaginal discharge, lower abdominal pains)
- In case of an emergency home delivery the mother should be encouraged to visit the health facility within 48 hrs for a postnatal check-up
- Request the woman to record when she notes the first foetal movement
- Questions & answers: time for free communication
- Advise the woman to bring her partner (or a family member or friend) to later ANC visits so that they can be involved in the activities and can learn how to support the woman throughout her pregnancy, childbirth and postnatal period
- Schedule appointment as per recommendations (state date, and hour). This should be written in the woman's antenatal card and in the clinic's appointment book.

l) Maintain complete records

- Complete clinic record. Give the ANC card/ mother child booklet to the patient and advise her to bring it with her to all appointments she may have with any health services.

Although every pregnancy is at risk, the following conditions require careful monitoring:

- | | |
|--|--|
| - Poor obstetrical history | - Strikingly short stature |
| - Very young maternal age (below 15 years) | - Nulliparity and grandmultiparity |
| - Size-date discrepancy | - Unwanted pregnancy |
| - Extreme social disruption or deprivation | - Preterm labour in previous pregnancy |
| - Multiple gestation | - Abnormal lie/presentation |
| - Previous uterine scar | |

The second visit:**Contents of the second visit****a) Obtain information on:**

- Personal history
 - Note any changes since first visit
 - Check-up on habits: smoking, alcohol, other
- Present pregnancy
 - Note abnormal changes in body features or physical capacity (e.g. peripheral swelling, shortness of breath), observed by the woman herself, by her partner, or other family members
 - Record symptoms and events since first visit: e.g. pain, bleeding, vaginal discharge (amniotic fluid or any other), and manage appropriately
 - Check for signs and symptoms of anaemia.
 - Note foetal movements; record time of first recognition
 - Review the individualised birth plan
- Obstetric history
 - Review relevant issues of obstetric history as recorded at first visit.
- Medical history
 - Review relevant issues of medical history as recorded at first visit
 - Note any inter-current diseases, injuries, or other conditions since first visit
 - Note intake of medicines, e.g. anti-TB, ARTs and check on compliance
 - Iron and folate intake: check on compliance
 - Note other medical consultations, hospitalization or sick-leave since last visit

b) Perform physical examination

- Measure blood pressure and pulse
- Fundal height
- Oedema
- Other signs of disease: shortness of breath, coughing, others.
- Vaginal examination: do only if indicated. If patient is bleeding or spotting, do not perform vaginal examination but refer for further management.

c) Perform the following tests:

- Urine: repeat multiple dipstick test to detect urinary-tract infection, proteinuria, and sugar
- Blood: repeat Hb if Hb at first visit was below 7.0 g/m1 or signs of anaemia are detected on examination.

d) Implement the following interventions:

- Iron: continue; if Hb is <7.0 g/ml, consider further investigations
- If bacteriuria was treated at first visit and test is still positive, consider culture, change treatment and/or refer
- Tetanus toxoid in line with national guidelines
- In malaria endemic areas: administer sulfadoxine/pyrimethamine as per national guidelines
- Administer mebendazole 500mg stat after 1st trimester

e) Re-assess for complications and possible referral

- Reassess whether the woman has developed any new complications since first visit, and refer/manage appropriately
 - Hb <7.0 g/ml at first and present (second) visit
 - APH / spotting
 - high blood pressure (>140/90 mm Hg):
 - foetal growth restriction
 - gestation diabetes
 - reduced foetal movement
 - polyhydramnios
 - malnutrition
 - opportunistic infections
 - any other alarming symptoms or signs

f) Advice, questions and answers, and scheduling the next appointment

- Repeat all the advice given at the first visit
- Questions & answers: time for free communication
- Schedule the next appointment

g) Maintain complete records

Complete clinic record. Give the ANC card /mother child booklet to the patient and advise her to bring it with her to all appointments she may have with any health services.

The third visit:**Contents of the third visit****a) Obtain information on:**

- Personal history
 - Note any changes since second visit
 - Check-up on habits: smoking, alcohol, other
- Present pregnancy
 - Note abnormal changes in body features or physical capacity (e.g. peripheral swelling, shortness of breath), observed by the woman herself, by her partner, or other family members
 - Record symptoms and events since second visit: e.g. pain, bleeding, vaginal discharge (amniotic fluid or any other), and manage appropriately
 - Check for signs and symptoms of anaemia.
 - Note foetal movements
 - Review the individualised birth plan
- Obstetric history
 - Review relevant issues of obstetric history as recorded at first visit.
- Medical history
 - Review relevant issues of medical history as recorded at first and second visit
 - Note any inter-current diseases, injuries, or other conditions since second visit
 - Note intake of medicines, e.g. anti-TB, ARTs and check on compliance
 - Iron and folate intake: check on compliance
 - Note other medical consultations, hospitalization or sick-leave since last visit

b) Perform physical examination

- Measure blood pressure and pulse
- Fundal height
- Palpate abdomen for multiple pregnancy
- Oedema
- Other signs of disease: shortness of breath, coughing, others.
- Vaginal examination: do only if indicated. If patient is bleeding or spotting, do not perform vaginal examination but refer for further management.

c) Perform the following tests:

- Urine: repeat multiple dipstick test to detect urinary-tract infection, proteinuria, and sugar
- Blood: repeat Hb if Hb at previous visit was below 7.0 g/ml or signs of anaemia are detected on examination.

d) Implement the following interventions:

- Iron: continue; if Hb is <7.0 g/ml, consider further investigations
- If bacteriuria was treated at previous visit and test is still positive, consider culture, change treatment and/or refer
- Tetanus toxoid in line with national guidelines
- In malaria endemic areas: administer sulfadoxine/pyrimethamine as per national guidelines

e) Re-assess for complications and possible referral

- Follow up on previous observations and assess for new complications, and refer/manage appropriately
 - Hb <7.0 g/ml at first and present (second) visit
 - APH / spotting
 - high blood pressure (>140/90 mm Hg):
 - foetal growth restriction
 - multiple pregnancy
 - gestation diabetes
 - reduced foetal movement
 - polyhydramnios
 - malnutrition
 - opportunistic infections
 - any other alarming symptoms or signs

f) Advice, questions and answers, and scheduling the next appointment

- Repeat all the advice given at the first and second visit
- Give advice on measures to be taken in case of (preterm) labour
- In case of suspected twins, advise mother to visit a facility that can provide Comprehensive Emergency Obstetric and Newborn Care to prepare for delivery
- Reconfirm in writing on whom to call and where to go in case of emergency or any other need
- Plans to ensure transport is available in case of need during labour
- Questions & answers: time for free communication

- Provide recommendations on lactation, contraception and the importance of the postpartum visits.
- Schedule appointment: fourth visit

g) Maintain complete records

Complete clinic record. Give the ANC card /mother child booklet to the patient and advise her to bring it with her to all appointments she may have with any health services.

The fourth visit:

Content of the fourth visit

a) Obtain information on:

- Personal history
 - Note any changes since third visit
 - Check-up on habits: smoking, alcohol, other
- Present pregnancy
 - Note abnormal changes in body features or physical capacity (e.g. peripheral swelling, shortness of breath), observed by the woman herself, by her partner, or other family members
 - Record symptoms and events since third visit: e.g. contractions (pre-term labour?), pain, bleeding, vaginal discharge (amniotic fluid or any other), and manage appropriately
 - Check for signs and symptoms of anaemia.
 - Note foetal movements
 - Review the individualised birth plan
- Obstetric history
 - Review relevant issues of obstetric history as recorded at first visit.
- Medical history
 - Review relevant issues of medical history as recorded at previous visits
 - Note any inter-current diseases, injuries, or other conditions since third visit
 - Note intake of medicines, e.g. anti-TB, ARTs and check on compliance
 - Iron and folate intake: check on compliance
 - Note other medical consultations, hospitalization or sick-leave since last visit

b) Perform physical examination

- Measure blood pressure and pulse
- Fundal height
- Palpate abdomen for multiple pregnancy and presentation
- Oedema
- Other signs of disease: shortness of breath, coughing, others.
- Vaginal examination: do only if indicated. If patient is bleeding or spotting, do not perform vaginal examination but refer for further management.

c) Perform the following tests:

- Urine: repeat multiple dipstick test to detect urinary-tract infection, proteinuria, and sugar
- Blood: repeat Hb if Hb at previous visit was below 7.0 g/m1 or signs of anaemia are detected on examination.

d) Implement the following interventions:

- Iron: continue; if Hb is <7.0 g/ml, consider further investigations
- If bacteriuria was treated at previous visit and test is still positive, consider culture, change treatment and/or refer
- In malaria endemic areas: administer sulfadoxine/pyrimethamine as per national guidelines

e) Re-assess for complications and possible referral

- Follow up on previous observations and assess for new complications, and refer/manage appropriately
 - Hb <7.0 g/ml at first and present (second) visit
 - APH / spotting
 - high blood pressure (>140/90 mm Hg):
 - foetal growth restriction
 - abnormal presentation / twin pregnancy
 - gestation diabetes
 - reduced foetal movement
 - polyhydramnios
 - malnutrition
 - opportunistic infections
 - any other alarming symptoms or signs

f) Advice, questions and answers, and scheduling the next appointment

- Repeat all the advice given at the first and second visit
- Give advice on measures to be taken in case of the initiation of labour or leakage of amniotic fluid.
- In case of suspected twins and/or malpresentation, advise mother to deliver at facility that can provide Comprehensive Emergency Obstetric and Newborn Care
- Reconfirm in writing on whom to call and where to go in case of emergency or any other need
- Plans to ensure transport is available in case of need during labour
- Questions & answers: time for free communication
- Provide recommendations on lactation, contraception and the importance of the postpartum visits.
- Schedule appointment: if not delivered by end of week 41 (state date and write it in the ANC card), go to hospital for check-up.

g) Maintain complete records

Complete clinic record. Give the ANC card to the patient and advise her to bring it with her to all appointments she may have with any health services.

Late enrolment and missed visits

It is very likely that a good number of women will not initiate ANC early enough in pregnancy to follow the focused four antenatal visits. These women, particularly those starting after 32 weeks of gestation, should have in their first visit all activities recommended for the previous visits, as well as those which correspond to the present visit. It is expected, therefore, that a late first visit will take more time than a regular first visit

The Mother and Child Health Booklet

On the new Ministry of Health MCH Health Booklet, you will see a place to record:

- Personal information
- Medical and surgical history; information on previous pregnancies, gravida and parity.
- Findings of the general physical examination
- A checklist to record additional data: urine, Hb, pallor, maturity, fundal height, presentation, lie, foetal heart rate and oedema
- Intermittent Preventive Treatment for Malaria
- Complications and/or referral information
- Laboratory data
- Delivery
- Immunization and maternal medication information.
- Post natal information and a place to record general "notes"
- Family Planning usage

National guidelines for IPT

- Intermittent Preventive Treatment (IPT) is an effective approach to preventing malaria in pregnant women by giving antimalarial drugs in treatment doses at defined intervals after quickening to clear a presumed burden of parasites
- *The Ministry of Health Guidelines on Malaria* directs us to give SP to pregnant women **in endemic malaria areas, at least twice during each pregnancy**, even if she has no physical signs and her haemoglobin is within normal range.
- Administer IPT with each scheduled visit after quickening (16 weeks) to ensure women receive at least 2 doses at an interval of at least 4 weeks.
- IPT should be given under Directly Observed Therapy (DOT) in the ANC clinic and can be given on an empty stomach

National guidelines for Tetanus Toxoid

Dose of TT	When to give
1	At first contact or as early as possible in pregnancy
2	At least 4 weeks after TT1
3	At least 6 months after TT2 or during subsequent pregnancy
4	At least 1 year after TT3 or during subsequent pregnancy
5	At least 1 year after TT4 or during subsequent pregnancy

OBSTETRIC COMPLICATIONS DURING ANTENATAL PERIOD**ANTEPARTUM HAEMORRHAGE****Outline**

1. Introduction
2. Definition /explanation of Antepartum Haemorrhage (APH)
3. Causes of APH
4. Diagnosis of APH
5. Management of APH
6. Management of Coagulopathy
7. Management of Ruptured uterus

Introduction

Haemorrhage is the leading direct cause of maternal mortality accounting for 34 % of all maternal deaths in Sub-Saharan Africa. APH complicates 2 to 6 percent of all pregnancies. Death may occur in about 10 hours after the onset of APH. Anaemia in pregnancy is common in Africa and bleeding in pre-existing anaemia increases the risk of death. Appropriate care in pregnancy and labour includes:

- Detection, correction and prevention of anaemia
- Care by skilled attendant
- Recognition and early management of complications

Definition of APH

APH is vaginal bleeding during pregnancy usually presenting in the last trimester of pregnancy. Any vaginal bleeding after 28 weeks should be assumed to be due to either placenta praevia or abruptio placentae, unless proven otherwise.

Causes of APH

Bleeding in late pregnancy and in labour is usually due to **placenta abruption** or **placenta praevia**.

Placenta Praevia:

This is when implantation of the placenta occurs at or near the cervix. It may be partial or complete praevia. In partial placenta praevia a posteriorly situated placenta is more dangerous than an anterior one. In placenta praevia bleeding is always revealed, though it may cease spontaneously. The blood colour is usually bright red.

The signs and symptoms of placenta praevia are as follows:

- painless bleeding
- Blood is bright red and may be Scanty or heavy
- Pale looking patient, the degree of which corresponds to the amount of blood loss.
- No tenderness in the abdomen
- Soft and relaxed uterus
- The presenting part may be high or there may be abnormal presentation
- The foetal parts are easily palpable
- Foetal heart sounds are usually present.

Abruptio Placentae

This is premature detachment of a normally situated placenta before the foetus is delivered. The resultant retro - placental bleeding may be revealed, concealed or mixed type.

The causes include toxemia, trauma, sudden uterine decompression, or short umbilical cord.

Signs and symptoms are as follows:

- Bleeding
 - In the revealed type, the amount of external blood loss is consistent with the condition of the patient
 - In the concealed type, there is usually little or no visible vaginal bleeding, yet the patient is pale
- Constant abdominal pain
- Tender abdomen
- Woody hard, tense uterus
- Foetal sounds are absent in severe cases.

Diagnosis of APH

The table below outlines the presenting signs and symptoms of APH and differential diagnosis of ruptured uterus

Presenting symptom and other symptoms and signs typically present	Symptoms and signs sometimes present	Probable Diagnosis
• Bleeding after 28 weeks gestation	• Shock • Bleeding may be precipitated by intercourse • Relaxed uterus • Foetal presentation not in lower uterine pole – feels empty • Normal foetal condition	Placenta Praevia
• Bleeding (may be retained in the Uterus) after 28 weeks gestation. • Intermittent or constant abdominal pain	• Shock • Tense tender uterus • Decreased foetal movements • Foetal distress or absent foetal heart sounds	Abruptio placentae
▪ Bleeding (intra -abdominally and /or vaginally) ▪ Severe abdominal pain (may decrease after rupture)	▪ Shock ▪ Abdominal distension! ▪ Free fluid ▪ Abdominal uterine contour ▪ Tender abdomen ▪ Easily palpable foetal parts ▪ Absent foetal movements and heart sounds ▪ Rapid maternal pulse	Ruptured uterus

The differential diagnosis of APH includes:

- Labour (bloody show)
- Cervical erosion
- Cervicitis
- Cervical polyp
- Carcinoma
- Trauma.

NOTE

Digital vaginal examination can cause severe bleeding, making the need for delivery urgent, so **IN GENERAL IT SHOULD BE AVOIDED.**

If it is absolutely necessary, it should be done under sterile conditions in the operating room and then only if preparations have been made for immediate blood transfusion and vaginal delivery or caesarean section (double setup)

MANAGEMENT OF APH**GENERAL MANAGEMENT**

- **Shout for help. Urgently mobilize all available personnel**
- Make a rapid evaluation of the general condition of the woman including vital signs (pulse, blood pressure, respiration, temperature).
- If you suspect shock, begin treatment immediately.
- Start a rapid IV infusion (Normal saline or ringers solution)
- Even if signs of shock are not present, keep shock in mind as you evaluate the woman further because her status may worsen rapidly

Management of PLACENTA PRAEVIA

Placenta praevia is implantation of the placenta at or near the cervix. If you suspect placenta praevia, do not perform a vaginal examination unless preparations have been made for immediate caesarean section

- Perform a careful *speculum* examination to rule out other causes of bleeding such as cervicitis, trauma, cervical polyps or cervical malignancy. The presence of these, however, does not rule out placenta praevia
- Assess the amount of bleeding.
- Restore blood volume by infusing IV fluids (normal saline or Ringer's lactate)
- If bleeding is heavy and continuous, arrange for caesarean delivery irrespective of foetal maturity
- If bleeding is light or if it has stopped and the foetus is alive but premature, consider expectant management until delivery or heavy bleeding occurs
 - Keep the woman in the hospital until delivery
 - Correct anaemia with oral iron therapy
 - Ensure that blood is available for transfusion, if required
- If bleeding recurs, decide management after weighing benefits and risks for the woman and foetus of further expectant management versus delivery.

Confirming the diagnosis of Placenta Praevia

- If a reliable ultrasound examination can be performed, localize the placenta.
- If placenta praevia is confirmed and the foetus is mature, plan delivery.
- If ultrasound is not available or the report is unreliable and the pregnancy is less than 37 weeks, manage as placenta praevia until 37 weeks.
- If ultrasound is not available or the report is unreliable and the pregnancy is 37 weeks or more, examine under double set-up to exclude placenta praevia, with the woman in the operating theatre with the surgical team present.

The double set-up prepares for either vaginal or caesarean delivery, as follows.

- Ensure IV lines are running and cross matched blood is available.
- Use a sterile vaginal speculum to see the cervix:
- If the cervix is partly dilated and placental tissue is visible, the diagnosis is confirmed; plan caesarean delivery
- If the cervix is not dilated, cautiously palpate the *vaginal fornices*:
- If you feel spongy tissue, confirm placenta praevia and plan caesarean delivery
- If you feel a firm foetal head, rule out major placenta praevia and proceed to deliver by induction
- If a diagnosis of placenta praevia is still in doubt, perform a cautious digital examination:
- If you feel soft tissue within the cervix, confirm placenta praevia and plan delivery
- If you feel membranes and foetal parts both centrally and marginally, rule out placenta praevia and proceed to deliver by induction.
- If delivered by caesarean section and there is bleeding from the placental site:
 - Under-run the bleeding sites with sutures.
 - Infuse oxytocin 20 units in 1 L IV fluids (normal saline or Ringer's lactate) at 60 drops per minute.

Women with placenta praevia are at high risk for postpartum haemorrhage and placenta accreta/increta, a common finding at the site of a previous caesarean scar

Delivery is indicated if:

- Foetus is mature
- Foetus is dead or has anomaly not compatible with life
- Mothers life is at risk due to excessive blood loss

Rupture the membranes for vaginal delivery if:

- Minor degree of placenta praevia is suspected and / or detected
- Presentation is favourable for vaginal delivery
- Bleeding is light

Perform caesarean section if:

- Bleeding is heavy and continuous irrespective of gestational age
- Major degree of placenta praevia is suspected

A lower segment caesarean section is the treatment of choice for a major degree of placenta praevia

If placenta obstructs delivery, either incise it or deliver the baby around the placental edge. Prompt delivery will reduce maternal and foetal complications including mortality.

MANAGEMENT OF ABRUPTIO PLACENTAE

An abruptio placentae (placental abruption, retro placental bleed) is the detachment of a normally located placenta from the uterus before the foetus is delivered

Management is as follows:

- Assess clotting status using a bedside clotting test. Failure of a clot to form after 7 minutes or a soft clot that breaks down easily suggests coagulopathy.
- Ensure that blood is available for transfusion, if required

- If bleeding is heavy (evident or hidden), deliver as soon as possible
 - If the cervix is fully dilated, perform assisted vaginal delivery if there are no other contraindications.
 - If vaginal delivery is not imminent, deliver by caesarean section.
- If bleeding is light to moderate (the mother is not in immediate danger), the course of action depends on the foetal heart rate:
 - If foetal heart rate is normal or absent, rupture the membranes with an amniotic hook or a Kocher's clamp
 - If contractions are poor, augment labour with oxytocin
 - If the cervix is unfavourable (firm, thick, closed), perform a caesarean section
 - If the foetal heart rate is less than 100 or more than 180 beats per minute:
 - Perform rapid vaginal delivery
 - If rapid vaginal delivery is not possible, deliver by immediate caesarean section.
- In every case of abruptio placentae, be prepared for postpartum haemorrhage.

Management of accidental haemorrhage (Abruptio Placenta) of revealed type

Consider conservative treatment if:

- Bleeding stops on admission or if it is minimal.
- There is a need to prolong the pregnancy
- Foetal condition is stable

If bleeding continues, however, examine the patient in an operating theatre, with trays at hand for both amniotomy for induction of labour or caesarean section, to decide/upon a further course of action.

Lower segment caesarean section in the management of APH is indicated in case of:

- poor progress of labour
- failure of the uterus to relax between contractions
- foetal distress
- increased bleeding

COAGULOPATHY (CLOTTING FAILURE)

Coagulopathy is both a cause and a result of massive obstetric haemorrhage.

It can be triggered by many causes, including:

- Abruptio
- Sepsis
- Foetal death
- Eclampsia
- Amniotic fluid embolism.

The clinical picture ranges from major haemorrhage, with or without thrombotic complications, to a clinically stable state that can be detected only by laboratory testing. In many cases of acute blood loss, the development of coagulopathy can be prevented if blood volume is restored promptly by infusion of IV fluids.

Management is as follows:

- Treat the possible cause of coagulation failure.
- Give fresh whole blood, if available, to replace coagulation factors and red cells
- If fresh whole blood is not available, choose one of the following based on availability:
 - Fresh frozen plasma or cryoprecipitate for replacement of coagulation factors
 - Packed red cells for red cell replacement
 - Cryoprecipitate to replace fibrinogen
 - Platelet concentrates (if bleeding continues and the platelet count is less than 20 000).

RUPTURED UTERUS

Bleeding from a ruptured uterus may occur vaginally unless the foetal head blocks the pelvis. Bleeding may also occur intra-abdominally. Rupture of the lower uterine segment into the broad ligament, however, will not release blood into the abdominal cavity.

- Restore blood volume by infusing IV fluids (normal saline or Ringer's lactate) before surgery.
- When stable, immediately perform laparotomy and deliver the baby and placenta.
- Repair the uterus if the operative risk is less than what hysterectomy would entail and the edges of the tear are not necrotic. This takes a shorter time than hysterectomy and reduces blood loss.
- If the uterus cannot be repaired, perform subtotal hysterectomy. If the tears extends through the cervix and vagina, total hysterectomy may be required

Because there is an increased risk of rupture with subsequent pregnancies, discuss the option of permanent contraception with the woman after the emergency is over.

Other important considerations for management of APH

When there is vaginal bleeding in pregnancy, the life of the mother and baby may be in danger:

1. *The delivery must always be in the hospital, even if the bleeding stops on its own.*
2. *Efficient referral systems must therefore be available at all levels and operational*

Preterm Premature Rupture of Membranes (PPROM)

Outline

1. Introduction
2. Definition of preterm Premature Ruptures of Membranes
3. Diagnosis of preterm Premature Ruptures of Membranes (PPROM)
4. Assessment of the condition of a patient with PPRM
5. Management of a woman with PPRM

Introduction

Preterm Premature Rupture of Membranes (PPROM) is a condition in which spontaneous rupture of membranes occurs before 37 completed weeks of pregnancy and at least one hour before the onset of labour. It occurs in about 3% of pregnancies. It varies considerably between different areas due to different population risk factors. It precedes about 30-40 % of spontaneous preterm labour. 30 – 40 % of PPRM will deliver within 48 hours and 56 to 63% within 7 days

Premature / prolonged rupture of membranes is a major risk factor for development of puerperal sepsis. It is a major cause of neonatal sepsis. As an etiological factor in these outcomes, PPRM causes chorioamnionitis which together with retained products of conception are the major causes of secondary postpartum haemorrhage.

Causes

The causative factors of PPRM are unclear, however possible factors include:

- History of PPRM
- Local amniotic membrane defect
- Genital tract infection or colonization with:
 - Chlamydia trachomatis
 - Neisseria gonorrhoea
 - Bacteria vaginosis
 - Group B streptococcus
 - Gardnerella vaginalis
- Incompetent cervix / Short cervix
- Multiple gestation
- Polyhydromnios
- Abruptio placentae and placenta praevia
- Iatrogenic (Invasive procedures – amniocentesis, foetal blood sampling)
- Foetal malformations
- Presence of foetal Fibronectin
- Intra uterine foetal death
- Trauma
- Low socio-economic status

Diagnosis**Symptoms**

- Abnormally heavy watery vaginal discharge, may run up to the feet OR Sudden gush of fluid from the vagina
- The fluid may be clear/ transparent, pink, yellow, green or brown
- The fluid may be foul smelling
- The fluid may leak constantly OR only when walking, standing, after sitting, lying down or on exertion
- There may be fever, chills or abdominal pains

Signs

- Temperature may be raised (above 37.2°C)
- Intermittent or slow leaking from the vagina soaking a vulva pad.
- Fluid seen escaping from cervical canal on speculum examination is diagnostic (n.b. Cervical OS can be closed)

Obstetric history

The following information should be obtained from the patient

- Last menstrual period, regularity of the menstrual cycles and hence duration of gestation
- History of similar episode in previous pregnancies
- Duration of drainage and amount of fluid
- Pattern of foetal movements

Assessing the condition of a patient with PPROM

- Take vital signs
- Perform head to toe examination (including obstetric examination)
- Inspect the vulva
- Inspect the vagina from OUTSIDE to see if liquid is dripping out. If so, how much it is and its colour/odour
- Perform speculum examination and rule out cord prolapse
- Evaluate the foetal movement, heartbeat and uterine contractions
- Determine the baby's presentation
- Determine gestational age by palpation

Sterile speculum examination

*Only a sterile speculum examination is performed to confirm drainage of liquor from cervical OS and to secure specimens for microbiological and lung maturity studies. **Do not perform a digital vaginal examination (unless delivery is anticipated within 24 hours) as it does not help establish the diagnosis and can introduce infection.***

Basic investigations include:

- Full blood count: Hb, WBC (total and differential count), ESR
- Amniotic fluid for microscopy, culture and sensitivity, bubble test for lung maturity
- Urine for albumin and sugar
- Obstetric ultrasound to determine: viability, maturity, amount of liquor, any foetal abnormalities and presentation

Management of Preterm Premature Rupture of Membranes

The patient is admitted into hospital for bed rest and may use toilet facilities.

- A sterile pad is used to monitor drainage of liquor.
- Foetal monitoring
- Maternal pulse and temperature are recorded 4 hourly
- Monitoring for uterine tenderness by abdominal palpation is performed.
- Start on antibiotic treatment, first choice prophylactic antibiotics:
 - Amoxicillin/Clavulanate Potassium e.g. Augmentin 1.2g IV. 8hrly for 48 hours, then 625 mg orally three times a day for five more days.
 - Erythromycin 500mg orally four times a day for seven days

Further management as follows:

Care of patients without clinical evidence of intrauterine infection

Before 34 weeks gestation, manage conservatively:

- Hospital bed rest
- Toilet facilities permitted
- Close observation till the patient starts labour
- Tocolysis e.g. salbutamol to prevent uterine contraction:
 - During referral
 - To allow time for steroids given for foetal lung maturity
- Bethamethasone 12mg IM OD for 2 days (24 hours apart) or Dexamethasone 6mg IM BD for 2 days (12 hours apart)
- Preterm delivery may be allowed in cases of spontaneous onset of labour, foetal distress. In cases of extreme prematurity or severe foetal distress caesarean section is the preferred mode of delivery.

Note: Corticosteroids should not be used in the presence of frank infection

Between 34-37 weeks active management is provided:

- Assess for foetal well-being and determine best mode of delivery.

Care of patients with intrauterine infection (Chorioamnionitis)

Commence broad-spectrum parenteral antibiotics and consider other supportive measures, such as IV fluids

First choice antibiotics:

Amoxicillin/Clavulanate Potassium e.g. **Augmentin 1.2g IV 8 hourly** for 48 hours then 625 mg three times a day for five more days

OR give the following combination for 10 days

Injection Ampicillin 500 mg I.M. 6 hourly until abdominal distension subsides and bowel returns followed by 500 mg by mouth 6 hourly.

PLUS

Injection Gentamycin 80 mg IV 8 hourly

PLUS

Injection Metronidazole 500mg I V 8 hourly

Once the results of culture and sensitivity are available, antibiotic therapy is modified accordingly

PRETERM LABOUR

Outline

1. Introduction
2. Definition of Preterm labour (PTL)
3. Diagnosis of Preterm labour (PTL)
4. Management of Preterm labour

Introduction

Preterm labour is defined as the occurrence of regular uterine contractions that produce progressive effacement and dilatation of the cervix after 28 weeks but before 37 completed weeks of pregnancy. Globally the incidence of Preterm labour continues to be about 10% of all live births despite advances such as the development and use of tocolytic agents.

Preterm birth is the cause of at least 25% of neonatal deaths that are not attributable to congenital malformations. Thus both premature rupture of membranes and preterm labour are major risk factors of maternal and perinatal mortality and morbidity. Interventions in the management of PPROM and PTL include community awareness, emergency preparedness, availability and accessibility of quality maternal and perinatal services.

Causes

Although the exact cause remains elusive triggers of PTL maybe multifactorial and include:

- Premature rupture of the membranes
- Chorioamnionitis
- Other ascending uterine infections of which Group B streptococci is the most common
- Multiple pregnancy
- Pre-eclampsia
- Placental abnormalities
- Urinary tract infections especially Pyelonephritis
- Sexually transmitted infections

In some cases no identifiable cause is found

Risk factors for PTL include:

- Low socio-economic status
- Non-white race
- Maternal age less than 18 or greater than 40
- Smoking
- Under weight
- Preterm PROM
- Cervical incompetence / Short cervix
- Uterine abnormalities
- Polyhydramnios
- Positive foetal fibrinectin
- Foetal abnormalities
- Intra uterine death
- Systemic febrile infections

- Genital tract infection or colonisation with
 - Chlamydia trachomatis
 - Treponema pallidum
 - Mycoplasma
 - Neisseria gonorrhoea
 - Bacterial vaginosis
 - Group B streptococcus
 - Gardnerella vaginalis
- Iatrogenic (medical indications for preterm delivery e.g. severe PET, IUGR, foetal distress, abruptio placenta, chorioamnionitis, cardiac disease, renal disease and malignancies)

Possible foetal consequences of Preterm labour

- Respiratory distress syndrome
- Broncho-pulmonary dysplasia
- Patent/ persistent ductus arteriosus
- Necrotizing enterocolitis
- Intraventricular haemorrhage
- Hypothermia
- Hypoglycaemia
- Jaundice
- Feeding difficulties
- Neurological impairment
- Apnoea
- Retrolental fibroplasia
- Disability and handicap
- Neonatal sepsis and death

Diagnosis of Preterm labour

Symptoms of preterm labour usually include:

- Complaints of Uterine contractions
- Passage of show or Vaginal bleeding
- Increased vaginal discharge
- Lower abdominal pain or cramping
- Sensation of vaginal pressure

The following history should therefore be taken

- Ask the mother about her previous pregnancies.
 - Has she had other premature deliveries?
- Last menstrual period and the Expected date of delivery
- Is there any lower abdominal pain radiating to the back (?labour/uterine contractions)
 - When did they start?
 - How often?
 - Are they strong or mild?
- Is there any history of previous rupture of the membranes
 - If yes, Duration/amount of fluid
- Is there bleeding? If so, how much?
- Are there any changes in the foetal movement

Signs of preterm labour

The following signs are usually indicative of preterm labour:

- Palpable uterine activity
- Engagement of presenting part
- Show – may be blood stained
- Cervical dilatation and effacement
- Bulging membranes /Rupture of membranes

Physical examination should therefore entail the following:

- Check vital signs (Temp, Pulse, Respiration, BP)
- Measure the fundal height to try to estimate the gestational age by weeks.
- Palpate the uterus to determine the frequency, duration and strength of the contractions as well as the position of the foetus. Determine the presentation.
- Take and record foetal heart rate.
- Inspect the vulva to see if there is leakage of amniotic fluid or blood
- Vaginal speculum assessment (assess cervix, membrane status for swab taking)
- Digital exam may be useful BUT not necessary

Investigations

The following are the basic investigations required:

- Blood slide for malaria parasites (in malarial endemic areas)
- Urine for microscopy culture and sensitivity
- Swabs:
 - High vaginal swab for gram stain and culture
 - Endocervical swab for gonorrhoea culture
 - Endocervical swab for Chlamydia
 - If genital infection is suspected, urethral and anorectal swabs are indicated as well
- Any other investigation as per individual assessment
- Ultrasound for foetal assessment (dating, foetal anomalies, presentation, liquor assessment, estimating foetal weight)

Management of Preterm labour***Conservative Management***

This is done if the cervix less than 2 cm dilated and includes:

- Bed rest if less than 34 weeks gestation.
- Administer to the mother corticosteroids (Betamethasone 12 mg I.M two doses 24 hours apart or Dexamethasone 6 mg I.M 4 doses 12 hours apart) to improve foetal lung maturity and chances of neonatal survival. (**Note: Corticosteroid should not be used in the presence of frank Infection**)
- Sedate the mother
- Administer tocolytics drugs to relax the uterine muscles, e.g. IV Salbutamol 10 mg in 1L iv fluids, 10 drops per minute. In case contractions persist, increase infusion rate by 10 drops/minute every 30 minutes until contractions stop or maternal pulse exceeds 120/minute.
- Treat any underlying cause(s)

Contra-indications

Contraindication for the use of tocolytic drugs include premature rupture of the membranes, chorio-amnionitis, fever of unknown origin, heart disease, cardiac dysrhythmias, thyrotoxicosis, Pre-eclampsia, severe antepartum haemorrhage, cervical dilatation of more than 2cm, foetal distress, or intrauterine death

Active Management

This is recommended if the cervical dilatation is more than 2cm, there is foetal distress, or intrauterine death. It involves the following:

- Administer corticosteroids in anticipation of preterm delivery. Contraindications to this treatment are maternal infection, hypertension, maternal heart disease, or rupture of the membranes.
- Commence administration of antibiotics
- Rupture the membranes (do not rupture if IUFD)
- Monitor labour in the usual manner with special consideration for maternal nutrition and hydration and foetal condition.
- Caesarean section is sometimes indicated for obstetric reasons, but vaginal delivery is usually preferable. When the head presents at the vulva, perform a wide episiotomy to prevent intracranial injury.
- Manage the pre term baby according to set standards

Important considerations for preterm labour:

Remember: premature babies are more susceptible to sepsis, hypothermia and hypoglycaemia. For this reason, it is very important to educate the mother and family about their care.

Allow labour to progress if:

- Gestation is more than 37 weeks
- Cervix is more than 3 cm dilated
- There is active bleeding (manage as appropriate)
- The foetus is distressed, dead or has an abnormality incompatible with survival
- There is evidence of chorioamnionitis
- The patient has severe Pre-eclampsia /eclampsia

Pre- Eclampsia and Eclampsia

Outline

1. Introduction and Definition pre-eclampsia and eclampsia
2. Risk factors for pre-eclampsia and eclampsia
3. Classification of pre-eclampsia /Eclampsia
4. Diagnosis pre-eclampsia /Eclampsia
5. Management of pre-eclampsia and eclampsia

Introduction / Epidemiology

Preeclampsia is a disorder of widespread vascular endothelial malfunction and vasospasm that occurs after 20 weeks' gestation and can present as late as 4-6 weeks postpartum. It is clinically defined by hypertension and proteinuria, with or without pathologic oedema.

Preeclampsia is part of a spectrum of hypertensive disorders that complicate pregnancy. These include chronic hypertension, preeclampsia superimposed on chronic hypertension, gestational hypertension, preeclampsia, and eclampsia. Although each of these disorders can appear in isolation, they are thought of as progressive manifestations of a single process and are believed to share a common aetiology.

The global incidence of preeclampsia has been estimated at 5-14% of all pregnancies. In developing countries, hypertensive disorders were the second most common obstetrical cause of stillbirths and early neonatal deaths, Preeclampsia is the third leading pregnancy-related cause of death, after haemorrhage and sepsis. Preeclampsia is the cause in an estimated 790 maternal deaths per 100,000 live births accounting for 23.6%.

Race: The frequency of mortality differs among race and ethnicity, with black women having a worse mortality rate than white women.

Age: Preeclampsia occurs more frequently in women at the extremes of reproductive age.

- Younger women (<20 y) have a slightly increased risk. Primigravid patients in particular seem to be predisposed.
- Older women (>35 y) have a markedly increased risk.

Genetics have long been understood to play an important role, and the risk of preeclampsia is positively correlated between close relatives; a recent study showed that 20-40% of daughters and 11-37% of sisters of preeclamptic women also develop preeclampsia. Twin studies have also shown a high correlation, approaching 40%.

Definitions:

Consensus is lacking among the various national and international organizations about the values that define the disorder, but a reasonable limit in a woman who was normotensive prior to 20 weeks' gestation is a systolic blood pressure (BP) greater than 140 mm Hg and a diastolic BP greater than 90 mm Hg on 2 successive measurements 4-6 hours apart.

Preeclampsia in a patient with pre-existing essential hypertension is diagnosed if systolic BP has increased by 30 mm Hg or if diastolic BP has increased by 15 mm Hg.

Proteinuria is defined as 300 mg or more of protein in a 24-hour urine sample. Although more convenient, a urine dipstick value of 1+ or more (30 mg/dL) is not reliable.

Risk factors for pre-eclampsia and eclampsia

- Pregnancy-associated risk factors
 - Chromosomal abnormalities
 - Hydatidiform mole
 - Multiple pregnancy: Incidence is increased in twin gestations but is unaffected by their zygosity.
 - Oocyte donation or donor insemination
 - Urinary tract infection
- Maternal-specific risk factors
 - Extremes of age (maternal age <20 and >35 yrs)
 - Black race: (In the United States, the incidence of preeclampsia is 1.8% among white women and 3% in African Americans).
 - Family history of preeclampsia
 - Nulliparity (more common in primigravidae)
 - Preeclampsia in a previous pregnancy
 - Change of male partner
 - Diabetes
 - Obesity: Body weight is strongly correlated with progressively increased risk, ranging from 4.3% for women with a BMI <20 kg/m to 13.3% in those with a BMI >35 kg/m.
 - Chronic hypertension
 - Renal disease
 - Collagen vascular disease
 - Antiphospholipid syndrome
 - Periodontal disease
 - Vitamin D deficiency: One literature review suggests that maternal vitamin D deficiency may increase the risk of preeclampsia and foetal growth restriction.

Essential for diagnosis of Pre-Eclampsia:

Hypertension:

Hypertension is blood pressure (BP) of 140/90 mmHg or more on two occasions six hours apart
OR

A diastolic blood pressure of 110 mmHg or more on a single occasion

Proteinuria:

Is a protein concentration of 0.3 g/l or more in at least two random urine specimens collected six hours apart
OR

Urine dipstick finding of '*trace*', '*1+*', or more proteins

Normally protein is not supposed to be present in urine.

Oedema:

Gradual or sudden swelling of the face, hands and legs.

Eclampsia:

It is characterized by convulsions -fits (in the absence of other medical conditions predisposing to convulsions) in a woman with pre-eclampsia.

Impending Eclampsia:

Impending eclampsia means that eclamptic fits are likely to occur very soon, usually in a woman with severe pre-eclampsia. Symptoms and Signs of impending eclampsia include:

- Severe headache
- Drowsiness
- Mental confusion
- Visual disturbance (e.g. blurred vision, flashes of light)
- Epigastric pain
- Nausea / vomiting
- A sharp rise in blood pressure
- Decreased urinary output
- Increased proteinuria
- Hyper-reflexia

Classification of pre-eclampsia/ eclampsia

Pre-eclampsia is classified as mild, and severe. The clinical picture of the different stages is shown in the table below:

Table showing Classification and Clinical picture of Pre-eclampsia and Eclampsia

Finding	Mild Pre-eclampsia	Severe Pre-eclampsia	Eclampsia
Diastolic blood pressure	absolute level is > 90 but <100	absolute level is >100	As in severe pre-eclampsia plus fits
Proteinuria	Trace or 1+	2+ or greater	
Generalized oedema including face and hands	Absent	Persistently present	
Headache	Absent	Present	
Visual disturbance	Absent	Present	
Upper abdominal pain	Absent	Present	
Oliguria	Absent	Present	
Diminished foetal movement	Absent	Present	

Characteristics of Eclamptic fits:

- Convulsions may occur regardless of the severity of hypertension, are difficult to predict and typically occur in the absence of hyper-reflexia, headache or visual changes.
- Convulsions are tonic-clonic and resemble grand-mal seizures of epilepsy
- Seizures may recur in rapid sequence as in status epilepticus, and end in death.
- Convulsion may be followed by coma that lasts minutes or hours, depending on the frequency of seizures.
- 25% of eclamptic fits occur after delivery of the baby.

Stages of eclamptic fit

An eclamptic fit is similar to an epileptic fit, and has the following stages:

A) Premonitory stage

This lasts 10-20 seconds, during which:

- The eyes roll or stare
- The face and hand muscle may twitch
- There is a loss of consciousness

B) Tonic stage

This stage lasts 10-20 seconds, during which:

- The muscles go stiff or rigid
- The colour of the skin becomes blue or dusky (cyanosis)
- The back may be arched
- The teeth are clenched
- The eyes bulge

Remember that the onset of pre-eclampsia and eclampsia can be very sudden and without warning

C) Clonic Stage

This stage lasts 1- 2 minutes and is marked by:

- Violent contraction and relaxation of the muscles occur
- Increased saliva causes "foaming" at the mouth
- Deep noisy breathing
- Inhalation of mucous or saliva
- The face looks congested (filled with blood) and swollen
- Tongue is bitten by violent action of the jaws

D) Coma stage

This may last minutes or hours. During this time

- There is a deep state of unconsciousness
- Breathing is noisy and rapid
- Cyanosis fades, but the face remains congested and swollen
- Further fits may occur before the woman regains consciousness

Differential diagnosis of Eclampsia

Eclampsia must be differentiated from other conditions that may be associated with convulsions and coma, e.g. epilepsy, cerebral malaria, meningitis, head injury, cerebrovascular accident, intoxication (alcohol, drugs, and poisons), drug withdrawal, metabolic disorders, water intoxication, , encephalitis, hypertensive encephalopathy, hysteria.

Diagnosis of Preeclampsia /Eclampsia

History:

Mild-to-moderate preeclampsia may be asymptomatic. Many cases are detected through routine prenatal screening.

Patients with severe preeclampsia display end-organ effects and may complain of the following:

- CNS
 - Headache
 - Visual disturbances - Blurred, scintillating scotomata
 - Altered mental status

- Blindness - May be cortical or retinal
- Dyspnoea
- Edema: This exists in many pregnant women but sudden increase in edema or facial edema is more concerning for preeclampsia.
- Epigastric or right upper quadrant (RUQ) abdominal pain: Hepatic involvement occurs in 10% of women with severe preeclampsia.
- Weakness or malaise:

Physical Examination

Findings on physical examination may include the following:

- Increased BP compared with the patient's baseline or greater than 140/90 mm Hg
- Altered mental status
- Decreased vision or scotomas
- Papilledema
- Epigastric or RUQ abdominal tenderness
- Peripheral edema: Edema can be normal in pregnancy; however, a sudden increase in edema or swelling of the face is more suggestive of preeclampsia and should be promptly investigated.
- Hyperreflexia or clonus: Although deep tendon reflexes are more useful in assessing magnesium toxicity, the presence of clonus may indicate an increased risk of convulsions.
- Seizures
- Focal neurologic deficit

Investigations:

Laboratory Studies

- CBC count and peripheral smear
 - Microangiopathic haemolytic anaemia (HELLP)
 - Thrombocytopenia <100,000
 - Hemoconcentration may occur in severe preeclampsia.
 - Schistocytes on peripheral smear
- Liver function tests: Transaminase levels are elevated from hepatocellular injury and in HELLP syndrome.
- Serum creatinine level: Levels are elevated due to decreased intravascular volume and decreased glomerular filtration rate (GFR).
- Urinalysis - Proteinuria is one of the diagnostic criteria for preeclampsia.
 - Significant proteinuria defining preeclampsia is 300 mg or more of protein in a 24-hour urine sample.
 - Proteinuria suggestive of preeclampsia is greater than or equal to 1+ protein on urine dipstick or 300 mg/L or more on urine dipstick.
- Abnormal coagulation profile: PT and aPTT are elevated.
- Disseminated intravascular coagulopathy testing will show fibrin split products and decreased fibrinogen levels.
- Uric acid
 - Hyperuricemia is one of the earliest laboratory manifestations of preeclampsia. It has a low sensitivity, ranging from 0-55%, but a relatively high specificity, ranging from 77-95%.

Ultrasonography:

This is used to assess the status of the foetus as well as to evaluate for growth restriction (typically asymmetrical IUGR). Aside from transabdominal ultrasonography, umbilical artery Doppler ultrasonography should be performed to assess blood flow.

Management of patients with pre-eclampsia /eclampsia.**General principles:****BP control**

- The goal is to lower BP to prevent cerebrovascular and cardiac complications while maintaining uteroplacental blood flow.
- Control of mildly increased BP does not appear to improve perinatal morbidity or mortality, and, in fact, it may reduce birth weight.
- Antihypertensive treatment is indicated for diastolic blood pressure above 105 mm Hg and systolic pressure above 160 mm Hg, though patients with chronic hypertension may tolerate higher values.
- Patients with severe preeclampsia who have BP below 160/105 mm Hg may benefit from antihypertensives because of the possibility of unpredictable acceleration of the disease and sudden increases in hypertension.
- The goal is to maintain diastolic blood pressure between 90 and 100 mm Hg and systolic pressure between 140 and 155 mm Hg.
- First-line medications are labetalol, given orally or IV; nifedipine, given orally or IV; or hydralazine IV. (*Atenolol, ACE inhibitors, ARBs, and diuretics should be avoided*).

Control of seizures

- The basic principles of airway, breathing, circulation (the ABCs) should always be followed as a general principle of seizure management.
- Active seizures should be treated with intravenous magnesium sulphate as a first-line agent.
- Prophylactic treatment with magnesium sulphate is indicated for all patients with severe preeclampsia.
- Magnesium levels, respiratory rate, reflexes, and urine output must be monitored to detect magnesium toxicity. Magnesium sulphate is mostly excreted in the urine, and therefore urine output needs to be closely monitored. If urine output falls below 20 mL/h, the magnesium infusion should be stopped.
- Be aware of the risk of seizures following delivery — up to 44% of eclampsia cases have been reported to occur postnatally. This risk is especially elevated 48 hours postpartum, but it can occur at any time up to 4 weeks after delivery.
- For seizure refractory to magnesium sulphate therapy, benzodiazepines and/or phenytoin may be considered.

Fluid management

- Despite the peripheral edema, patients with preeclampsia are intravascularly volume depleted with high peripheral vascular resistance. **Diuretics should be avoided.**
- Aggressive volume resuscitation may lead to pulmonary edema, which is a common cause of maternal morbidity and mortality. Pulmonary edema occurs most frequently 48-72 hours postpartum, probably due to mobilization of extravascular fluid.
- Because volume expansion has no demonstrated benefit, patients should be fluid restricted when possible, at least until the period of postpartum diuresis. Total fluids should generally be limited to 80 mL/h or 1 mL/kg/h.
- Careful measurement of fluid input and output is advisable, particularly in the immediate postpartum period. Many patients will have a brief (up to 6 h) period of oliguria following delivery; this should be anticipated and not overcorrected.
- If fluids are required, preferably use Ringer's Lactate or Normal saline at a rate of 80 mls/ hr or 1ml/kg/hr. Avoid using Dextrose or Dextrose- Saline infusion

Delivery

- Delivery is the definitive treatment for antepartum preeclampsia.
- Patients with mild preeclampsia are often induced after 37 weeks' gestation. Prior to this, the immature foetus is treated with expectant management with corticosteroids to accelerate lung maturity in preparation for early delivery.
- In patients with severe preeclampsia, induction of delivery should be considered after 34 weeks' gestation. In these cases, the severity of disease must be weighed against the risks of prematurity.
- Eclampsia is common after delivery and has occurred up to 6 weeks after delivery. Patients at risk for eclampsia should be carefully monitored postpartum. Additionally, patients with preeclampsia successfully treated with delivery may present with recurrent preeclampsia up to 4 weeks postpartum.

Medication

Magnesium sulphate is the first-line treatment of prevention of primary and recurrent eclamptic seizures.

For eclamptic seizures refractory to magnesium sulphate, Diazepam and phenytoin may be used as second-line agents.

In the setting of severe hypertension (systolic BP, >160 mm Hg; diastolic BP, >110 mm Hg), antihypertensive treatment is recommended. Antihypertensive treatment decreases the incidence of cerebrovascular problems but does not alter the progression of preeclampsia.

Anticonvulsants:**Magnesium sulphate:**

This works by antagonizing calcium channels of smooth muscle. Administer IV/IM for seizure prophylaxis in preeclampsia. Use IV for quicker onset of action in true eclampsia. The table below illustrates the dosage and administration schedule.

Magnesium sulphate schedules for severe pre-eclampsia and eclampsia**Loading Dose**

Magnesium sulphate 20% Solution, 4g IV over 5 minutes

Follow promptly with 10g of 50% magnesium sulphate solution, 5g in each buttock as deep IM injection with 1mL of 2% lignocaine in the same syringe

Ensure that aseptic technique is practiced when giving magnesium sulphate deep IM injection. Warn the woman that a feeling of warmth will be felt when magnesium sulphate is given.

If convulsions occur after 15 minutes, give 2g magnesium sulphate (50% solution) IV over 5 minutes

Maintenance Dose

Give 5g magnesium sulphate (50% solution) + 1 mL lignocaine 2% IM every 4 hours into alternate buttocks. Continue treatment with magnesium sulphate for 24 hours after delivery or the last convulsion, whichever occurs last.

If 50% solution is not available, give 1g of 20% magnesium sulphate solution IV every hour by continuous infusion

CLOSELY MONITOR THE WOMAN FOR SIGNS OF TOXICITY

Before repeat administration, ensure that:

Respiratory rate is at least 16 per minute

Patellar reflexes are present

Urinary output is at least 30 ml per hour over preceding four hours

WITHHOLD OR DELAY DRUG IF:

Respiratory rate falls below 16 per minute

Patellar reflexes are absent

Urinary output falls below 30ml per hour over the preceding 4 hours

Keep antidote ready:

In case of respiratory arrest:

Assist ventilation (mask and bag, anaesthesia apparatus, intubation)

Give Calcium gluconate 1g (10mL of 10% solution) IV slowly until calcium gluconate begins to antagonise the effects of magnesium sulphate and respiration begins

Phenytoin:

Phenytoin has been used successfully in eclamptic seizures, but cardiac monitoring is required due to associated bradycardia and hypotension.

Central anticonvulsant effect of phenytoin is by stabilizing neuronal activity by decreasing the ion flux across depolarizing membranes.

Some benefits to using phenytoin are that:

- It can be continued orally for several days until the risk of eclamptic seizures has subsided,
- It has established therapeutic levels that are easily tested,
- It has no known neonatal adverse effects associated with short-term usage.

Dosage:

10 mg/kg loading dose infused IV no faster than 50 mg/min, followed by maintenance dose started 2 hrs later at 5 mg/kg

In the absence of MgSO₄, diazepam is used following the regime below

Diazepam schedules for severe pre-eclampsia and eclampsia

Intravenous administration:

Loading dose

- ◆ Diazepam 20mg IV slowly over 2 minutes
- ◆ If **convulsions recur**, repeat loading dose

Maintenance dose

- ◆ Diazepam 40mg in 500ml IV fluids (normal saline or Ringer's Lactate) titrated to keep the woman sedated but can be aroused
- ◆ Maternal respiratory depression may occur when dose exceeds 30mgs in 1 hour
- ◆ Assist ventilation (mask and bag, anaesthesia apparatus, intubation), if necessary
- ◆ Do not give more than 100mg in 24 hours.

Rectal Administration:

- ◆ Give Diazepam rectally when IV access is not possible. The loading dose is 20mg in 10ml syringe. Remove the needle, lubricate the barrel and insert the syringe into the rectum to half its length. Discharge the contents and leave the syringe in place, holding the buttocks together for 10 minutes to prevent expulsion of the drug. Alternatively, the drug may be instilled into the rectum through a catheter.
- ◆ If **convulsions are not controlled within 10 minutes** administer an additional 10mg per hour or more, depending on the size of the woman and her clinical response.

Antihypertensives

These agents are used to decrease systemic resistance and to help reverse uteroplacental insufficiency.

Hydralazine (Apresoline)

This is the first-line therapy against preeclamptic hypertension. It decreases systemic resistance through direct vasodilatation of arterioles, resulting in reflex tachycardia. Reflex tachycardia and resultant increased cardiac output helps reverse uteroplacental insufficiency, a key concern when treating hypertension in a patient with preeclampsia. Adverse effects to the foetus are uncommon.

Dosage

Give 5mg IV slowly over 10 mins if BP > or =160/110mm Hg; repeat 5 mg q20min to maximum of 20 mg

Labetalol

This is the recommended second-line therapy that produces vasodilatation and decreases in systemic vascular resistance. It has alpha-1 and beta-antagonist effects and beta2-agonist effects. The onset of action is more rapid than hydralazine and it results in less overshoot hypotension. Dosage and duration of labetalol is more variable. Adverse effects to foetus are uncommon.

Dosage

Give 20mg bolus, subsequently give doses of 40mg followed by 80mg IV at 10- 20 min intervals to achieve BP control to a maximum of 300 mg. Labetalol may also be administered by continuous IV infusion at 1mg /kg/hr

Nifedipine

It relaxes coronary smooth muscle and produces coronary vasodilatation, which, in turn, improves myocardial oxygen delivery. Sublingual administration is generally safe, despite theoretical concerns.

Dosage

Initial dosage is 10 mg orally if BP $\geq$ 160/110 mmHg. One may repeat after 30 minutes as needed

Definitive Management**a) Mild Pre-eclampsia** e.g. with BP 140/90

- Establish if the mother can rest at home
- Advise patient and relatives on importance of bed rest
- Give oral antihypertensives (alpha methyl dopa 250mg three times daily) Maintain diastolic BP at 90-100 mmHg
- Monitor maternal and foetal condition weekly
- Admit if coming too far away from hospital,
- Advise on worsening signs of the condition, and the need to report if any signs of severe pre-eclampsia are present
- Advise mother to take a diet, which is rich in protein, fibre and vitamins but low in carbohydrate and salt
- If the mother shows no improvement and facilities /skills to manage severe eclampsia are lacking, refer to higher level

c) Severe Pre-eclampsia e.g. BP diastolic $>$ 100 mmHg

- Admit patient
- Nurse in a quiet semi dark room
- Monitor vital signs every 15- 30 minutes
- Start MgSO₄ regime
- Consider timing and mode of delivery
- Closely monitor fluid intake and urine output
- Do blood chemistry (liver enzymes and creatinine)
- If the diastolic blood pressure is 110 mmHg or more, start antihypertensive drugs, e.g. Hydralazine 5 mg IV slowly every 5 minutes until blood pressure is lowered. Repeat hourly as needed or give hydralazine 12.5mg IM every 2 hours as needed
- If hydralazine is not available, give labetalol or nifedipine
- If no improvement, refer to comprehensive centre accompanied by trained nurse

Management of eclampsia:

- Call for help
- Maintain open airway
- Control fits
- Control the blood pressure and monitor quarter hourly
- Start IV line but restrict fluid intake to avoid pulmonary and cerebral oedema. Maximum of 30 drops per minute.
- Catheterise, and closely monitor fluid intake and urine output

Management of fitting patient:

- Patient should be put in semi prone position so that mucous and saliva can drain out
- Tight fitting dresses around the neck should be loosened or removed
- No attempt should be made to insert any instrument into the mouth
- Administer magnesium sulphate (or diazepam) as per regime to control fits
- Aspirate secretions from the mouth and nostrils as necessary
- Give Oxygen continuously during fit and for 5 minutes after each fit (if available)
- Fitting should be allowed to complete its course without restraining the patient
- Privacy and dignity of patient must be observed - pull screens around her

DELIVERY:

Delivery is the only cure for pre-eclampsia and eclampsia

- Delivery should take place as soon as the woman's condition has been stabilized, preferably within 6-8 hours from first convulsion; or within 12 hours of admission
- Delaying delivery to increase foetal maturity will risk the lives of both the woman and the foetus.
- Delivery should occur regardless of the gestational age, but **Eclampsia alone is not an indication for C/section**. Get skilled anaesthetic help early; this will also aid the management of hypertensive crises and fits.

Mode of delivery

Vaginal delivery is recommended:

- If the **cervix is favourable** (soft, dilated, effaced), rupture the membranes and induce labour using oxytocin
- If there is no absolute indication for Cesaerian section
- If **safe anaesthesia is not available for C/section** or if the **foetus is dead or too premature for survival**:

If the cervix is unfavourable (firm, thick, closed), ripen the cervix using prostaglandins or a Foley catheter

Caesarean section should be done:

- If **vaginal delivery is not anticipated** within 8 hours (for eclampsia) or 24 hours (for severe pre-eclampsia), deliver by C/section
- If there are **foetal heart rate abnormalities** (< 100 or > 180 beats / minute)
- If the **cervix is unfavourable** (firm, thick, closed) and the **foetus is alive**,

Postnatal care:

- Continue anticonvulsive therapy for 24 hours after delivery or last convulsion, whichever occurs last.
- Continue antihypertensive therapy as long as the diastolic pressure is 110 mmHg or more.
- Continue to monitor urine output. If urine output is less than 500 ml in 24 hours, limit the amount of fluid intake to 500 mls per 24 hour + an amount equal to the amount of urine passed
- Watch carefully for the development of pulmonary oedema, which often occurs after delivery.
- Life threatening complications can still occur after delivery. Monitor carefully until the patient is clearly recovering.
- Consider referral of women who have:
 - Oliguria (less than 500 ml urine output in 24 hours) that persists for 48 hours after delivery

- Coagulation failure (e.g. coagulopathy or haemolysis, elevated liver enzymes and low platelets (HELLP) syndrome)
- Persistent coma lasting more than 24 hours after convulsion.

Complications

Complications of preeclampsia /eclampsia may include the following:

- Abruptio placentae with disseminated intravascular coagulopathy
- Renal insufficiency or failure
- Haemolysis, elevated liver enzyme levels, and low platelet count (or HELLP syndrome)
- Cerebral haemorrhage
- Maternal death and/or foetal demise

Prognosis

- Early detection and frequent obstetric assessment and prompt management markedly improves prognosis.
- Women at risk of preeclampsia must have pre conception care and attend ANC early and regularly
- A history of preeclampsia increases a woman's subsequent risk of vascular disease, including hypertension, thrombosis, ischemic heart disease, myocardial infarction, and stroke.

ABORTION

OUTLINE

1. Definition and classification of abortion
2. Epidemiology
3. Risk Factors for abortion
4. Diagnosis of abortion
5. Complications of abortion and its management
6. MVA procedure
7. Follow up and FP

Introduction

Abortion is defined as the termination of pregnancy by any means, resulting in expulsion of an immature nonviable foetus of less than 28 weeks. It may be early or late depending on gestation (early up to 12 weeks gestation and late between 13-28 weeks gestation). Abortion can also be classified as spontaneous or induced. Induced abortion may be further classified as safe or unsafe. The WHO defines unsafe abortion as a procedure meant to terminate an unintended pregnancy that is performed by individuals without the necessary skills, or in an environment that does not conform to the minimum medical standards, or both.

Epidemiology:

Worldwide, the overall abortion rate declined between 1995 and 2003 from 35 to 29 per 1,000 women of reproductive age (WRA). This may be attributed to increased contraceptive use, and enhanced post abortion care services. In contrast, during the same period the unsafe abortion rate declined minimally—from 15 to 14 per 1,000 WRA. Almost 95% of unsafe abortions occur in women from low resource settings.

Adolescents (women aged 15–19) are estimated to have 2.5 million of the approximately 19 million unsafe abortions that occur annually in the developing world

It is estimated that 316,560 spontaneous and induced abortions occur in Kenya annually—46 for every 1,000 WRA. Abortion is one of the 5 major causes of maternal mortality in Kenya.

“Paragraph 8.25 from the International Conference on Population and Development (ICPD) Programme of Action 1994

In no case should abortion be promoted as a method of family planning.....

Prevention of unwanted pregnancies must always be given the highest priority and all attempts should be made to eliminate the need for abortion.....”

Risk factors for spontaneous abortion:

The majority of spontaneous abortions occur early in pregnancy with approximately 80% occurring in the first trimester. In many cases, there is no specific factor that causes a spontaneous abortion.

However, more than half of first trimester spontaneous abortions are due to abnormal embryological development. Other possible factors include: febrile illnesses, systemic and genital infections such as syphilis, systemic tuberculosis, Chagas disease, rubella virus, cytomegalovirus, herpes simplex virus, Chlamydia, mycoplasma, toxoplasma gondii, listeria, brucella, maternal chronic disease, hormonal causes, environmental toxins, dietary causes, anatomic abnormalities, and pregnancy occurring while an IUD is in place.

Risk factors for induced abortion:

Contributing factors at individual level

- Sexual activity at a young age
- Lack of knowledge about family planning
- Lack of knowledge about where to obtain family planning services
- Unwillingness to use family planning methods for cultural, religious, social, economic or emotional reasons (services not perceived as user-friendly)
- Inability to use a contraceptive method effectively
- Contraceptive failure
- Lack of awareness about the harmful effects of unsafe abortion
- Low educational status (related to lack of knowledge)
- Low economic status (leads to lack of access if services are fee paying)
- Previous history of unwanted pregnancy and abortion.

Contributing factors at community level

- Lack of awareness about the harmful effects of unsafe abortion
- Lack of family planning services
- Low socioeconomic status
- Lack of involvement of men in reproductive health matters, men not willing to comply with contraceptives
- Women's low status e.g. may not be able to seek care without permission of partner or older member of family.

Types of Abortion:

Septic abortion is defined as any abortion that is complicated by infection

Habitual or recurrent abortion is when a woman has had three or more consecutive pregnancies ending in spontaneous abortion.

Missed abortion describes a pregnancy where the fetus has died but the fetal tissue and placenta are retained in the uterus.

Four stages of abortion have been described:

1. Threatened abortion- implies that pregnancy may continue
2. Inevitable abortion – implies that the pregnancy will not continue and will proceed to partial or complete expulsion
3. Incomplete abortion – Where products of conception are partially expelled
4. Complete abortion – When products of conception are completely expelled

Features of the various types of abortion are outlined in the table below:

Diagnosis	Bleeding	Cervix	Uterine size	Other signs
Threatened abortion	Slight to moderate	Not dilated	Equal to dates	Positive pregnancy test Cramping Uterus soft
Inevitable abortion	Moderate to heavy	Dilated	Less than or equal to dates	Cramping Uterus tender/firm
Incomplete abortion	Slight to heavy	Dilated	Less than or equal to dates	Partial expulsion of products of conception Uterus tender/firm
Complete abortion	Slight to moderate	Dilated or closed	Less than dates	Complete expulsion of products of conception
Missed abortion	Little or none	Closed	Less than or equal to dates	Fetus dead; delayed expulsion Decrease in pregnancy signs

Summary of complete Clinical assessment:

History	Obtain the following information, either from the woman or from a relative: ▪ amenorrhoea - when was the last menstrual period ▪ bleeding - duration, amount and presence of clots or pieces of tissue ▪ cramping - duration, severity and location ▪ abdominal or shoulder pain ▪ fever, chills, general malaise or fainting ▪ interference with pregnancy - if and how an attempt was made to stop the pregnancy ▪ past obstetrical and gynaecological problems - nature of problems and how they were managed ▪ drug allergies - including reactions to local anaesthetic
General physical examination	▪ take and record vital signs - temperature, pulse, respiration and blood pressure ▪ note general health of woman - e.g. malnourished, anaemic, poor general health, check for physical injuries ▪ cramping - duration, severity and location ▪ auscultate heart and lungs ▪ examine abdomen - listen for bowel sounds, look for distention and rigidity, gently palpate for abdominal masses, check for rebound tenderness¹
Pelvic examination	▪ perform a speculum examination ▪ remove any visible products of conception from vaginal canal or cervical os ▪ note the amount of bleeding and whether the cervix is open or closed ▪ check for vaginal and cervical lacerations ▪ note if there is a foul smelling discharge ▪ perform bimanual examination to estimate size of uterus, check for pelvic masses, pelvic pain (note severity, location and cause of pain)

Adapted from *Clinical management of abortion complications: a practical guide*. Geneva, World Health Organization, 1994 (WHO/FHE/MSM/94.1).

Laboratory Tests and X- Rays:

Test	Potential use
Haemoglobin and haematocrit	In cases of shock, severe vaginal bleeding, suspected intra-abdominal injury or anaemia - to assess the Hb level to determine whether or not to transfuse
Blood typing and crossmatching	In cases of shock, severe vaginal bleeding, or suspected intra-abdominal injury - is done to determine suitability of blood for transfusion
Complete blood count	In cases of shock, infection, suspected intra-abdominal injury, or coagulopathy - to determine the levels of platelets, white blood cell count in order to decide on an intervention
Rh testing	It should be done to determine the Rh state of the woman so that prophylaxis treatment against Rh iso-immunization can be done if the woman's Rh is negative
Ultrasound	In cases of suspected ectopic pregnancy or uncertain uterine size - to confirm diagnosis
Abdominal x-ray	Only in cases of severe infection or suspected intra-abdominal injury - to determine and confirm the extent of injury
STI screening and voluntary counselling and testing (VCT) for HIV, unless HIV status already known	Important to offer both tests to all women, but especially important where pregnancy is associated with violence, in very young girls and in cases of unsafe abortion

Post Abortion care

- Post-abortion care is the care given to a woman who has had an unsafe, spontaneous or legally induced abortion. It consists of the following components:
- Emergency treatment of complications from a spontaneous or unsafe induced abortion
- Family planning counseling and services
- Access to comprehensive reproductive health care, including screening and treatment for STI, RTIs and HIV/AIDS
- Community education to improve reproductive health and reduce the need for abortion.

Management of Shock:

The main aim when managing shock is to stabilize the patient, as follows:

1. Universal measures:

- Make sure that the airway is open;
- Check vital signs;
- Do not give fluids by mouth as the woman may vomit and inhale or aspirate the vomitus;
- Keep the woman warm but do not over heat;
- Maintain circulation to vital organs by elevating the legs (either by placing pillows under feet, elevating foot of the bed or placing the patient in a trendelenburg position). *Remember if you elevate the foot of the bed too much, the blood may collect in the uterus rather than be expelled.*

2. Oxygen: if oxygen is available, give by mask or nasal cannulae at 6–8 litres per minute.**3. Fluids:**

- Start intravenous fluids immediately; use a large bore needle (i.e. 16–18 gauge)
- If possible, collect blood samples for hemoglobin and haematocrit and crossmatch;
- Give sodium lactate or normal saline at a rate of 1 litre in 15–20 minutes (normally it takes approximately 1–3 litres, infused at this rate to stabilize a patient in shock).

- Blood transfusion is required if hemoglobin is 5 g/100 ml or less or haematocrit is 15% or less.¹ No fluids should be given by mouth.
- 5. *Medication:*
 - Broad spectrum antibiotics should be started either intravenously or intramuscularly;
 - Tetanus toxoid and antitoxin should be given if there is any uncertainty about the woman's vaccination history.

Management of haemorrhage

This involves the following basic steps

1. Manage shock as above
2. Identify site of bleeding
3. Evacuate the uterus
4. Examine products of conception
5. Repair cervical /genital tract lacerations
6. Manage uterine perforations
7. Referral and transfer as appropriate

Abnormal findings on tissue examination:

-The presence of decidua without villi may indicate incomplete evacuation of the uterus, ectopic pregnancy, completed abortion prior to procedure, or blighted ovum
 -Old blood clots, pus, or foul-smelling material indicate infection/sepsis
 -Grape-like clusters indicate the possibility of a molar pregnancy or hydatidiform mole.

SPECIFIC MANAGEMENT

Threatened Abortion

- Medical treatment is usually not necessary
- Avoid strenuous activity and sexual intercourse, but bed rest is not necessary
- If bleeding stops, follow up in antenatal clinic. Reassess if bleeding reoccurs.
- If bleeding persists, assess for foetal viability (pregnancy test / ultrasound) or ectopic pregnancy (ultrasound). Persistent bleeding, particularly in the presence of a uterus larger than expected, may indicate twins or molar pregnancy

Inevitable Abortion

- If pregnancy is less than 16 weeks, plan for evacuation of uterine contents. If evacuation is not possible immediately, give oxytocin 10 IU IM and arrange for evacuation as soon as possible
- If pregnancy is greater than 16 weeks, await for spontaneous expulsion of the products of conception followed by evacuation; if necessary infuse oxytocin 40 units in 1L iv fluids at 40 drops per minute to help achieve expulsion of products of conception
- Ensure follow-up of the woman after treatment

Incomplete Abortion

- If bleeding is light to moderate and pregnancy is less than 16 weeks, use fingers or ring (or sponge) forceps to remove products of conception protruding from the cervix
- If bleeding is heavy and pregnancy is less than 16 weeks, evacuate the uterus:
 - Manual Vacuum Aspiration is the preferred method of evacuation. Evacuation by sharp curettage should only be done if MVA is not available
 - If evacuation is not immediately possible, give oxytocin 10 IU IM and arrange for evacuation as soon as possible

- If pregnancy is greater than 16 weeks:
 - Infuse oxytocin 40 units in 1 L iv fluids (normal saline or Ringer's Lactate) at 40 drops per minute until expulsion of products of conception occurs
 - If necessary, give misoprostol 200 mcg vaginally every 4 hours until expulsion, but do not administer more than 800 mcg
 - Evacuate any remaining products of conception from the uterus
- Ensure follow-up of the woman after treatment

Complete Abortion

- Evacuation of the uterus is usually not necessary
- Observe for heavy bleeding
- Ensure follow-up of the woman after treatment

Management of Septic abortion

1. Manage Shock
2. Identify source of infection
3. Choice of antibiotics:

If severe infection involving deep tissue, give:

 - Ampicillin 2 g IV stat every 6 hours, **and**
 - Gentamicin 5 mg/kg body weight IV every 24 hours, **and**
 - Metronidazole 500 IV every 8 hours.

If infection does not involve deep tissue, give:

 - Amoxicillin 500 mg orally 3 times a day for 5 days, **and**
 - Metronidazole 400 mg orally 3 times a day for 5 days.
 - Gentamicin 5mg/kg body weight IV every 24hours for 5 days.
4. Tetanus Immunoprophylaxis
5. If the woman has not been fully immunized* for tetanus within the last 10 years or is unsure of her vaccination status, tetanus vaccine and tetanus antitoxin should be given.
6. Evacuate the uterus
7. Examine products of conception
8. Referral and transfer

Procedure of Manual Vacuum Aspiration

The management of incomplete abortion almost always includes evacuation of retained products of conception from the uterus. MVA is a simple, cost-effective procedure involving the use of suction to remove tissue and blood through a cannula and into a syringe. The procedure is highly effective in removing retained products of conception from the uterus and is associated with a low complication rate. It is an effective method of treatment for uterine sizes up to 12 weeks. MVA does not require a general anesthetic and can be performed in an examination or procedure room, rather than in an operating room.

Certain serious complications resulting from unsafe abortion, such as shock, uterine perforation or sepsis must be identified and treated before uterine evacuation is attempted. It is also contraindicated in large fibroids. MVA should be used with caution in the following cases and only in health facilities with full emergency backup: History of bleeding disorder, hemodynamic instability due to cardiac disease and severe anemia.

MVA

• Explain the procedure to the patient. • Provide emotional/verbal support and encouragement throughout the procedure • Maintain aseptic technique • Give Pethidine 50mg IM 30 minutes before the procedure at hospital level or Diclofenac/Ibuprofen at Health Centre level • Assemble the equipment • Perform 6 swab technique to clean the vulva and vagina with chlorhexidine • Perform bimanual pelvic examination • Insert the speculum gently and remove the visible products of conception • Clean the cervix • Examine the cervix for tears, lacerations, etc. • Put single tooth tenaculum or vulsellum forceps on anterior lip of cervix • Gently apply traction on the cervix and insert cannula slowly into uterine cavity until it touches the fundus (not more than 10cm)	• Withdraw the cannula 1cm away from the fundus • Attach the prepared syringe to the cannula • Release the pinch valve on the syringe • Evacuate any contents of the uterine cavity by gently rotating the cannula and syringe • Check for signs of completion (<i>red or pink foam, no more tissue in cannula or 'gritty' sensation</i>) • Gently withdraw the cannula and detach the cannula from syringe • Quickly inspect the products of conception • Give Oxytocin 10 IU IM • Process the MVA equipment according to standards • Observe the client / patient for 30 minutes • Complete the counselling process including Family Planning and provision of the chosen method • Documentation
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Complications of Abortions

It is estimated that between 10% and 50% of all women who experience unsafe abortion need medical care for complications.

The most common complications are incomplete abortion, sepsis, hemorrhage and intra-abdominal injury (e.g. puncturing and tearing of the uterus).

Common long-term health problems caused by unsafe abortion include anemia, chronic pain, pelvic inflammatory disease, tubal blockage and secondary infertility.

Other potential consequences of unsafe abortion include ectopic pregnancy and an increased risk of spontaneous abortion or premature delivery in subsequent pregnancies.

Abortion is one of the five major causes of maternal death

Management of complications of abortion

Symptoms and signs	Complication	Management
• Lower abdominal pain • Rebound tenderness • Tender uterus • Prolonged bleeding • Malaise • Fever • Foul smelling vaginal discharge • Purulent cervical discharge • Cervical motion tenderness	Infection / sepsis	Begin antibiotics as soon as possible before attempting manual vacuum aspiration Ampicillin 2g IV 6hrly plus Gentamycin 5mg/kg IV daily plus Metronidazole 500 mg IV 8hrly Until the patient is fever free for 48 hours
• Cramping / abdominal pain • Rebound tenderness • Abdominal distension • Rigid (tense and hard) abdomen • Shoulder pain • Nausea / vomiting • Fever	Uterine, vaginal or bowel injury	Perform a laparotomy to repair the injury and perform MVA simultaneously. Seek further assistance is required.

Follow up of women who have had an abortion

- Before discharge, tell a woman who has had a spontaneous abortion that spontaneous abortion is common and occurs in at least 15% of clinically recognised pregnancies. Also reassure the woman that the chances for a subsequent successful pregnancy are good unless there has been sepsis or a cause of the abortion is identified that may have an adverse effect on future pregnancies (rare).
- Some women may want to become pregnant soon after having an incomplete abortion. The woman should be encouraged to delay the next pregnancy until she is completely recovered.
- It is important to counsel a woman who has had an unsafe abortion. If pregnancy is not desired, certain methods of family planning can be started immediately (within 7 days) provided:
 - There are no severe complications requiring further treatment
 - The woman receives adequate counselling and help in selecting the most appropriate family planning method

Post Abortion Family Planning:

Ovulation can occur as early as two to four weeks after an abortion. Approximately 75% of women who have had an abortion will ovulate within six weeks of the abortion. After a first trimester abortion, ovulation often occurs within two weeks, and after a second trimester abortion, within four weeks. Therefore, there is an immediate need for contraception for women who do not want to become pregnant, or for health reasons should delay becoming pregnant.

There is no medical reason to limit the choice of contraceptive methods available to women after treatment for abortion. All methods can be considered for use after abortion, providing there are (a) no complications requiring further treatment, (b) appropriate screening is provided for the contraindications to each method, and (c) good counseling is offered (see methods below)

Method	Timing after abortion	Remarks
Fitted barriers used with spermicides (diaphragm) cervical cap	Diaphragm can be fitted immediately after first trimester abortion After second trimester abortion, fitting should be delayed until uterus returns to pre-pregnancy size (in 6 weeks)	May provide some protection against STIs; protection against HIV should not be assumed
Fertility awareness-based methods	Not recommended for immediate post-abortion use Women can use calendar-based methods as soon as they have completed three post-abortion menses	No protection against STI/HIV
Tubal occlusion	Tubal occlusion (mini laparotomy or laparoscopy) can be performed immediately after an uncomplicated abortion In cases of post-abortion sepsis or fever, severe post-abort haemorrhage, severe trauma to the genital tract or acute haematoaetra, the procedure must be delayed until satisfactory treatment has been completed and/or injury has healed	Performing tubal occlusion after a first trimester incomplete abortion is similar to an interval procedure After a second trimester incomplete abortion, it is similar to a postpartum procedure Adequate counselling and informed decision-making and consent must go before voluntary sterilization procedures (tubal occlusion or vasectomy); however this is often not possible at the time of emergency care No protection against STI/HIV

Method	Timing after abortion	Remarks
Oral contraceptives Combined oral contraceptives (COCs) and Progestogen only pills (POPs)	Start COC or POP use immediately, preferably on the day of treatment	Can be started immediately, even if infection is present If adequate counselling and informed decision-making cannot be guaranteed, delay starting pills and provide condoms in the meantime No protection against STI/HIV infection
Injectables Depot medroxy progesterone acetate (DMPA), Norethisterone enantate (NET-EN)	May be given immediately	Can be started immediately, even if infection is present If adequate counselling and informed decision-making cannot be guaranteed, delay first injection and provide condoms in the meantime No protection against STI/HIV
Implants Levonorgestrel and etonorgestrel	May be given immediately	Can be started immediately, even if infection is present If adequate counselling and informed decision-making cannot be guaranteed, delay first insertion and provide condoms in the meantime Access to a provider who is skilled in insertion and removal is necessary No protection against STI/HIV
IUD Intra uterine device	First and second trimester abortion: IUDs can be inserted if risk or presence of infection can be ruled out Delay insertion until serious injury is healed, haemorrhage is controlled and acute anaemia improves	Uterine perforation can occur during insertion If adequate counselling and informed decision-making cannot be guaranteed, delay insertion and provide condoms in the meantime Access to a provider who is skilled in insertion and removal is necessary No protection against STI/HIV There is some concern about the risk of expulsion after second trimester abortion
Non-fitted barriers and spermicides (condoms, foam, cream, film, tablets, gel)	Start as soon as intercourse is resumed	Good interim methods if initiation of another method must be postponed Intercourse should be delayed until bleeding has stopped (5 to 7 days) Latex and vinyl condoms provide protection against STI/HIV

Post-abortion contraception: guidelines for contraceptive use by clinical condition

Clinical condition	Precautions	Recommendations
Confirmed or presumed diagnosis of infection: - signs and symptoms of sepsis/infection - signs of unsafe or unclean abortion - unable to rule out infection	IUD: Do not insert until risk of infection ruled out, or infection has completely gone (approximately three months after completion of treatment) Female voluntary sterilization: Do not perform procedure until risk of infection ruled out, or infection has completely gone (approximately three months after completion of treatment)	Oral contraceptives (COCs and POPs) can begin use immediately Patch and ring can begin use immediately Implants can begin use immediately Injectables (DMPA, NET-EN) can begin use immediately Condom can be used when sexual activity is resumed Diaphragm can be used when sexual activity is resumed Spermicides can be used when sexual activity is resumed
Injury to genital tract: - uterine perforation (with or without bowel injury) - serious vaginal or cervical injury, including chemical burns	IUD: Do not insert until serious injury has healed Diaphragm: Do not use until vaginal or cervical injury has healed Spermicides: Do not use until vaginal or cervical injury has healed Ring: Do not use until vaginal or cervical injury has healed	Oral contraceptives (COCs and POPs) can begin use immediately Patch and ring can begin use immediately Implants can begin use immediately Injectables (DMPA, NET-EN, Cycloferm, Mesigyna) can begin use immediately Condom can be used when sexual activity is resumed Diaphragm can be used when sexual activity is resumed (can be used with uncomplicated uterine perforation) Spermicides can be used when sexual activity is resumed (can be used with uncomplicated uterine perforation)
Severe bleeding (haemorrhage) and related severe anaemia (Hb<7 gm/dl or Hct<20)	IUD: (inert or copper-bearing): Delay insertion until acute anaemia improves Female voluntary sterilization: do not perform procedure until the cause of haemorrhage or anemia has been resolved	Oral contraceptives (COCs and POPs) can begin use immediately Implants can begin use immediately Injectables (DMPA, NET-EN): Can begin use immediately Patch and ring can begin use immediately IUD (progestogen-releasing) can be used with severe anaemia (decreases menstrual blood loss) Condom can be used when sexual activity is resumed Diaphragm can be used when sexual activity is resumed Spermicides can be used when sexual activity is resumed

ECTOPIC PREGNANCY**OUTLINE**

1. Definition/explanation of ectopic pregnancy
2. Incidence and Risk factors
3. Diagnosis of ectopic pregnancy
4. Immediate and subsequent management of a patient with ectopic pregnancy
5. Complications of ectopic pregnancy

Definition of ectopic pregnancy and anatomical sites

In ectopic pregnancy, implantation occurs at a site other than the endometrial lining of the uterine cavity, e.g. in the fallopian tube, uterine cornua, cervix, ovary, abdominal or pelvic cavity. All ectopic pregnancies eventually rupture or involute. An ectopic pregnancy is a medical emergency and if not treated may lead to death.

Classification:

- I. **Tubal ectopic:** The most common site for ectopic implantation is the fallopian tube (more than 90%), followed by the uterine cornua. Tubal ectopic pregnancy is caused by a combination of retention of the embryo within the fallopian tube due to impaired embryo-tubal transport and alterations in the tubal environment allowing early implantation to occur.
- II. **Non Tubal ectopic pregnancy:** Two percent of ectopic pregnancies occur in the ovary, cervix, or are intraabdominal. Maternal morbidity and mortality from extra-uterine pregnancy is high as attempts to remove the placenta from the organs to which it is attached usually lead to uncontrollable bleeding from the attachment site.
- III. **Heterotopic pregnancy.** This is rare. It occurs when there are two fertilized eggs, one outside the uterus and the other inside. The uterine pregnancy is usually discovered later than the ectopic.
- IV. **Persistent ectopic pregnancy.** This refers to the continuation of trophoblastic growth after a surgical intervention to remove an ectopic pregnancy.

Incidence and risk factors

The overall incidence of ectopic pregnancy is about 2% of all pregnancies. In 1/3 -1/2 of cases no risk factor is identified. The incidence increases as maternal age increases. Other risk factors include previous pelvic inflammatory disease, previous tubal surgery, previous ectopic pregnancy, cigarette smoking and previous induced abortion. Ectopic pregnancy may occur any time from menarche to menopause; However about 40% occur in women between ages 20 and 29 years. Over 75% of ectopic pregnancies are diagnosed before the 12th week of gestation.

Diagnosis of ectopic

A high index of suspicion is required for diagnosis of ectopic pregnancy. Early symptoms are either absent or subtle. Clinical presentation of ectopic pregnancy occurs at a mean of 7.2 weeks after the last normal menstrual period. Early signs include:

- Pain in the lower abdomen, and inflammation- This is usually mild
- Dysuria /Pain while urinating
- Mild vaginal bleeding, usually mild.
- Pain while having a bowel movement

Patients with a late ectopic pregnancy typically experience pain and bleeding.

- External bleeding is due to the falling progesterone levels.
- Internal bleeding (hematoperitoneum) is due to hemorrhage from the affected tube.

Symptoms and signs differ according to stage of rupture:

- An **un-ruptured ectopic** pregnancy may be difficult to diagnose. The patient may only complain of vaginal spotting, intermittent abdominal pain and normal pregnancy symptoms (amenorrhoea, nausea, vomiting, etc.)
- In a **slow leaking ectopic** pregnancy, an ammenorrhoeic patient usually abdominal pain, and may experience fainting attacks. She may be pale, hypotensive, and will have tachycardia, abdominal distension with tenderness, guarding / rebound; pain on cervical motion and adnexal tenderness.
- An **acutely ruptured ectopic** patient may, in addition to the above, present with signs and symptoms of shock

Differential diagnosis

<i>Presenting symptoms and other symptoms typically present</i>	<i>Symptoms and signs sometimes present</i>	<i>Probable Diagnosis</i>
• Abdominal pain • Amenorrhoea • Light bleeding • Closed cervix • Uterus slightly larger than normal • Uterus softer than normal		THREATENED ABORTION
• Abdominal pain • Light bleeding • Closed cervix • Uterus slightly larger than normal • Uterus softer than normal	• Fainting • Tender adnexal mass • Amenorrhoea • Cervical motion tenderness	ECTOPIC PREGNANCY
• Abdominal pain • Adnexal mass on vaginal examination	• Palpable, tender discrete mass in lower abdomen • Light vaginal bleeding	OVARIAN CYST
• Abdominal pain • Low grade fever • Rebound tenderness	• Abdominal distension • Anorexia • Nausea/vomiting • Paralytic ileus • Increased white blood cells • No mass in lower abdomen • Site of pain higher than expected	APPENDICITIS
• Dysuria • Increased frequency and urgency to pass urine • Abdominal pain	• Retropubic or suprapubic pain	CYSTITIS
• Dysuria • Spiking fever and chills • Increased frequency and urgency to pass urine • Abdominal pain	• Retropubic or suprapubic pain • Loin pain/tenderness • Tenderness in rib cage • Anorexia • Nausea/Vomiting	ACUTE PYELONEPHRITIS
• Low grade fever/chills • Lower abdominal pain • Absent bowel sounds	• Rebound tenderness • Abdominal distension • Anorexia • Nausea/vomiting • Shock	PERITONITIS

Investigations

An ectopic pregnancy should be considered in any woman with abdominal pain or vaginal bleeding who has a positive pregnancy test.

- **Pregnancy test:** Measurement of the urine β human chorionic gonadotrophin is about 99 % positive for pregnancy and ectopic. Note that a negative pregnancy test **does not rule out** ectopic pregnancy.
- If on **paracentesis or culdocentesis** non-clotting blood is obtained, this indicates ruptured ectopic.
- **Ultrasonography:** An ultrasound showing a gestational sac with fetal heart in the fallopian tube is clear evidence of ectopic pregnancy.
- **A laparoscopy or laparotomy** can also be performed to visually confirm an ectopic pregnancy

Management

Untreated ectopic pregnancy is fatal to the mother; However if treatment occurs before rupture, maternal death is rare.

Medical management:

Early treatment of an ectopic pregnancy with methotrexate is a viable alternative to surgical treatment since at least 1993. If administered early in the pregnancy, methotrexate terminates the growth of the developing embryo; this may cause an abortion, or the tissue may then be either resorbed by the woman's body or pass with a menstrual period.

Immediate Management

- If the patient is in shock, manage accordingly
- If in a peripheral facility, stabilise patient and refer to a hospital that can offer surgical services
- Take blood for cross matching and arrange for immediate laparotomy. Do not wait for blood before performing surgery.
- At surgery go straight for the ectopic gestation and stop the bleeding. If the damage to the tube is extensive perform salpingectomy. If the damage is minimal and further fertility desired perform salpingostomy.
- Auto transfusion may be considered if significant haemorrhage occurs and the blood is fresh and free from infection and clots.

Subsequent Management

- Provide counselling on future fertility, risk of repeat ectopic pregnancy
- Provide contraception information / services before discharge.
- Correct/prevent anaemia as appropriate
- Provide nutritional and dietary counselling
- Arrange for a follow follow-up visit in 1 week

Complications of ectopic pregnancy

- Haemorrhagic shock
- Anaemia
- Pelvic adhesions, chronic pelvic pain
- Secondary infertility
- Increased risk of repeat ectopic pregnancy
- Maternal death

Prognosis

Fertility following ectopic pregnancy depends upon several factors, the most important of which is a prior history of infertility.

The treatment choice, whether surgical or nonsurgical, also plays a role. For example, the rate of intrauterine pregnancy may be higher following methotrexate compared to surgical treatment.

Rate of fertility may also be better following salpingostomy than salpingectomy

Multiple pregnancies

OUTLINE

1. Introduction: (definition, epidemiology)
2. Diagnosis
3. Differential diagnosis
4. Investigations
5. Management

Introduction:

Multiple pregnancy is when there is a pregnancy with more than one foetus. Twin pregnancy is the most common form of multiple pregnancy.

Symptoms and signs

- A positive family history of twins
- Exaggerated symptoms of pregnancy (hyperemesis gravidarum, pre-eclampsia)
- Uterus greater than gestational age
- Globular uterus
- Two or more foetal hearts
- Heads feel smaller than the dates would indicate

Differential diagnosis

- Large single foetus
- Wrong dates
- Polyhydramnios
- Obesity of the mother
- Hydrocephalus
- Uterine / ovarian mass

Investigations

- Ultrasonography

Management

- If twins are expected, refer to facility that can provide Comprehensive Emergency Obstetric and Newborn Care
- Screen for possible complications, e.g. pre-eclampsia, anaemia, etc.
- Reasons for admission are:
 - To ensure bed rest
 - For women who have no access to emergency transport
 - Polyhydramnios
 - Preterm labour
 - Anaemia
 - APH
 - Hypertension in pregnancy
 - Poor past obstetric history
 - Malpresentation of the first twin

Labour

Allow spontaneous labour only if the first twin is presenting cephalic. If the first baby is a malpresentation, CS should be performed.

- Set up an IV line and take blood for grouping and cross matching
- Ensure preparedness of neonatal / paediatric unit
- No oxytocics should be administered after delivery of first baby
- After delivery of the first baby, ascertain lie of second baby. If longitudinal, rupture the membranes and wait for spontaneous delivery of second baby
- Continue foetal monitoring
- If no contraction within 10 minutes, put up oxytocin drip to augment labour and deliver second baby.
- In case of retained subsequent baby (>30 minutes after delivery of first twin), consider C/section
- Palpate uterus and ensure that there is no baby before giving oxytocin
- Conduct active management of third stage of labour
- Examine placenta(s) for consanguinity and zygosity
- Continue with IV oxytocin for one hour after delivery of placenta

Note

- Twin pregnancies pose serious risks to the woman and the foetuses. The risk of stillbirth is ten times higher in each twin foetus than in a singleton foetus. Neonatal mortality is also higher, mainly because 50% of twins are born preterm and many are growth retarded. Twin foetuses may suffer from discordant growth and twin-to-twin transfusion syndrome, sometimes in combination. These and other complications are more often seen in monozygotic twins.
- Triplets and higher order multiples are increasingly vulnerable. Women carrying twins more often develop anaemia, preeclampsia, hyperemesis and polyhydramnios, and will experience more peripartum complications. With advancing pregnancy they will be increasingly burdened by physical work. Sick-leave will relieve them of undue strain, but bed rest has not been shown to be beneficial.
- As soon as a twin (or higher order) pregnancy is diagnosed or suspected, the woman should be referred to a comprehensive facility. Ideally, referral centres should be equipped with an ultrasound scanner for diagnosis and monitoring. Further antenatal care should be as advised by the specialist obstetrician. Provision of care may then be shared between the primary care and referral centres.
- Advice is crucial for women pregnant with twins. Preparing for labour and delivery at the hospital should involve prior contact with the obstetrical unit to prepare a plan for adequate and immediate transportation in case of labour or complications (e.g. passage of amniotic fluid or bleeding), and to emphasize that birth is likely to be preterm. The woman should be given appropriate advice, both verbally and in written form. Sick-leave during the third trimester should be considered, especially for women with physically strenuous work.

Session 1: Malaria in Pregnancy

Outline

1. Introduction
2. Definition of malaria
3. Clinical features of malaria
4. Effects of malaria in pregnancy
5. Prevention of malaria in pregnancy
6. Treatment of malaria in Pregnancy

INTRODUCTION

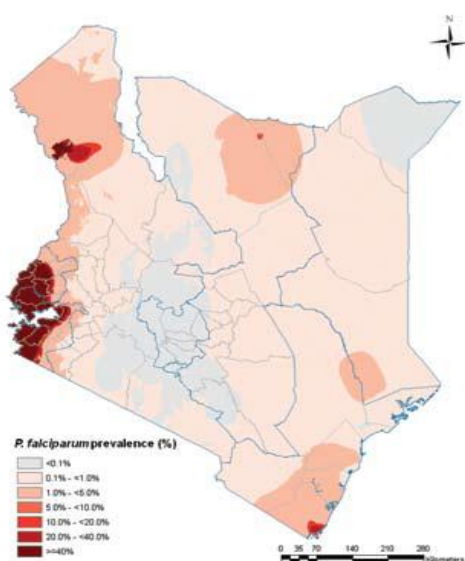
Malaria is a disease caused by parasites of the genus *Plasmodium*. Nationally, *Plasmodium falciparum* is the predominant species accounting for 98.2 per cent of all infections. Malaria is one of the major diseases of public health significance in this country. It causes 5 times more illness than TB, AIDS, measles and leprosy combined. It is responsible for 20- 45% of hospital admissions and 25 -35% of outpatient clinic visits. In Kenya alone, 96 children die daily from malaria. It is also a major cause of maternal morbidity and mortality, accounting for 10% of maternal deaths. By preventing malaria during pregnancy an estimated 25,000 lives could be saved each year.

Kenya has four malaria epidemiological zones, with diversity in risk determined largely by altitude, rainfall patterns and temperature. The zones are:

1. **Endemic:** Areas of stable malaria have altitudes ranging from 0 to 1,300 meters around Lake Victoria in western Kenya and in the coastal regions. Transmission is intense throughout the year
2. **Seasonal transmission:** Arid and semi-arid areas of northern and south-eastern parts of the country experience short periods of intense malaria transmission during the rainfall seasons.
3. **Epidemic prone areas of western highlands of Kenya:** Malaria transmission in the western highlands of Kenya is seasonal, with considerable year-to-year variation. Epidemics are experienced when climatic conditions favor sustainability of minimum temperatures around 18C.
4. **Low risk malaria areas:** This zone covers the central highlands of Kenya including Nairobi. The temperatures are usually too low to allow completion of the sporogonic cycle of the malaria parasite in the vector.

Approximately 1.5 million women become pregnant each year in Kenya, majority live in areas of moderate to intense transmission of malaria. Pregnant women are especially vulnerable to malaria infection. Effects of MIP are greatest in primigravida, second pregnancy and HIV positive pregnant women. Women without pre existing immunity (those living in a non endemic malaria area) are susceptible to more severe complications of malaria; whereas women with acquired immunity to malaria (those living in Malaria endemic areas) are at a higher risk for developing severe anaemia and its consequences.

2009 Malaria Endemicity Map



Clinical features of malaria

Uncomplicated Malaria:

This is characterized by fever in the presence of peripheral parasitaemia. Other features may include chills, profuse sweating, muscle pains, joint pains, abdominal pain, diarrhoea, nausea, vomiting, irritability, loss of appetite and splenomegaly. In pregnancy, false labour may occur. These features may occur singly or in combination.

Severe malaria:

This is a life threatening manifestation of malaria, and is defined as the detection of *P. falciparum* in the peripheral blood in the presence of any of one or more of the clinical or laboratory features listed below:

- Prostration (inability or difficulty to sit upright, stand or walk without support in a person normally able to do so)
- Alteration in the level of consciousness (ranging from drowsiness to deep coma)
- Cerebral malaria (unrousable coma not attributable to any other cause in a patient with *falciparum* malaria)
- Respiratory distress (acidotic breathing)
- Multiple generalized convulsions (2 or more episodes within a 24 hour period)
- Shock (circulatory collapse, septicemia)
- Pulmonary edema
- Abnormal bleeding (Disseminated Intravascular Coagulopathy -DIC)
- Jaundice
- Haemoglobinuria (black water fever)
- Acute renal failure - presenting as oliguria or anuria
- Severe anemia (Hemoglobin < 5g/dl or Haematocrit < 15%)
- Hypoglycemia (blood glucose level < 2.2.mmol/l)
- Hyperlactataemia

Investigations:

- In **all pregnant women** with fever or history of fever the use of **parasitological diagnosis** is recommended.
- At health facilities where malaria diagnostics (microscopy or RDT) are not available, patients with fever or history of fever in whom the health worker suspects malaria and has eliminated other possible causes of fever, should be presumptively classified and treated as malaria.

Effects of Malaria in pregnancy**Mother:**

Pregnant women are at higher risk from malaria infection and its harmful effects. During pregnancy a woman also loses some of the ability to fight the infection thus exacerbating her risk of morbidity and mortality. The malaria parasite in the blood of the mother hides in the placenta and hence malaria parasites may not be detected when you take a finger blood sample. The parasites may however still be present and cause damage to the placenta.

The major health effect of malaria on the mother is the development of anaemia. (2 – 15% of severe maternal anaemia is attributable to malaria). Malaria causes anaemia by destroying the red blood cells of the mother. This augments maternal ill health and increases her risk of dying. Severe anaemia manifests in approximately 6,000 primigravida in Kenya (MOH, GOK 1998: A situation analysis for Kenya). Haemorrhage complicating malaria-related anaemia during pregnancy contributes significantly to maternal mortality. Malaria-related anaemia is estimated to cause as many as 10,000 maternal deaths in Africa each year.

Malaria also increases the risk of premature labour (8 – 36% of preterm delivery is attributable to malaria)

Baby:

Malaria infection poses a risk to the unborn child leading to spontaneous abortion, stillbirth, congenital infection, low birth weight (up to 30% of preventable low birth weight is attributable to malaria); prematurity and intrauterine growth retardation (13 – 70% of intrauterine growth retardation is attributable to malaria). It causes 3-5 % of neonatal deaths.

Prevention of malaria in pregnancy

The goal of prevention of malaria in pregnancy is to reduce maternal and perinatal morbidity and mortality associated with malaria. The strategies in prevention of malaria in pregnancy are integrated in the overall antenatal care (ANC) package for maternal health. They include the provision of:

- Intermittent preventive treatment for malaria in pregnancy (IPTp)
- Long lasting Insecticidal Nets
- Provision of prompt diagnosis and treatment of fever due to malaria
- Health education

Intermittent Preventive Treatment for Malaria in Pregnancy

IPTp is the presumptive provision of a full treatment course of an efficacious antimalarial at specific intervals during pregnancy (regardless of whether the woman is infected or not). IPTp has been shown to reduce the risk of placental infection and the associated risk of maternal anaemia, miscarriage, premature deliveries and low birth weight. The current recommended medicine for IPTp is 3 tablets of sulphadoxine/sulphalene 500mg and pyrimethamine 25mg.

- IPTp is recommended in areas of high malaria transmission
- Administer IPTp with each scheduled visit **after quickening** to ensure women receive a minimum of 2 doses
- IPTp should be given at an interval of at least 4 weeks (1 month)
- IPTp should be given under directly observed therapy (**DOT**) in the antenatal clinic and can be given on an empty stomach.
- SP as IPTp is safe up to 40 weeks pregnancy and late dosing is beneficial for women presenting late in pregnancy
- Folic acid tablets should NOT be administered with SP given for IPTp and if need be, may be taken 14 days following administration of IPTp

Before SP is given

- Ask if the woman has had any allergic reaction e.g. a severe skin rash or mucous membrane reaction to a sulpha drug
- If the client does not know whether she has had a reaction to sulpha drugs it is safe to presume that they have not had a serious reaction
- If the woman has had a serious skin or mucous membrane reaction, **do not give SP**.

If a patient is allergic to SP

- Unfortunately, no alternative to SP for use as IPT for pregnant women has been approved.
- If your client is allergic to SP:
 - Carefully counsel her about symptoms of malaria and early seeking of treatment,
 - Monitor her for anaemia and ensure that she knows that she has to promptly return to the clinic if she develops symptoms of anaemia or malaria
 - Minimize her risk for anaemia from other causes such as iron deficiency, hookworm, etc. by appropriate diet, supplements and medication.
 - Advise her to sleep under an **Insecticide-treated net (ITN)**.
 - If she becomes symptomatic for malaria treat her appropriately

IPT in HIV positive Women:

HIV infection during pregnancy increases the risk of the complications of malaria in pregnancy; while malaria infection during pregnancy particularly placental malaria increases the risk of mother to child transmission of HIV.

- Women known to be HIV infected or with unknown HIV status living in areas of high HIV prevalence (>10% among pregnant women) should receive at least **3** doses of IPTp.
- Pregnant women who are HIV positive and are on daily cotrimoxazole chemoprophylaxis should not be given SP for IPTp
- Pregnant women who are HIV positive and are also taking antiretroviral therapy for PMTCT who are not receiving cotrimoxazole should receive IPTp with SP.

Long Lasting Insecticidal Nets

A study in an area of high malaria transmission in Kenya has shown that women protected by ITNs every night during their first four pregnancies produce 25% fewer underweight or premature babies. In addition, ITN use benefits the infant who sleeps under the net with the mother by decreasing exposure to malaria infection. Therefore the service provider should ensure that:

- Each pregnant woman living in a malaria risk area receives a free LLIN at the first contact visit to the ANC
- Each pregnant woman is shown how to hang the LLIN and encouraged to use the net each and every night during her pregnancy and thereafter.
- LLIN also kill lice, ticks, and pests such as bedbugs and cockroaches
- LLIN are not a substitute for IPTp and vice versa. Both must be used in order to achieve maximal benefits in the reduction of both maternal and perinatal morbidity and mortality

Health Education

Continuous maternal health education should be provided at the ANC encouraging use of all interventions and services and encouraging the pregnant woman to attend all ANC visits as scheduled.

Treatment of Malaria in pregnancy**First trimester**

The recommended treatment for uncomplicated malaria in the first trimester is a 7-day therapy of oral quinine. Do not withhold artemether-lumefantrine or any other treatment in 1st trimester if quinine is not available. Malaria if untreated can be fatal to the pregnant woman.

Second and third trimesters

Artemether-lumefantrine is the recommended treatment in the 2nd and 3rd trimesters. Oral quinine may also be used but compliance must be ensured.

Artemether-lumefantrine (AL) currently available as a co-formulated dispersible tablet containing 20 mg of artemether and 120 mg of lumefantrine. This is administered as a 6-dose regimen given over three days (that is 4 tablets stat, repeat after 8 hours, 24hrs, 36hrs, 48hrs and 60hrs). HIV/AIDS patients with Malaria should be managed according to the same regimen.

Second line treatment in all age groups

The recommended second line treatment for uncomplicated malaria in Kenya is dihydroartemisinin-piperaquine (DHA-PPQ). This is currently available as a fixed-dose combination with adult tablets containing 40 mg of dihydroartemisinin and 320 mg of piperaquine. These are administered as three (3) tablets once daily for three days.

Treatment of Severe MIP

The recommended medicine for severe malaria in pregnancy is parenteral quinine or parenteral artemisinins (artemether or artesunate). The preferred route of administration is the intravenous route for quinine and artesunate. However the intramuscular route can be used as an alternative where intravenous route is not feasible. Administration of quinine to pregnant women should be closely observed as it can induce premature labour.

Quinine administration in adults

Quinine should only be given as an intravenous infusion and NEVER given as an intravenous (bolus) injection.

- The Loading dose should be omitted if patient has received quinine in the last 24 hours or has received mefloquine in the last 7 days
- Quinine is not contraindicated in severe anaemia
- In renal insufficiency the dose of quinine remains unchanged
- In hepatic insufficiency, the dose of quinine should be reduced by 25%
- Hypoglycemia is a potential side effect of quinine administration particularly in pregnant women and therefore quinine should be administered in a glucose containing infusion.

Administer quinine as follows:

- A loading dose of quinine 20mg/kg (maximum 1200mg) diluted in 15mls/kg (maximum 500ml) of isotonic solution (5% dextrose or normal saline) is given intravenously to run over 4 hours.
- 8 hours from commencement of the initial dose of quinine, give 10mg/kg (maximum 600mg) diluted in 10mls/kg (maximum 500ml) of isotonic solution (5% dextrose or normal saline) to run over 4 hours.
- Repeat 10mg/kg quinine infusion every 8 hours until the patient can take medication orally.
- Thereafter a complete course of artemether-lumefantrine (AL) is given
- Alternatively oral quinine is continued at 10mg/kg (maximum 600mg) every 8 hours to complete a total of 7 days treatment, in combination with clindamycin or doxycycline also for 7 days.

Session 2: Anaemia in Pregnancy

Outline

1. Introduction
2. Definition and classification anaemia
3. Common causes of anaemia
4. Identification of women at risk of developing anaemia
5. Diagnosis of anaemia
6. Effects of anaemia in pregnancy
7. Management of anaemia during pregnancy and labour
8. Prevention of Anaemia

Introduction

Anaemia is one of the most frequently observed nutritional deficiency diseases in the world today. It is especially prevalent in women of reproductive age, particularly during pregnancy where it is often a contributory cause of maternal death. In areas where malaria is prevalent, the number of women affected increases. The prevalence of anaemia in rural Kenya was found to be 7.4% (Sinei *et al*, 1984). *It is a major obstetric complication in Kenya and one of the commonest medical condition encountered during pregnancy.*

During pregnancy, delay in treatment is common with large numbers of those affected being seen for the first time with severe degrees of anaemia. Consequently, pressure on the health services rises and treatment costs increase, while maternal and foetal lives are lost on a large scale. After the puerperium, the debilitating effect of anaemia undermines women's health, lowers their economic productivity, and reduces their ability to care for their homes and look after their children.

Definition of anaemia

Anaemia is a disorder characterised by blood haemoglobin concentration lower than the defined normal level and it is usually associated with decrease in circulating mass of red blood cells. This may result from decreased generation of red blood cells, or from their premature destruction, or from loss through chronic blood loss or haemorrhage.

Classification of anaemia

In Kenya, anaemia is diagnosed when the Hb level of pregnant women is below 10 gm/dl and can be grouped as follows:

- Mild: Hb 8.1 – 9.9 g/dl (mucous membranes look slightly pale)
- Moderate: Hb 5.1 g – 8.0 g/ dl (mucous membranes are moderate pale)
- Severe: Hb less or equal to 5 g/ dl (mucous membrane markedly pale)

Causes of anaemia

During pregnancy, the growth of the foetus and the placenta and the larger amount of blood circulating blood in the expectant mother lead to an increase in the demand for nutrients, especially iron and folic acid. The fact that most women start pregnancy with depleted body stores of these nutrients mean that

their extra requirements are even higher than usual.

The total iron needed during the whole pregnancy is estimated at 1000mg. The daily requirement of iron as well folic acid is six times greater for a woman in the last trimester of pregnancy than for a non pregnant woman. This need cannot be met by diet alone, but it is derived at least partly from maternal reserves. In a well nourished woman about half of total requirement of iron may come from iron stores. When these reserves are already low-due to malnutrition, malaria and /or frequent pregnancies, anaemia results. Common causes are classified as shown below:

(a) Physiological anaemia

This is due to the disproportionate increase in plasma volume in relation to the red blood cell mass during pregnancy.

(b) Dietary causes

- A low dietary intake of iron, folic acid and proteins
- Faulty absorption of nutrients such as iron, folic acid and proteins

(c) Obstetrical and gynaecological reasons

- Pregnancy related blood loss (Abortions, Ectopic Pregnancy, APH, PPH)
- Menorrhagia
- Increased demand (multiple pregnancy, frequent child birth)

(d) Non-obstetrical reasons

- Frequent attacks of malaria
- Dysentery
- Hook worm infestation
- Urinary tract infections including bilharzia

(e) Chronic illness

- Bleeding Disorders
- Pulmonary Tuberculosis
- Pre -existing medical conditions i.e. HIV/AIDS, sickle cell disease

Women at risk of developing anaemia in pregnancy are those with:

- Low socio economic status
- Young primigravida
- Frequent or too many pregnancies
- Previous history of PPH
- History of APH
- Multiple pregnancy
- Pregnant women in Malaria endemic areas

Signs and symptoms of anaemia and differential diagnosis

<i>Presenting Symptoms and Other Symptoms and Signs Typically Present</i>	<i>Symptoms and Signs Sometimes Present</i>	<i>Probable Diagnosis Differential diagnosis of severe anaemia</i>
• Dizziness • Difficulty in breathing • Pallor of conjunctiva, tongue, nail beds and/or palms • Haemoglobin 5 g/ dl or less • Haematocrit 15 % or less	• Lethargy and fatigue • Flat or concave nails • Chest pain • Headache • Glossitis/ stomatitis • Loss of appetite	Severe anaemia
• Symptoms and signs of severe anaemia	• Oedema • Cough • Basal crepitations • Enlarged liver • Prominent neck veins • Systolic murmur	Heart failure due to anaemia
• Difficulty in breathing • Diastolic murmur and /or harsh systolic murmur with palpable thrill	• Irregular heart beat • Enlarged heart • Rales /crepitations • Cyanosis (blueness) • Cough • Swelling of legs • Enlarged liver • Prominent neck veins	Heart failure due to heart disease
• Difficulty in breathing • Fever • Cough with expectoration • Chest pain	• Consolidation • Congested throat • Rapid breathing • Rhonchi/rales	Pneumonia
• Difficulty in breathing • Wheezing	• Cough with expectoration • Rhonchi/rales	Bronchial asthma
• Difficulty in breathing • Hypertension • Proteinuria	• Rales • Frothy cough	Pulmonary oedema associated with P.E.T

Effects of anaemia in pregnancy

The effect of anaemia on pregnancy results from the diminished oxygen carrying capacity of the blood. When this occurs, even minor blood loss at delivery may be fatal. Anaemia is a major indirect cause of maternal mortality

Maternal Effects:

Antenatal period	During labour and delivery	In Puerperium
Prone to PET	Heart failure	Puerperal sepsis
Diminished resistance to infection	Predisposed to PPH	Uterine sub-involution
Late abortions (20-28 weeks)	Maternal death	Deep venous thrombosis (DVT)
Preterm labour		Pulmonary embolism
Congestive cardiac failure		Post partum haemorrhage

The greatest risk of anaemia related heart failure is during the following periods:

- 30 – 32 weeks gestation
- During labour
- Immediately after delivery
- In puerperium especially days 7 – 10

Effects of anaemia on foetus / neonate include:

- Prematurity
- Intra uterine growth retardation (IUGR)
- Foetal malformations esp. in folate deficiency.
- Intra uterine foetal death (IUFD)
- Foetal distress
- Asphyxia at birth and/or cerebral damage
- Meconium aspiration
- Low birth weight
- Still births (may be fresh or macerated)

Diagnosis of anaemia

A comprehensive history and physical examination is imperative to rule out the underlying causes of anaemia, and to detect any complications that may have occurred. Basic laboratory work up should include the following:

1. Haemoglobin and haematocrit Estimation (to know degree of anaemia)
2. Full blood count and peripheral blood film (to know the type of anaemia)
3. Stool examination for ova and cysts, Blood Slide or RDTs for malaria diagnosis, urinalysis / microscopy etc (to know the cause of anaemia)
4. Blood group and Rhesus factor determination
5. Other tests will be determined by the findings on history and physical examination

Management of anaemia during pregnancy and labour

General treatment of anaemia during pregnancy

- Prescribe ferrous sulphate or ferrous fumarate 200 mg PLUS folic acid 5mg by mouth once daily for 6 months during pregnancy. Continue for 3 months postpartum.
- Where *hookworm is endemic* (prevalence of 20% or more), give:
 - Albendazole 400 mg by mouth once;
 - Or mebendazole 500 mg by mouth once or 100 mg two times per day for 3 days;
 - Or levamisole 2.5 mg/kg body weight by mouth once daily for 3 days;
 - Or pyrantel 10mg/kg body weight by mouth once daily for 3 days;
- Treat any underlying cause of anaemia as appropriate

It is important to differentiate between mild, moderate and severe anaemia at the time of diagnosis as the specific management depends on the degree of anaemia present.

Mild anaemia is to be treated by administration of oral iron and folate.

Moderate anaemia may need parental iron therapy. If detected after 36 weeks, she may need a blood transfusion.

Severe cases of anaemia should be managed as follows:

- Admit to the hospital for close supervision and intensive treatment.
- Investigate for the other causes of anaemia and treat appropriately.
- Transfuse using packed red cells. Administer a diuretic (e.g. frusemide 40mg IV) with each unit of blood.
- If the woman is in heart failure, transfuse as above slowly, maintain a strict fluid balance chart and manage the congestive cardiac failure.
- Thereafter maintain on iron 120mg plus folate 400mcg orally once a day for six months during pregnancy and until 3 months post partum
- In case of caesarean section, avoid the use of spinal anaesthesia in women with severe anaemia, haemorrhage and coagulation disorders.

Treatment of anaemia during Labour and delivery

Labour and the first two weeks of the puerperium are the periods of greatest danger to the anaemic mother, and more than half of the deaths occur in the first 12 hours after delivery. When a severely anaemic patient is in labour, she should be nursed in a propped up position. Judicious monitoring of the mother and foetus must be maintained. The team must always be prepared to manage PPH and for newborn resuscitation.

1. Give oxygen inhalation by mask
2. Transfuse as necessary.
3. Maintain strict aseptic technique in order to minimize puerperal infection.
4. The second stage of labour usually poses no problem, but assisted delivery with forceps or vacuum extraction is recommended.
5. Active management of third stage of labour is recommended. Oxytocin is the uterotonic of choice. Do not give ergometrine especially if the woman is in CCF

6. Prophylactic antibiotics such as Amoxicillin may be given as 500mg orally every 8 hours.

NOTE: In facilities where blood transfusion services are not available, EARLY REFERRAL is mandatory with an experienced escort

Prevention of Anaemia

- Pre-pregnancy care for early diagnosis and management of anaemia and any underlying causes should be encouraged.
- Early ANC attendance is important for prompt diagnosis of anaemia
- Ensure comprehensive obstetric and social history in antenatal clinic to identify factors predisposing to anaemia
- During the ANC, give routine supplementation of iron and folic acid
- Deworm the pregnant mothers as part of ANC care
- Give intermittent preventive treatment of malaria in Malaria endemic areas
- Treat any concurrent infections, infestations and manage medical conditions as appropriate
- Give dietary advice which is appropriate for each woman depending on health status, religious and cultural preferences. Highlight the sources of iron available in the index community
- Advise women on healthy timing and spacing of pregnancy
- Counsel to discourage pica (especially eating of soil) during pregnancy

Session 3: Cardiac Disease in Pregnancy

Outline:

1. Definition of cardiac disease in pregnancy
2. Common causes of cardiac disease in pregnancy
3. Classification of cardiac disease in pregnancy
4. Diagnosis of cardiac disease
5. Effect of pregnancy on cardiac disease
6. Effect of cardiac disease on pregnancy
7. Management of a woman with cardiac disease in pregnancy
8. Criteria for referral.

Definition of cardiac disease in pregnancy

These are disorders that affect the heart muscles, valves or blood vessels in pregnancy. The disease impairs the ability of the heart to supply tissue with oxygen.

Background:

Cardiovascular disorders complicate 1% of all pregnancies, and they include pre-existing diseases, conditions developed during pregnancy and the postpartum period, congenital or acquired structural abnormalities and arrhythmias. During pregnancy enormous changes take place in the cardio vascular system; these have many implications on the management of pregnant women with cardiac disease. These implications must be considered for appropriate care during the antepartum, intrapartum and postpartum periods.

Cardiovascular changes during pregnancy:

Kindly refer to the chapter on physiological changes in pregnancy

Common causes of cardiac disease in pregnancy are:

- Congenital anomalies
- Rheumatic fever
- Cardiomyopathies
- Coronary artery disease

Classification of cardiac disease in pregnancy

According to the New York Heart Association, cardiac disease in pregnancy is classified into four grades as shown below.

Grades and classification of cardiac disease

Grade	Classification
Grade I	Uncompromised patient: A heart lesion exists but the patient is <i>asymptomatic</i> , leads a normal active life without discomfort or breathlessness
Grade II	Slightly compromised patient: Patient experiences breathlessness, exhaustion with moderate to heavy work. Has slight limitation to physical activity.
Grade III	Markedly compromised patient: Patient experiences breathlessness with light work or exercise (household chores or walking on the level). Has marked limitation to physical activity
Grade IV	Severely compromised patient: <i>Symptomatic</i> at rest. Patient is unable to carry out any light work or exercise.

Patients in NYHA grades III and IV have high complication rates such as heart failure, arrhythmias, stroke and even maternal death

Patients with valvular stenosis (e.g. mitral or aortic stenosis) and minimal symptoms (NYHA I and II) may deteriorate rapidly. As such they are managed as grade III or IV

The increase in maternal morbidity and mortality related to cardiac disease is found in the following conditions

- Severe cardiomyopathy (that leads to heart failure)
- Symptomatic valve narrowing (mitral or aortic or pulmonary stenosis)
- Cyanotic heart disease (e.g. Tetralogy of Fallot)
- Pulmonary hypertension
- Artificial valves

Diagnosis of cardiac disease

Because of the physiological changes that occur in the cardiovascular system in pregnancy, it may be difficult to distinguish signs of heart disease from physiological changes.

Signs noted in a normal pregnancy

- Fatigue and decreased exercise capacity and orthopnoea
- Dyspnoea
- Syncope
- Palpitations
- Distended neck veins
- Displaced apex beat
- Soft continuous murmur at the apex

Warning Signs Suggestive of Heart Disease:

Particular attention must be paid to warning signs, which include the following:

- Worsening dyspnoea on exertion, or dyspnoea at rest
- Chest pain with exercise or activity
- Syncope preceded by palpitations or exertion
- Loud systolic or diastolic murmur
- Cyanosis or clubbing of fingers or toes
- Jugular venous distension
- Cardiomegaly or a ventricular heave

Effects of Pregnancy on Heart Disease:

This is related to the marked increase in cardiac output leading to increased risk of cardiovascular compromise. Cardiac failure may occur during pregnancy, during labour or puerperium. The risk periods for cardiac failure are: -

- 30 – 32 weeks gestation
- During labour especially 2nd stage of labour
- Immediately after delivery

Common Aggravating Factors for Cardiac Failure:

- Anaemia
- Respiratory or urinary tract Infection
- Any febrile illness
- Excessive exercise
- Emotional upset
- Hypertension
- Multiple gestation
- Obesity

Effect of Heart Disease on Pregnancy

Cyanosis and poor functional capacity are indicators of significant maternal and foetal risk. Obstetric complications of cardiac disease include:

- Preterm Labour
- Intrauterine growth retardation (IUGR)
- Intrauterine foetal death (IUFD)

Investigations

In most patients with cardiac disease, the diagnosis has already been made either before or early in pregnancy, as can be deduced from the history and documents available. For all patients however:

- A thorough history and physical examination must be done.
- Other recommended investigations include:
 - Electrocardiogram (ECG) - to assess ischemic acute/chronic changes in cardiac function
 - Echocardiogram - to identify the specific heart lesion
 - Chest X-ray (shielded)
 - Full blood count to rule out anaemia and infection
 - Urinalysis to rule out urinary tract infection

Management of cardiac disease in pregnancy**Principles of Management:**

The following principles must be applied for successful management of Cardiac disease in pregnancy

1. Early diagnosis and evaluation of the functional classification
2. Prevention, timely detection and institution of effective therapy for cardiac failure
3. Prevent and control of any underlying conditions or complications e.g. Anaemia
4. Judicious follow up and prevention /management of any obstetric complications along the continuum of pregnancy, labour and the puerperium
5. Apart from the obstetrician, The patient should be followed up by a cardiologist
6. Mandatory hospital delivery

Preconception Care:

When the patient's cardiac status is known, it is very important that the woman is counselled carefully about the maternal and foetal risks, which can occur during pregnancy. In some serious heart conditions the mother should be warned that pregnancy is absolutely contra-indicated. In an ideal situation, this counselling should take place before conception but if the woman is already pregnant, it should take place as early as possible. Any underlying conditions (e.g. anaemia, hypertension, pre existing cardiac conditions, etc) must be treated /controlled before pregnancy or as soon as the diagnosis is made. If the pregnancy poses a serious risk to maternal health, the patient should receive counselling to help her evaluate the option of terminating the pregnancy on medical grounds.

Antenatal Care:

Early initiation of antenatal care is recommended.

Continuity of care with a single provider facilitates early intervention.

There should be close monitoring of foetal growth and viability

The patient should be advised on adequate rest and avoidance of aggravating factors for cardiac failure:

- Infections should be treated vigorously.
- Anaemia should be prevented using prophylactic haematinics, and when present it should be treated vigorously.
- Encourage good dental care
- Patients with prosthetic valves should be put on anticoagulants.

Management of Grade I and II:

- Manage as outpatient
- Admit at 34 weeks gestation ; (In case of unfavourable social surrounding admit earlier)
- Admit in case of deterioration of Cardiac state
- Admit in the event of any obstetric complications

Management of Grade III and IV:

- Admit as soon as pregnancy is diagnosed until delivery
- The patient should have complete bed rest
- Look out for aggravating signs and treat aggressively

Management in labour:**1st Stage of labour:**

- Prop up in bed and tilt forwards the left side
- Give Oxygen continuously by mask or nasal catheter
- Provide adequate analgesia with pethidine 25 -50mg IM or morphine
- Avoid dehydration; Maintain strict fluid balance chart (limit fluid infusion to minimize the risk of circulatory overload)
- If oxytocin infusion is required, use a higher concentration at a slower rate
- Start on parenteral antibiotics (e.g. crystalline penicillin 1MU)for prophylaxis against infection
- Carefully monitor pulse and respiratory rate
- If pulse is >110/minute in between uterine contractions or in case of cardiac failure give digoxin
- In case of pulmonary oedema give Frusemide 40mg IV

NB/ Caesarean section should only be done for obstetric reasons.

Second / Third stage of labour:

- Maintain the patient in a propped up position
- Assisted vacuum delivery should be done to avoid sustained bearing down efforts during expulsive phase as this can aggravate cardiac failure
- Ensure active management of third stage - immediate oxytocin, controlled cord contraction and uterine massage.
- DO NOT GIVE ERGOMETRINE as this may lead to sudden overload of the heart as a result of additional blood squeezed out from the uterus
- In case of caesarean section avoid spinal anaesthesia

Postpartum Care

There is need to observe the patient closely for the first few days because a significant number of deaths occur during this period. Cardiac output may increase as much as 65% after delivery.

The major causes of maternal morbidity and mortality immediately postpartum are haemorrhage and pulmonary oedema. The risk of pulmonary oedema increases as interstitial fluid is mobilized into the vascular space. With this in mind:

- The patient should be closely monitored for the first 24 hours
- Retain the patient in hospital for at least 10 – 14 days depending on grade
- Restrict exercise in the first week of delivery and mobilize slowly thereafter
- Give prophylactic crystalline penicillin 2 mega unit I.M. 6 hourly for 48 hours after delivery. Continue penicillin treatment orally for 10 days 500mg 6 hourly (this is to prevent sub-acute bacterial endocarditis)
- Manage the cardiac condition and any complications as appropriate
- Encourage breastfeeding
- Advise on family planning

Referral of patients with cardiac disease in pregnancy

All patients suspected to have cardiac disease in pregnancy should be referred to a hospital with a detailed referral letter where suitable investigations and management will be done. All women with heart disease should be advised to deliver in a hospital under the care of skilled experts.

Session 4: Sickle Cell Disease (SCD) in Pregnancy

Outline

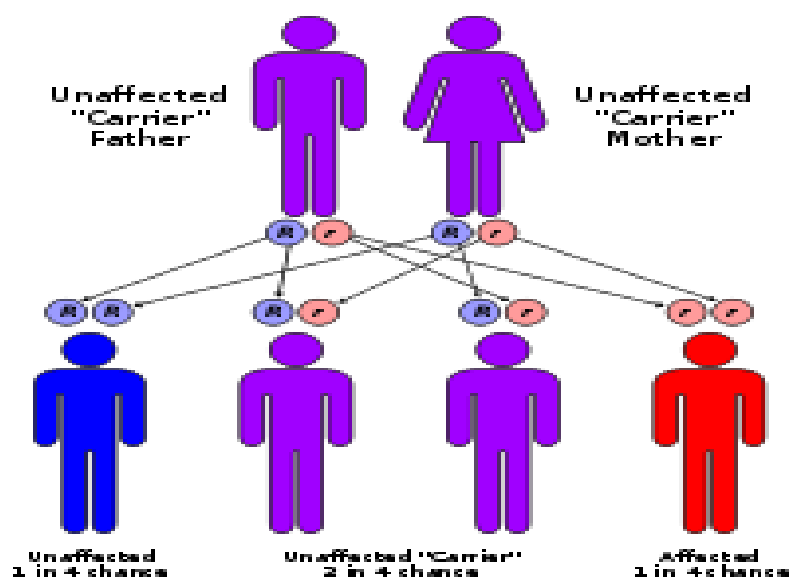
1. Definition of sickle cell disease (SCD)
2. Background
3. Pathophysiology
4. Symptoms and signs
5. Effects of pregnancy on SCD
6. Effect of SCD on Pregnancy
7. Management of a woman with SCD in pregnancy
 - a. Preconception care
 - b. During pregnancy
 - c. During labour and delivery
 - d. In puerperium
8. Contraception

Definition

Sickle cell disease (SCD) is a genetically transmitted autosomal recessive condition occurring in persons who inherit homozygous sickle cell haemoglobin (HbSS). This abnormal Hb variant results from the substitution of valine for glutamic acid at position 6 in the beta-globin chain. Upon deoxygenation, the poorly soluble HbSS undergoes polymerization leading to the characteristic sickle cell.

Those who inherit the gene from both parents (homozygous) have **sickle cell anaemia** (HbSS) and hence full blown disease. On the other hand those who inherit the gene from one parent (heterozygous) **have sickle cell trait** (HbAS) and are carriers; displaying clinical manifestations only under stressful conditions.

Inheritance of sickle cell gene



Background

More than 80 million people worldwide carry the HbSS gene. Sickle cell disease is common through East, West and Central Africa. A summary of the global distribution is shown below

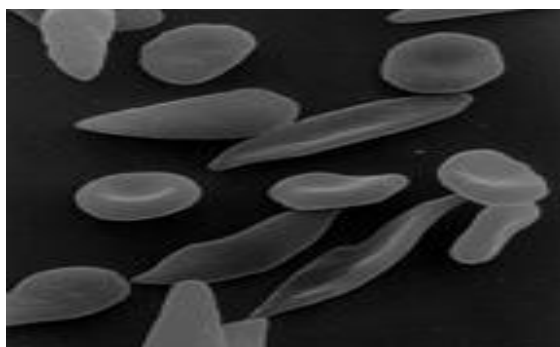
	Homozygous HbSS %	Heterozygous HbAS %
USA (African Americans)	3-9	8-16
USA (White Americans)	1-8	8-10
Africa	1-10	10-25
Europe	2-8	3-8

In affluent societies sickle cell disease runs a less severe course than it does in poor and deprived areas. This explains why both the manifestations of sickle cell disease and its morbidity and mortality are much worse in Africa than in the Caribbean, USA, and Europe.

In sub Saharan Africa, a tenfold increase in Maternal Mortality for HbSS (and a 5 fold increase for Hb SC) is common compared with overall MMR. Sickle cell disease increases maternal morbidity and mortality by enhancing the development of haemolytic anaemia, folic acid deficiency, embolism following bone marrow infarction and acute sequestration of red cells. Perinatal mortality rate is high in Hb SS with a moderate increase in the other forms of sickle cell disease.

Pathophysiology

HbS molecules as opposed to HbA, when subjected to low oxygen tension undergo polymerization to form the characteristic sickle shape. Predisposing factors to sickling include Hypoxia, Hypothermia/ Hyperthermia, Acidosis, Dehydration and Infection. Constant sickling and de-sickling results in membrane damage, and the cell may become irreversibly sickled.



Signs and symptoms

Sickle cell disease typically manifests in the following ways:

- **Chronic Anaemia**
It results from the shortened survival time of the homozygous S red blood cells due to circulation trauma and intravascular hemolysis or phagocytosis by reticuloendothelial cells in the spleen and liver.
- **Increased susceptibility to bacterial infections:**
(E.g. broncho pneumonia) and pulmonary infarction.

- **Sickle-cell crises**

The hallmark of sickling episodes is periods during which there is ischemia and infarction in various organs resulting predominantly in severe pain. Sickle Cell Crises may be classified as: vaso-occlusive, haemolytic, sequestration or aplastic

1. Vaso-occlusive crisis

This occurs when the sickle-shaped red blood cells obstruct capillaries and restrict blood flow to an organ, resulting in ischemia, pain, necrosis and often organ damage. The frequency, severity, and duration of these crises vary considerably. Recurrent episodes cause Irreversible Organ damage. The patient may present with:

- Osteonecrosis, osteomyelitis
- Hand foot syndrome
- Acute abdomen
- Autosplenectomy
- Cerebral infarction
- Acute chest syndrome

2. Haemolytic crisis

This is due to sequestration and destruction of deformed cells in the Reticuloendothelial system. The life span of the cells is reduced from 120 days to 17- 20 days. Patients usually manifest with sudden exacerbation of anaemia and sudden drop in Hb levels.

3. Acute splenic sequestration crisis

1. This occurs when there is sudden massive trapping of red blood cells within the splenic sinusoids resulting in severe anaemia and hypovolemic shock. This is largely a pediatric problem although adolescent pregnant girls with SCD may be affected. The abdomen becomes bloated and very hard. ***Splenic sequestration crisis is considered an emergency.*** If not treated, patients may die within 1–2 hours due to circulatory failure.

4. Aplastic crisis

Aplastic crisis may be as a result of bone marrow infection or folate deficiency. It is rare in obstetric practice. It is characterized by rapidly developing anaemia due to cessation of red blood cell production. The haemoglobin level may be as low as 2–3 g/dL. The patient presents with fatigue, pallor, and the peripheral blood film shows a diminished reticulocyte count.

Effect of pregnancy on sickle cell disease

Pregnancy aggravates SCD and increases maternal morbidity and mortality as a result of

- Haemolytic and folate deficiency anaemia
- Frequent crises
- Pulmonary complications
- Congestive cardiac failure
- Infections

Effects of sickle cell disease on pregnancy

SCD affects pregnancy by exacerbating the following conditions:

- Increased risk of crises especially painful crisis affecting the bones and joints. These may occur at any time during pregnancy, labour and puerperium and are more severe during the last 4 weeks of pregnancy and the first 4 days after delivery.
- Acute chest syndrome - several related disorders that affect the lungs present with similar clinical features and occur mostly during painful crisis may occur. These include:
 - Lung infarction
 - Pulmonary sequestration
 - Pneumonia
 - Bone marrow embolism in the lungs.
- Anaemia during pregnancy is frequent and may be severe. Continuing red cell haemolysis adds to the normally increased demand for folic acid during pregnancy, the bone marrow becomes megaloblastic if folate is not supplemented in pregnancy.
- Bacterial infections especially UTI and RTIs occur more frequently during pregnancy than in non pregnant state and are most troublesome during the puerperium
- There is increased incidence of pre-eclampsia
- Obstetric haemorrhage may occur especially Post Partum Haemorrhage

Effect on the foetus

With SCD, there is excessive foetal wastage due to increase in:

- Spontaneous abortions
- IUGR
- IUFD
- Preterm delivery
- Low birth weight
- Early neonatal deaths

Lab Investigations

- A full blood count reveals haemoglobin levels in the range of 6–8 g/dL with a high reticulocyte count (as the bone marrow compensates for the destruction of sickle cells by producing more red blood cells). Those with sickle cell trait have a higher Hb
- Sickling of the red blood cells, on a blood film, can be induced by the addition of sodium metabisulfite 2%, one drop mixed with one drop of blood.
- Haemoglobin electrophoresis confirms diagnosis and determines whether homozygous or heterozygous.
- Other investigations include urinalysis and CXR to rule out infection

Management of SCD in pregnancy

Preconception care

When managing patients with SCD considering pregnancy the following measures need to be instituted

- Folic acid supplementation from 1mg to 5mg per day
- Immunization against pneumococcus & influenza where possible.

- Stop Hydroxyurea 3-6 months before Pregnancy. (Hydroxyurea is a chemotherapeutic agent that reactivates the production of Foetal Haemoglobin (HbF) in place of HbS thus improving survival. It also reduces adhesion of sickle cells to the endothelium. BUT it is teratogenic and should be avoided in pregnancy). If the patient becomes Pg while on Rx to stop immediately.
- Assessment for :
 - Frequency of crisis
 - End organ damage (nephropathy, heart failure, stroke)
 - Pulmonary hypertension (This is associated with 30-50% Maternal Mortality thus pregnancy contraindicated).

Prevention and management of various crisis of Sickle Cell Disease

In the management of crises

- The most common predisposing factors—infection, dehydration, and hypoxia—should be diagnosed and treated.
- Symptomatic treatment of painful crisis consists of rest, intravenous fluids, oxygen supplementation, and adequate analgesics (Mild pain - paracetamol; moderate pain – dihydro codeine; severe pain - opiates).
- Adequate hydration is achieved by oral fluid intake of at least 3 litres daily; prophylactic antibiotics are administered as long as the painful crisis lasts and hematocrit estimated twice daily during crises.
- Bacterial pneumonia or pyelonephritis must be treated vigorously with intravenous antibiotics. Streptococcal pneumonia is common and is a serious complication.
- In all cases, adequate oxygenation must be maintained by face mask as necessary.
- Aplastic and acute splenic sequestration crises are managed by blood transfusion in order to maintain haemoglobin in the range of 7 - 8 g/dl.

Management of sickle cell disease during pregnancy

- Good antenatal care must be hospital based, and should aim at prevention of severe anaemia, infection, effective treatment of other medical and obstetric complications, and proper management of other sickling complications.
- Folic acid supplementation - 5mgs once daily; in areas with folate deficiency give 30mg at each visit using DOT.
- Due to the risk of iron overload, iron treatment should be reserved for haematologically proven iron deficiency. The aim is to maintain the hematocrit level at 0.22-0.25 in HbSS, and over 0.3 in all other forms of sickle cell disease.
- Antimalarial prophylaxis (IPT with SP) is also important to avoid additional haemolytic effects of malaria which can lead to megaloblastic anaemia
- Haemoglobin estimation must done at every visit and the results known before woman leaves clinic
- Encourage 2 weekly visits until the 30th week of pregnancy then weekly thereafter until delivery. At each visit check Hb level, check for proteinuria, examine for jaundice and hepatosplenomegaly.
- Closely monitor foetal growth and well being and look out for IUGR
- All pregnancy related complications must be treated on an **inpatient** basis The patient must also be admitted when Hb level drops and/or she develops bone pain

- Painful crises must be closely supervised, frequently assessed and promptly treated.
- Conditions that predispose to sickling e.g. dehydration, bacterial infections and acidosis should be recognised promptly and treated appropriately.
- Note that the last month of pregnancy requires special attention. When crisis occur during the last 4 weeks of pregnancy, in labour, or in the first 4 days of the puerperium, fatal bone marrow embolism is prevented by an immediate partial exchange blood transfusion followed by rapid delivery of the baby, if necessary by C/section.

Management during labour

All women with sickle cell disease are advised to deliver in the hospital

- Prepare at least 2 units of compatible blood preferably Hb AA for each patient in labour.
- Administer prophylactic IV antibiotics
- Maintain Nil by mouth until delivery
- Estimate Hb or PCV including spleen and liver size 6 hourly to help detect acute sequestration crisis early
- Ensure adequate rehydration and pain relief in labour
- In the absence of obstetric complications, allow spontaneous labour (***SCD per se is not an indication for induction of labour***). C/Section is done for obstetric indications
- Avoid unnecessary perineal trauma during 2nd stage and perform active management of third stage of labour. Blood loss exceeding 150ml should be replaced if maternal PCV is 0.2 or less.
- Blood loss should be minimized during operative deliveries as wound hematomas lead to serious complications.
- When there is CPD or prolonged labour, early Caesarean Section is preferred. (Prolonged labour increases the risk of infection and maternal acidosis leading to painful crises).
- Before C/section, correct severe anaemia (aim to achieve PCV of 0.25). During the operation adequate oxygenation (30-50% oxygen) and ventilation should be given to avoid sickling; maintain circulating volume (replace blood loss adequately).
- Risks from painful crisis are high in first 24 hours after surgery due to dehydration thus the need for good nursing care and maintain adequate hydration.

Management during puerperium

- Careful observation is critical during the first four days of puerperium due to high likelihood of painful and sequestration crises, with pseudo toxemia, anaemia from the acute haemolytic crisis and bacterial infections. These complications may be as high as during labour. There is therefore need for close supervision, prophylactic antibiotics, adequate fluid intake and twice daily PCV estimation.
- If the Hb falls by more than 2g/100ml in 24hours - exchange transfusion with packed cells is recommended
- Assess liver and spleen size
- Encourage breast feeding
- Wound infection is problematic due to poor maternal nutrition, severe anaemia, wound hematoma, local bacterial infection, and local tissue hypoxia caused by sickling.
- Complete wound dehiscence is also common and takes long to heal, even after secondary suturing.
- Delay discharge until 10 days post delivery.

- Discharge from post natal clinic at 6 weeks post partum and refer to the local sickle cell clinic

Contraception

Because of chronic debility, complications caused by pregnancy, and the predictably shortened life span of women with sickle-cell anaemia, the couple must be counselled to limit family size and be offered suitable contraception

According to the American College of Obstetricians and Gynaecologists (2000b), use of combined Oestrogen-progesterone oral contraceptives has not been well assessed in women with sickle hemoglobinopathies. Many clinicians do not recommend their use because of potential adverse vascular and thrombotic effects

Progesterone has been long known to prevent painful sickle-cell crises; therefore low-dose oral progesterone, progesterone injections, or implants seem ideal. Permanent sterilization (BTL or Vasectomy) should also be considered

Session 6: Syphilis in Pregnancy

OUTLINE

1. Definition
2. Background
3. Mode of transmission
4. Clinical features of syphilis in the mother
 - a. Primary
 - b. Secondary
 - c. Latent
 - d. Tertiary
5. Laboratory tests for syphilis
6. Prevention of mother to child transmission of syphilis
7. Signs and symptoms of congenital syphilis
8. Diagnosis of congenital syphilis
9. Management of congenital syphilis

Definition

Syphilis is a complex disease caused by the spirochete *Treponema pallidum*. It can involve nearly every organ system in a variety of ways either acutely or more commonly in an insidious and chronic fashion. Latent periods between clinical manifestations may be of variable duration. It has the potential to cause serious congenital disease and appears to enhance the transmission of human immunodeficiency virus (HIV).

Background

Syphilis is a chronic often latent infection but with some clinically recognisable stages. Where the disease is prevalent, most cases may be asymptomatic. Syphilis is important due to the disastrous consequences of mother to child transmission which is common in many developing countries. In parts of sub-Saharan Africa, prevalence rates in pregnant women exceed 10%. In Kenya according to the national RT guidelines (2006) a prevalence of 5.8% with a range of 2-9% was reported and the Kenya AIDS Indicator Survey of 2008 quoted a prevalence rate of 1.8%.

Although estimates vary, at least 50% of women with acute syphilis suffer adverse pregnancy outcomes. Of these 50% end in still births or spontaneous abortions and the other 50% in perinatal deaths, serious neonatal infections or low birth weight. Mortality in infected infants can be higher than 10%. The more recent the maternal infection, the more likelihood the infant will be infected.

Mode of transmission

Syphilis is typically transmitted sexually or congenitally.

Rare cases of acquisition through contaminated blood products have been reported.

Syphilis can also be spread by skin or mucosal contact with an infectious lesion (e.g. through nonsexual direct contact such as skin to skin or kissing)

Clinical features in the mother

Most pregnant women with syphilis have no clinical signs, hence the need for routine screening in pregnancy.

The incubation period averages 14-28 days after exposure, before development of primary chancre. However it can be as long as 90 days. The clinical features vary according to the stage of syphilis.

Primary syphilis

The initial manifestation is the chancre. This is an indurated, non-tender lesion that feels hard and exudes clear fluid. The chancre can be found in the perineum, vagina, cervix, anus, or rectum. Lesions can also appear on the lips or in the oropharynx. Several lesions may occur at once, but they are more often solitary. In case the chancre has secondary bacterial infection it will usually become painful. In primary syphilis, patients usually develop non-suppurative, non-tender inguinal lymphadenopathy. The chancre heals spontaneously in about 3 weeks leaving a thin atrophic scar or none at all

Secondary Syphilis

The clinical manifestations of secondary syphilis develop several weeks later and include the following:

- A diffuse maculopapular rash; circumferential scaling may involve the palms and soles
- Moist heaped-up lesions, termed *condylomata lata*, are seen in the intertriginous areas such as the buttocks and the upper thighs. Similar lesions, termed *mucoous patches*, appear in the nasolabial folds and in the mouth.
- Patchy alopecia, diffuse lymphadenopathy, pharyngitis, or fever may also be present.
- Focal involvement of various organ systems, such as gastritis, uveitis, hepatitis, periostitis, meningitis, and cerebrovascular accidents, can occur
- The period of spirochetemia that is linked to the development of secondary syphilis is the most likely opportunity for transplacental transmission in the pregnant woman.

Latent syphilis

As in primary syphilis, the clinical manifestations of secondary stage disease abate with time (i.e. within weeks) even in the absence of specific therapy. At this point the disease is considered to have entered a latent period. Studies have demonstrated that about 25% of untreated persons with latent syphilis may have recrudescence secondary symptoms within a 4- to 5-year period after their initial resolution. The majority of these events occur within 1 year.

Nevertheless as many as one third of untreated patients with latent syphilis go on to develop tertiary syphilis. Sexual transmission of syphilis in the latent stage is not likely.

Tertiary Syphilis

This stage is characterized by an element of end-organ damage. There are three types of presentations of tertiary disease: neurosyphilis, cardiovascular syphilis, and gummatous (or late benign) syphilis. These are described below:

1. Neurosyphilis may present as follows:

- There may be **ocular** manifestations such as uveitis or cerebrovascular accidents.
- There may be **vascular** compromise of some portion of the neuroaxis or chronic debilitating loss of function due to and correlating with parenchymal destruction.
- There may be **General paresis** characterized by a combination of psychiatric and neurologic findings. The letters in the word PARESIS correspond to the prominent findings associated with this aspect of disease: Personality (emotional lability), Affect (flat mood), Reflexes (hyper reflexivity), Eye (Argyll-Robertson pupil), Sensorium (illusions, delusions, hallucinations), Intellect (memory, judgment impairment), and Speech (slurring). The classic Argyll-Robertson pupil of late neurosyphilis is characterized by a pupil that constricts upon accommodation but not to light.
- Another classic late-stage neurosyphilis syndrome is **tabes dorsalis**. This is as a result of demyelination of the posterior columns of the spinal cord. The patients develop abnormalities in gait, as well as various sensory abnormalities, including characteristic "lightening" pains, bladder and bowel dysfunction, and a positive Romberg sign. These symptoms may present alone or combination

2. Cardiovascular Syphilis

T pallidum damages the muscular intima of the aorta and with time the resultant weakening leads to the development of an aortic aneurysm, usually of the ascending arch. Dissection, however, is uncommon. Dilation resulting from syphilitic aortitis in turn leads to aortic regurgitation. Involvement of the coronary ostia may compromise myocardial blood flow.

3. Gummatous (or Late Benign) Syphilis

Gummatous (localised granulomas) disease is also extremely uncommon and is characterized by indolent destructive lesions of skin, soft tissue, and bony structures. Significant scarring may result in disfigurement. Visceral organs and the central nervous system may also be involved. Gummas may vary widely in size from small defects to large tumour-like masses.

Laboratory tests for syphilis

• Non-treponemal Tests

Initial testing is performed with a non-treponemal serologic test. These tests use a laboratory-prepared lecithin-cholesterol antigen to detect treponemal-directed antibody in the target serum specimen. The sensitivity of these tests (which include Rapid Plasma Reagin [RPR], Venereal Disease Research Laboratory [VDRL], and Tolidine Red Unheated Serum Test [TRUST]), is very good. Specificity is slightly less reliable. A variety of factors can produce false-positive reactions, including older age, autoimmune disease, intravenous drug use, and recent vaccination.

• Dark field microscopy

T pallidum is too slender to be adequately observed by ordinary light microscopy and fails to take up usual stains. Instead it can be observed using dark field techniques, which require a microscope equipped with a special condenser that angles light to allow only those rays reflected by the object of interest to enter the objective. Dark field microscopy is only useful when examining the moist

lesions of primary syphilis or condylomata lata. For dark field specimen collection, lesions must first be cleaned with saline-soaked gauze. Serous exudate is then pressed against a glass slide, which must be immediately examined before the specimen desiccates. Dark field examination may also be used for aspirates from involved lymph nodes. The yield from resolving lesions is low.

- **Treponemal Serologic Tests**

To rule out false-positive tests, when used for diagnosis, reactive non treponemal serologic tests must be confirmed. This is done using treponemal-specific tests, which are more specific and confirmatory. They include the fluorescent treponemal antibody absorbed (FTA-ABS), *T pallidum* particle agglutination (TP-PA), and *T pallidum* hemagglutination assay (TPHA).

Prevention of Mother to Child Transmission of SYPHILIS

Providers of maternal and neonatal health care in particular skilled attendants must:

- Screen all pregnant women for syphilis at the first ANC visit, preferably before 16 weeks gestation
- Review test result at subsequent visits and at time of delivery
- Offer syphilis screening after delivery to all those not screened during pregnancy
- Treat all sero reactive women with: BENZATHINE benzyl penicillin at the recommended dosages of at least 2.4 MU IM as a single dose. If mother is allergic to penicillin give Erythromycin orally 500mg three times daily for 7 days in early syphilis (NB- erythromycin diffuses poorly in foetal circulation so prevention of congenital syphilis will not be achieved).
- Contact tracing and treatment of partners
- Counsel sero negative women to remain negative
- Treat of women with clinical disease or history of exposure
- Offer voluntary counselling and testing of HIV to all woman who test positive for syphilis
- Screen for other STIs
- Plan for treatment of baby at birth
- Record testing results and treatment in the facilities register and the Mother Child booklet

CONGENITAL SYPHILIS

Symptoms usually develop 2-8 weeks after birth.

Symptoms and signs:

- Generalized oedema
- Skin lesions include: Skin rash, bullous eruptions, blisters on palms and soles, shiny scaly erythema on palms and soles
- Mucous membrane lesions include snuffles which make suckling difficult, laryngitis and pharyngitis
- Anal condylomata
- Enlarged spleen and liver
- Paralysis of one limb
- Jaundice
- Anaemia -Pallor
- Failure to gain weight
- Marasmus
- Gastroenteritis

- Bone lesions (osteochondritis, and periostitis) are characteristic
- Saddle nose (*no bridge to nose*)

Confirmation of diagnosis:

- Spirochetes seen on dark field examination of lesions, body fluid, or CSF.
- RPR/VDRL titres higher than maternal titres
- Rising RPR/VDRL titres over the following 6-12 weeks
- Sero conversion from negative to positive in baby
- FTA - absorption test is positive

NB: passively transferred maternal antibodies are recognized by:

Decline in titre in repeat tests which become negative within 3-6 months although the TPHA may remain positive up to 15 months

Treatment of Congenital Syphilis:

- If the mother has a positive serologic test for syphilis or is symptomatic but the new born shows no signs of syphilis, whether or not the mother was treated, give benzathine penicillin 50 000units /Kg body weight IM as a single dose.
- If CSF is normal treat as above or give procaine penicillin 50 000 i.u. daily for 10 days
- If CSF is abnormal: admit, then give crystalline penicillin 50 000 I.U IM/IV 12 hrly for at least 10 days.

Tuberculosis in Pregnancy

OUTLINE

1. Definition and Epidemiology of tuberculosis
2. Risk factors and Clinical features of tuberculosis
3. Effects of pregnancy on tuberculosis and effect of tuberculosis in pregnancy
4. Screening, diagnosis & Management of tuberculosis in pregnancy and post partum period
5. TB and the newborn
6. Family Planning for TB patients

Definition and epidemiology of tuberculosis

Tuberculosis (TB) is a chronic infectious disease caused by *Mycobacterium tuberculosis*, an acid fast rod shaped bacillus. Although TB is found in most parts of the world, over 90% of new TB cases and deaths occur in developing countries. In some parts of Asia and Africa, 0.5-1% of the adult population is sputum positive for TB. TB is one of the leading infectious causes of morbidity and mortality among women of reproductive age.

Kenya ranks 13th on the list of 22 high-burden tuberculosis (TB) countries in the world and has the fifth highest burden in Africa. According to the World Health Organization's (WHO's) Global TB Report 2010, Kenya had approximately 132,000 new TB cases and an incidence rate of 142 new sputum smear-positive (SS+) cases per 100,000 population. In the last decade TB case notification in Kenya has been increasing at an average of 7% annually. However over the past 3 years the number of cases has been noted to be stabilizing.

Tuberculosis remains a major cause of morbidity and mortality in Kenya. It affects all age groups, but has its greatest toll in the most productive age group of 15 to 44 years. The major factor responsible for the large TB disease burden in Kenya is the concurrent HIV epidemic. HIV+ persons have 10% annual risk and 50% lifetime risk of developing TB disease. TB is the leading cause of mortality in PLHIV. It is important to note that HIV is prevalent in pregnant populations and this puts mothers at increased risk of contracting TB. Hence pregnancy, labor and the postpartum period provides a unique opportunity for TB screening and management.

Factors leading to the increase in TB Cases

- HIV pandemic
- Poverty
- Overcrowding
- Poor nutrition
- Limited access to health services
- Chronic diseases (diabetes, carcinoma, silicosis etc)
- Immune suppressing therapy
- Males are usually more susceptible than females, as are persons at the extremes of age.

Risk of TB infection

The risk of one being infected with the TB bacillus depends on:

- Exposure to bacilli
- Intensity of exposure
- Duration of exposure

- Presence of undetected smear positive TB
- Presence of poorly treated previous TB

Types of Tuberculosis

Tuberculosis for epidemiological purposes is classified according to the organ affected. Pulmonary Tuberculosis (PTB) is the most common and infectious type of TB. It affects the lungs and accounts for majority of TB cases. PTB can either be smear positive or smear negative.

Extra Pulmonary Tuberculosis is TB of organ other than the lung. It can involve any organ of the body such as the kidney, bladder, ovaries, testes, eyes, bones or joints, intestines, skin or glands, and the meninges which is TB meningitis. The most common extra pulmonary TB is TB of the glands, also called TB Lymphadenitis. The most severe extra pulmonary TB is pleural effusion and meningitis

Signs and Symptoms of Pulmonary (Lung) Tuberculosis:

These include:

- Persistent cough lasting for more than two weeks with or without blood stained sputum
- Excessive night sweats
- Intermittent fever
- Loss of body weight
- Excessive tiredness and generally feeling unwell
- Chest pain
- Shortness of breath
- Loss of appetite
- Excessive tiredness and generally feeling unwell

Effect of Pregnancy on TB:

Pregnancy has no adverse impact on TB if there is no great delay in diagnosis. The diagnosis of TB may be delayed in pregnancy. Pregnant patients with pulmonary TB are more likely to be asymptomatic at the time of diagnosis, compared with non-pregnant women with pulmonary TB. They are also more likely to have non-specific symptoms and to experience a delay in obtaining a chest X-ray. The clinical manifestations of pulmonary TB, if present, are the same as in non-pregnant women. The tuberculin reaction is not altered in pregnancy.

Obstetric morbidity and perinatal mortality have been found to increase in patients whose treatment was started late in pregnancy. Infant and maternal mortality rates from untreated active TB are 30-40 per cent. With adequate treatment, a pregnant woman with TB has a prognosis equivalent to that of a comparable non-pregnant woman.

With regard to Latent TB, the risk of disease developing in a tuberculin-positive pregnant woman with a normal chest X-ray is the same as the risk for a non-pregnant woman. The risk of reactivation of inactive pulmonary TB during the post-partum period is possibly higher, but this view is disputed.

Effect of TB on pregnancy:

In the chemotherapy era, the outcome of pregnancy is rarely altered by the presence of TB except in the rare cases of congenital TB. Most studies have not shown that TB increases complications of childbirth. The general consensus is that the risk of an adverse pregnancy outcome is no greater

among pregnant women on anti-tuberculous drugs than among healthy pregnant women. Untreated TB however represents a far greater hazard to a pregnant woman and her fetus than does the treatment of her disease. In which case it may lead to: pregnancy wastage, LBW, preterm delivery, IUFD, increased NMR, maternal morbidity and mortality.

Congenital infection may occur as a result of transplacental spread or aspiration or ingestion of infected amniotic fluid in utero or of infected genital secretion during birth. These routes of infection are extremely rare. Most cases of neonatal TB occur as a result of airborne spread after delivery.

Antenatal care

- All pregnant women should be screened for TB routinely
- Pregnant women suspected to have TB should have their sputum collected and tested for TB
- Pregnant women suspected to have TB should be referred to the TB clinic for treatment
- Pregnant women with sputum smear positive TB and with children under 5 years should be requested to get the children screened for TB

NB: Negative Sputum does not exclude TB!

Screening for TB in pregnancy

During history taking, ask the pregnant woman the following questions:

1. Have you had persistent cough for more than two weeks with or without blood stained sputum?
2. Have you experienced excessive sweating at night?
3. Have you lost weight?
4. Do you have chest pain?
5. Have you been in contact with anyone who has TB?
6. Do you have swollen glands? (Response can be confirmed during head to toe examination)

Screening for TB:

(Ask every mother at every ANC/PNC visit the following questions)

Symptom	YES	NO
1. Have you had a persistent cough with or without sputum for more than two weeks?		
2. Have you experienced excessive sweating or fever at night		
3. Have you lost any weight?		
4. Do you have any chest pain?		
5. Have you been in contact with anyone who has TB?		
6. Do you have any swollen glands? (confirm during physical examination)		

How to detect TB in a pregnant woman

- If **"Yes"** to question one: Do sputum test and carry out clinical evaluation of the patient using the algorithm of diagnosing PTB below.
- If **"No"** to question 1 and **"Yes"** to any other question; continue investigating for TB according to clinical signs. Refer when necessary.
- If **"No"** to all questions: Stop investigations for TB and repeat intensive detection during the next medical visit.

For **HIV negative** women any **one** of the following signs may indicate TB infection;

- Cough of more than 2 weeks
- Haemoptysis (blood stained sputum even once)
- Chest pain for more than one month

For **HIV positive** women **YES** to any of the screening questions may indicate TB.

Investigation: - PTB detection /Diagnosis

PTB is confirmed by examining two separate sputum specimens including an early morning sample which should be collected within a 24 hour period. Two specimens are collected and examined by direct smear for acid fast bacilli (AFB). A negative smear test for TB does NOT exclude TB infection. In case of negative smear, consider other signs and symptoms. The process of collection involves collecting a Spot and a **Morning** sample (Spot” refers to a specimen obtained immediately TB is suspected)

Procedure:

- 1st specimen to be taken immediately TB is suspected at the lab, or “on the spot”. A container is then provided for next day home collection and delivered to the laboratory on the same day
- The pregnant woman produces a 2nd specimen in the early morning of the following day at home and takes it to the laboratory

Counselling for TB during pregnancy

If the pregnant woman has been confirmed to have TB;

- Explain that treatment for TB is **free**
- Explain that TB is treated over an six to eight month period and the drugs are **safe to use** during pregnancy and breastfeeding
- Explain the importance of drug compliance and contact invitation
- Explain that after delivery, discussions on methods of family planning are necessary as some TB drugs (rifampicin) interfere with the absorption of hormonal contraceptives
- Explain the need for high nutritious diet obtained from locally available sources

Treatment:

Most countries have standard drug treatment regimens in their national anti - TB programmes. Generally treatment is in 2 phases. The following drug regimens are used in Kenya

For new TB case (previously untreated)

Intensive phase (2 months):

Ethambutol (E), Rifampicin (R), Isoniazid (H), pyrazinamide (Z)

Continuation phase (4 months)

Rifampicin (R) and Isoniazid (H)

For retreatment TB cases

Intensive phase (3 months):

Ethambutol (E), Rifampicin (R), Isoniazid (H), pyrazinamide (Z)

Continuation phase (5 months)

Rifampicin (R) and Isoniazid (H)- Ethambutol (E),

Notes on the Drugs:

Isoniazid and *ethambutol* are both category A drugs, and are safe in pregnancy. The current consensus is that rifampicin is not teratogenic and that any risk to the foetus must be small compared with the risks from other sources. Pregnancy is not a contraindication of rifampicin.

The use of *pyrazinamide* (category B2) is little studied in pregnancy. Pyrazinamide is especially indicated:

- When multidrug resistance is suspected
- When the pregnant woman is HIV infected
- For tuberculous meningitis, especially when isoniazid resistance is a possibility.

Streptomycin (category D) occasionally causes ototoxicity and is contraindicated in pregnancy.

A *pyridoxine* supplement in pregnancy should be at a dose of 50 mg/day (instead of 25 mg/day).

DOT: Directly Observed Treatment**Initial phase:**

The first 2 months of TB treatment should be administered under direct observation of either a health worker in the facility or a member of the household or community. If client is too sick or observed treatment is not possible, the client should be admitted to hospital.

Continuation phase:

The client collects supplies two weekly for daily DOT at home.

For pregnant women who are HIV positive and also have TB, the treatment should be continued and the client referred to comprehensive care clinic.

All co-infected patients (HIV and TB) should be started on co-trimoxazole prophylaxis as it reduces mortality.

TB AND THE NEW BORN

In HIV negative mothers

- If the woman is diagnosed with PTB all children under 5 should be screened for evidence of active TB. Those found with TB should be put on treatment
- Children <5 years without TB disease should be put on Isoniazid 5mg/kg daily for 6 months
- If TB disease develops during the six months period **STOP** isoniazid and switch to anti-TB treatment (See National TB guidelines)

If a mother has TB and has started treatment 2 months or more before the due date, she should have 2 sputum smear tests done before giving birth. If she is sputum smear negative just before delivery, then she is non infectious and the infant does not need prophylaxis and BCG is given at birth.

If the mother has active lung tuberculosis and was treated for less than two months before birth or was diagnosed with tuberculosis after birth: do not give the tuberculosis vaccine (BCG) at birth.

In the asymptomatic newborn of a mother with tuberculosis (smear positive):

- Give prophylactic isoniazid 5 mg/kg body weight by mouth once daily
- At the age of six weeks, re-evaluate the baby, noting weight gain and taking an X-ray of the chest, if possible
- If there are **any findings suggestive of active disease**, start full anti-tuberculosis treatment
- If the **baby is doing well and tests are negative**, continue prophylactic isoniazid to complete six months of treatment.

- Delay BCG vaccine until two weeks after treatment is completed. If **BCG was already given**, repeat BCG two weeks after the end of the isoniazid treatment
- Reassure the mother that it is safe for her to breastfeed her baby
- Follow up in two weeks to assess weight gain.

Co-infection with HIV and TB is common in children. TB in HIV-infected children is more difficult to diagnose. HIV-infected children are more likely to experience progressive primary TB disease and severe forms of extra-pulmonary disease, such as TB meningitis

Management of TB in children:

1. Recommended TB treatment for child weighing less than 10kg:
 - a. Rifampicin 60 mg + Isoniazid 30mg + Pyrazinamide 150 mgs (RHZ) **OR**
 - b. Rifampicin 60 mg + Isoniazid 30mg (RH)
2. If HIV+ and below 3 years or weighs < than 10kg give AZT+3TC+ABC
3. Provide counseling and support to the mother
4. Admit all children with severe cases of TB

TB and breastfeeding

Encourage the mother to continue breast feeding. Breast feeding women on INH should also take a diet rich in Vitamin B6

If mother is HIV+ explore other feeding options and discuss with the mother according to the infant and young child feeding (IYCF) guidelines -AFFASS

Monitor the babies' growth. Failure to thrive is the most common suggestive sign associated with TB in children.

TB drugs get into breast milk. However Potential toxic effects of drugs delivered in breast milk have not been reported.

Follow up management

All pregnant TB positive women should be followed up at weekly intervals for two months; then two weekly in the chest clinic until completion of treatment.

The woman should continue with ANC services as appropriate. Contacts should be traced and investigated.

At the post partum visit, information should be sought on:

- Assessment and treatment of newborn and other close contacts,
- Adherence to treatment,
- Infant feeding and family planning.
- HIV positive women should be linked to comprehensive care services.

Family Planning and Tuberculosis

According to the WHO MEC, all contraceptive methods are category 1 for women with non pelvic tuberculosis and female sterilisation is acceptable. This implies that they can be used in any circumstance. In case of known pelvic Tuberculosis, use of IUCD is category 3/ 4 - meaning that generally the IUCD should not be used; while the rest are category 1.

However Rifampicin use is category 2-3 for hormonal contraceptives. Dual contraception is therefore recommended for TB patients on rifampicin.

In a TB mother co-infected with HIV, one would have to take into account the drug interactions of various contraceptive methods with ARVs. The gestation of the infant, whether the mother is breastfeeding or not, and the coexistence of other medical conditions will also impact on contraceptive choices for TB patients.

TB Infection Control Measures:

1st Priority: Administrative Control Measures

- Patient Management
 - Early recognition of patients with suspected or confirmed TB disease, through **screening** – may be done by registering officer/clerk
 - **Education** of the above mentioned persons identified through screening in **cough etiquette and respiratory hygiene**
 - Triaging symptomatic patients to the front of the line for the services they are seeking
 - TB suspects or TB cases identified by the screening questions, are **separated** from other patients and requested to wait in a separate well-ventilated waiting area or patient ward
 - Provide identified TB suspects with a surgical mask or tissues to cover their mouths and noses to ensure compliance with cough etiquette.

Environmental control:

- This is used to reduce the concentration of infectious droplet
- It includes:
 - Maximizing natural ventilation through open windows and doors
 - use of mechanical ventilation
 - ❖ window fans
 - ❖ exhaust ventilation systems
 - ❖ supply and exhaust ventilation systems
 - Additional complex and costly methods include
 - ❖ room air cleaners with air filtration
 - ❖ Air filtration with ultraviolet germicidal irradiation (UVGI) to inactivate *M. tuberculosis* organisms

Infection Prevention of Air Borne diseases

- Each facility should have a written airborne disease(TB/MDR-TB) infection prevention control plan that outlines protocol for the immediate **Recognition, Separation, Investigation for TB; Provision of services and/or Referral for services of patients with suspected or confirmed TB disease**
- Administrative support for implementation of the plan, including quality assurance should be available

Diabetes in Pregnancy

Outline:

- Introduction and epidemiology
- Effects of diabetes on pregnancy and effects of pregnancy on diabetes
- Diagnosis of gestational diabetes
- Preconception care
- Antenatal care
- Care during labour
- Postnatal care including contraception

Introduction

Diabetes mellitus, a clinical syndrome characterized by deficiency of or insensitivity to insulin and exposure of organs to chronic hyperglycemia, is a common medical complication of pregnancy. **Gestational diabetes mellitus (GDM)** is defined as any degree of glucose intolerance with first recognition during pregnancy.

Gestational diabetes is the result of hormonal changes that occur in all women during pregnancy. Increased levels placental hormones interfere with the ability of insulin to manage glucose. This condition is called "insulin resistance." Usually the mother's pancreas is able to produce more insulin (about three times the normal amount) to overcome the insulin resistance. If this does not occur, glucose levels will rise, resulting in gestational diabetes. Usually, blood glucose levels return to normal after childbirth.

Epidemiology

Abnormal maternal glucose regulation occurs in 3 -10% of pregnancies. Studies suggest that the prevalence of diabetes in WRA is increasing. This may be attributed to: more sedentary lifestyles, dietary changes, and an increase in early childhood and adolescent obesity. Gestational diabetes accounts for up to 90% of diabetes mellitus in pregnancy. Prevalence of gestational diabetes is higher in African than white women.

Risk factors for gestational diabetes include: advanced maternal age (older than 35 yrs), obesity (>90kg), previous history of diabetes, previous history of macrosomia (over 4kg), previous unexplained foetal death, women with polycystic ovarian syndrome, and a strong family history of diabetes

Effect of diabetes on pregnancy:

Risks of pre-gestational diabetes to the baby

Poorly controlled pre-gestational diabetes poses a number of risks to the baby. These risks can be greatly reduced with good blood sugar control starting before pregnancy. They include the following:

- **Birth defects:** Women with poorly controlled diabetes in the early weeks of pregnancy are 3 to 4 times more likely than non diabetic women to have a baby with a serious birth defect. These include heart defects or neural tube defects (NTDs), birth defects of the brain or spinal cord
- **Miscarriage:** High blood sugar levels around the time of conception may increase the risk of miscarriage
- **Premature birth** (before 37 completed weeks of pregnancy): Premature babies are at increased risk of health problems in the newborn period as well as lasting disabilities.
- **Macrosomia:** Women with poorly controlled diabetes are at increased risk of having a very large baby (10 pounds or more). Macrosomia is the medical term for this. These babies grow so large because some of the extra sugar in the mother's blood crosses the placenta and goes to the foetus. The foetus then produces extra insulin, which helps it process the sugar and store it as fat. The fat tends to accumulate around the shoulders and trunk, sometimes making these babies difficult to deliver vaginally and putting them at risk for injuries (brachial plexus trauma, shoulder dystocia, fractures) during delivery.
- **Stillbirth:** Though stillbirth is rare, the risk is increased with poorly controlled diabetes
- **Newborn complications:** These include respiratory distress syndrome, hypoglycaemia, polycythaemia, neonatal hypocalcaemia and neonatal jaundice. These complications can be treated, but it's better to prevent them by controlling blood sugar levels during pregnancy.
- **Obesity and diabetes:** Babies of women with poorly controlled diabetes may be at increased risk of developing metabolic syndrome (childhood obesity, glucose intolerance, hypertension and diabetes as young adults)

Risks of gestational diabetes to the baby

Babies of women with gestational diabetes usually face fewer risks than those of women with pre-gestational diabetes. Babies of women with gestational diabetes usually do not have an increased risk of birth defects. However, some women with gestational diabetes may have had unrecognized diabetes that began before pregnancy. These women may have had high blood sugar in the early weeks of pregnancy, which increases the risk of birth defects. Like pre-gestational diabetes, poorly controlled gestational diabetes increases the risk of macrosomia, stillbirth and newborn complications, as well as obesity and diabetes in young adulthood

Effects of diabetes mellitus on the mother

Women with diabetes (pre-gestational and gestational) are likely to have an uncomplicated pregnancy and a healthy baby, as long as blood sugar levels are well controlled. However, women with poorly controlled diabetes are at increased risk of certain pregnancy complications. These include:

- Diabetic retinopathy
- Chronic hypertension
- Renal dysfunction
- Preeclampsia
- Polyhydramnios
- Increased operative deliveries
- Abruptio placentae
- Maternal stroke
- HELLP syndrome
- Maternal mortality

Effect of pregnancy on diabetes:

Deterioration of glucose tolerance occurs normally during pregnancy. Due to the circulating hormones, insulin resistance increases with gestational age. Patients with risk factors who test negative in early pregnancy should be retested at 26 -28 weeks.

Certain complications e.g. retinopathy worsen in pregnancy.

Gestational diabetes only occurs in pregnancy. Diagnosis is by glucose tolerance testing

Diagnosis of gestational diabetes mellitus

Risk assessment for GDM is undertaken at the first prenatal visit. Women with risk factors, should have a glucose tolerance test (GTT) as soon as feasible. If results of testing do not demonstrate diabetes, they should be retested between 24 and 28 weeks' gestation. A fasting blood sugar > 7.8 mmol/l or random blood sugar >11.1 mmol/l, meets the criteria for diabetes if confirmed on a subsequent day.

Symptoms of diabetes (polyuria, polydipsia, and/or unexplained weight loss) plus a fasting blood sugar > 7.8 mmol/l should raise suspicion of gestational diabetes.

Glucosuria is a common finding in pregnancy due to increased glomerular filtration and is therefore unreliable as a means of diagnosis.

Pre-conception care

In spite of the goal of preconception counselling for women with pre-existing diabetes, many women will present for medical care for the first time during pregnancy. In this light, pregnancy affords a unique opportunity for diabetes screening and may well be the best opportunity in a woman's life to discover or prevent her diabetes.

Women with diabetes who are planning to become pregnant should be informed that establishing good glycaemic control before conception and continuing this throughout pregnancy will reduce the risk of miscarriage, congenital malformation, stillbirth and neonatal death. It is important to explain that risks can be reduced but not eliminated.

The importance of avoiding unplanned pregnancy should be an essential component of diabetes education from adolescence for women with diabetes. Women with diabetes who are planning to become pregnant should be offered pre-conception care and advice before discontinuing contraception.

Information and advice should include the following:

Women with diabetes who are planning to become pregnant and their families should be offered information about how diabetes affects pregnancy and how pregnancy affects diabetes. The information should cover:

- The role of diet, body weight and exercise
- The risks of hypoglycaemia and hypoglycaemia unawareness during pregnancy
- How nausea and vomiting in pregnancy can affect glycaemic control
- The increased risk of having a baby who is large for gestational age, which increases the likelihood of birth trauma, induction of labor and caesarean section

- The need for assessment of diabetic retinopathy and diabetic nephropathy before and during pregnancy
- The importance of maternal glycaemic control during labor and birth and early feeding of the baby in order to reduce the risk of neonatal hypoglycaemia
- The possibility of transient morbidity in the baby during the neonatal period, which may require admission to the neonatal unit
- The risk of the baby developing obesity and/or diabetes in later life.
- Taking folic acid supplements (5 mg/day) from pre-conception until 12 weeks of gestation
- Review of, and possible changes to, medication, glycaemic targets and self-monitoring routine
- Frequency of appointments and local support, including emergency telephone numbers/contacts.

Provide / offer the following:

- Blood glucose meter for self-monitoring
- Ketone testing strips to women with type 1 diabetes and advise on use if hyperglycaemic or unwell
- Diabetes structured education programme
- Offer monthly HbA1c. Advise women to aim for an HbA1c below 6.1%. Inform women that any reduction in HbA1c may reduce risks. Advise women with HbA1c above 10% to avoid pregnancy.

Antenatal care

The following should be observed on top of the routine ANC care. Note that diabetic patients will require more ANC visits.

Before or as soon as pregnancy is confirmed:

- stop oral hypoglycaemic agents, apart from metformin², and commence insulin if required
- stop angiotensin-converting enzyme inhibitors and angiotensin-II receptor antagonists and consider alternative antihypertensives

If it is safely achievable, women with diabetes should aim to keep fasting blood glucose between 3.5 and 5.9 mmol /litre and 1-hour postprandial blood glucose below 7.8 mmol/litre during pregnancy.

Diabetics have triple the normal rate of asymptomatic bacteriuria. Therefore, a urine culture is obtained initially, and appropriate treatment initiated if it is positive. After cessation of therapy, urinary culture is again obtained to confirm elimination of the infection.

Protein detected in clean-catch urine specimens should be evaluated by 24-hour urine testing and repeated as needed.

In addition to routine prenatal care the development of edema (including carpal tunnel syndrome) is closely monitored. If edema occurs, greater attention to glucose control (e.g. returning to daily monitoring) and enhanced bed rest are necessities.

Clinical/ultrasound assessment of foetal growth should be routinely carried out. In addition, women with diabetes should be offered antenatal examination of the four-chamber view of the foetal heart and outflow tracts at 18–20 weeks.

Weekly NSTs (from 32 weeks' gestation) are recommended in patients with insulin-requiring gestational diabetes, with an increase to biweekly recommend after 36 weeks as well as the addition of AFI evaluation. For diet-controlled gestational diabetics, weekly NSTs are usually begun at 36 weeks.

All patients should be instructed to make daily assessments of foetal movements and to alert the physician if a decrease is noted.

A biophysical profile should be done if decreased movement is noted or if a nonreactive NST occurs.

During pregnancy, women who are suspected of having ketoacidosis should be admitted immediately for critical care, where they can receive both medical and obstetric care.

In the case of abnormal foetal testing, the practitioner should assess gestational age and, if the foetus is found to be mature, delivery should be expedited. If the foetus is intermediate in maturity, amniotic fluid assessment for pulmonary maturity may assist in the decision regarding whether delivery should be effected. Lung maturity should also be assessed before elective induction if glucose control is questionable or if the foetus is less than 38 weeks unless foetal jeopardy is suspected. The lecithin: sphingomyelin ratio should be 2.5 or higher due to the higher incidence of respiratory distress in the foetus. If the foetus is immature, further testing such as contraction stress tests or hospitalization with continuous foetal heart rate monitoring is advised.

Preterm labour is increased in patients with diabetes, and they should be treated with magnesium sulphate as the initial tocolytic agent because the beta mimetics markedly influence glucose control. Corticosteroids increase maternal glucose levels, and therapy should be prescribed to keep levels in the desired range. This therapy may consist of continuous insulin infusion in certain cases.

Induction of labour is recommended at 38 weeks in patients with poor glucose control and macrosomia. Use of Prostaglandin to ripen the cervix reduces the caesarean section rate, but is not advised without a negative contraction stress test if oligohydramnios is the indication for induction.

Hypoglycaemic therapy

Consider hypoglycaemic therapy for women with gestational diabetes:

- If lifestyle changes do not maintain blood glucose targets over a period of 1–2 weeks or
- If ultrasound shows incipient foetal macrosomia (abdominal circumference above the 70th percentile) at diagnosis.

If hypoglycaemic therapy is required:

- Tailor hypoglycaemic therapy to the individual woman
- Regular insulin, the rapid acting insulin analogues or the oral hypoglycaemic agents metformin and glibenclamide may be considered.

- The patient should be managed jointly by the diabetes and antenatal clinic team. Maintain contact with the diabetes care team every 1–2 weeks to assess glycaemic control

Management of Labour

Diabetic patients must be advised to deliver in hospital under skilled birth attendance.

Insulin-dependent diabetics should be induced at 40 weeks' gestation if spontaneous labour has not occurred. Diabetes Mellitus alone is not an indication for C/section. Oxytocin is given for labour induction similarly to normal pregnancies. Continuous foetal heart rate monitoring is required with careful attention to decelerations.

Glucose infusion (D5W, lactated Ringer's solution) is given to all patients in labour unless delivery is immediate.

Glucose levels are monitored every 2-4 hours with the goal of maintaining levels at 3-7 mmol/L till delivery.

In those requiring insulin, give half the dose of insulin with a light meal in the morning on the day of delivery. Maintain with regular insulin (25 iu/250 mL normal saline, giving a dilution of 0.1 iu/mL) by continuous infusion at levels of 0.5-2 iu/h.

Shoulder dystocia should always be anticipated and prepared for.

If repeat caesarean section or other indication for elective surgery occurs, the patient should be directed to take the evening insulin dose prior to surgery, but not her morning dose. Showering with a bacterial solution the night before delivery seems reasonable due to the increase in wound infections in this group. The patient is at increased risk of thromboembolic events due to decreased prostacyclin production by the platelets.

Neonatal care

Babies of women with diabetes should be kept with their mothers unless there is a clinical complication or there are abnormal clinical signs that warrant admission for intensive or special care. However they need to be observed carefully for complications such as hypoglycaemia, Respiratory Distress Syndrome (RDS) and neonatal jaundice.

Breastfeeding is not affected by diabetes and is generally encouraged.

Postnatal care

Women who were diagnosed with gestational diabetes should be offered lifestyle advice (including weight control, diet and exercise) and offered a fasting plasma glucose measurement at 6-week postnatal check and annually thereafter.

Contraception should be offered. For gestational diabetes, all methods are MEC category 1.

However if the diabetes is persistent, hormonal methods are MEC category 2, while IUCD is MEC category 1. Female sterilisation needs extra preparation and precaution (category C).

In case of vascular complications including kidney, ocular or nerve damage, hormonal contraceptives are categories 3 /4 meaning they should generally not be used.

Session 5: HIV in Pregnancy

OUTLINE

1. Definition of HIV/AIDS
2. Background
3. Magnitude of HIV in Kenya
4. MTCT transmission patterns
5. Effect of HIV of pregnancy and Effect of pregnancy on HIV
6. Risk factors for MTCT
7. Management of HIV in pregnancy
 - a. Preconception care
 - b. Antenatal care
 - c. Use of ARVs
 - d. Intrapartum care
 - e. Postpartum care
 - f. Neonatal care
 - g. Contraception

Definition of HIV/AIDS

HIV: stands for Human Immunodeficiency Virus, the virus that causes AIDS. Clients with HIV infection do not have symptoms. However, they can still pass HIV to others. The duration of asymptomatic phase varies from a few months to years. Most children infected through MTCT develop symptoms before they are 2 years old

AIDS: stands for Acquired Immunodeficiency Syndrome. Clients have physical signs and symptoms of HIV infection that come as a result of weakened immune system. Progression of HIV depends on type of virus and specific characteristics of person, including general health, nutritional and immune status

Background

According to UNAIDS 2008 report there were an estimated 33 million people living with HIV globally in 2007. Sub-Saharan Africa remains the region most heavily affected, accounting for 67% of all people living with HIV and for 75% of AIDS deaths in 2007. Women account for half of all people living with HIV worldwide, and nearly 60% of HIV infections in sub-Saharan Africa. Young people aged 15–24 account for an estimated 45% of new HIV infections worldwide. Globally, the number of children younger than 15 years living with HIV increased from 1.6 million in 2001 to 2.0 million in 2007. Almost 90% live in sub-Saharan Africa.

Generally if in the absence of any intervention, the risk of an HIV-infected mother passing the virus to her infant during pregnancy, labour and delivery or in the postnatal period is 1 in 3. In the developed countries, the rate of MTCT is less than 2% because of widespread access to anti-retroviral therapy (ART), planned caesarean sections (CS), ability to safely formula feed, and access to quality medical services. In contrast resource poor countries like Kenya, have a 30-40% chance

that an HIV positive breastfeeding mother will pass HIV to her child due to the absence of these interventions. PMTCT services therefore must be integrated into SRH to minimise transmission rates.

Magnitude of HIV in Kenya

According to the 2009 KDHS results, 6% of Kenyan adults age 15-49 are infected with HIV. The peak prevalence among women is at age 40-44 (14%), while prevalence among men is highest at age 35-39 (10%). The prevalence of HIV in pregnancy in Kenya is 9.8%

The HIV epidemic shows regional heterogeneity, with Nyanza province having an overall prevalence of 14% –more than double the national average; while Nairobi and Western provinces have a prevalence of 7% each. All other provinces have levels between 3% and 5% overall, except North Eastern province where the prevalence is about 1%.

Infants and young children under 15 years account for 16% of all new HIV infections mainly as a result of MTCT. Most of the new infections occur among young people, in whom the main mode of transmission is through sexual intercourse.

MTCT transmission patterns in Kenya

During pregnancy	5 – 10%
During labour and delivery	10 – 20%
Non breastfeeding	15 – 30%
Breastfeeding 1ST 6 months	25 – 35%
Breastfeeding 18 – 24 months	30 – 45%

Effect of HIV on pregnancy

HIV/ AIDS may have the following effects on pregnancy

Maternal

1. Spontaneous Miscarriage
2. Low weight gain/ may experience weight loss
3. Frequent infections especially UTI and RTI
4. Anaemia (common)
5. APH in 3rd trimester/ placental abruption
6. Greater likelihood of PPH reported
7. High risk of maternal mortality
8. Preterm PROM
9. Chorioamnionitis

Baby

1. Preterm delivery
2. Low birth weight/ IUGR
3. Increased IUFD and still births
4. Low apgar scores at 5 minutes
5. High infant mortality rates

Effect of pregnancy on HIV

Studies have shown that pregnancy does not seem to have an effect on overall HIV disease progression

Risk factors for MTCT

The most important risk factor for MTCT is the amount of HIV in the mother's blood. This is known as the viral load. The viral is usually high in case of:

- Recent HIV infection
- Advanced AIDS

Maternal Risk factors for MTCT during pregnancy

- High maternal viral load (new infection or advanced AIDS)
- Low CD4 count
- Placental Infections e.g. Malaria
- Anaemia
- Sexually transmitted infections (STIs) especially the ulcerative ones
- Unprotected sex
- Multiple sexual partners
- Smoking

Maternal Risk factors for MTCT during labour and delivery

- High maternal viral load (new infection or advanced AIDS)
- Rupture of membranes for more than 4 hours
- Instrumental delivery
- Episiotomy
- APH or Intrapartum haemorrhage
- Chorioamnionitis
- Vaginal delivery
- External cephalic version

Infant Risk factors for MTCT

- Premature delivery
- Low birth weight
- Breaks in the skin or mucous membranes ((e.g. thrush or sores)

Risk factors for MTCT during breastfeeding

- Breastfeeding
 - Method of breastfeeding (exclusive versus mixed feeding)
 - Duration of breastfeeding,
- Maternal disease status
 - High viral load,
 - Low CD4 count
- Breast disease
 - Cracked nipples, mastitis, breast abscess

Role of the Community in PMTCT

Large proportions (60%) of women in Kenya deliver outside the health systems. HIV positive women must be advised to deliver in a health facility with assistance from qualified personnel.

- There is need to educate the community on the risk of MTCT and ways of prevention
- The community should be encouraged to facilitate mothers to attend ANC and deliver in health facilities
- The community should be encouraged to refer to health facilities all children born at home and mothers who deliver at home for PNC

1. Preconception care

Preconception care refers to interventions that identify and modify risks to a couple's health and future pregnancies. It includes prevention and management of health issues that require action before conception. These interventions include:

- Knowledge of HIV status to make informed choices
- Partner involvement
- Good nutrition
- Provision of Comprehensive Post Rape Care services
- STI screening and management
- Contraception to prevent unintended pregnancies
- Life style and behaviour change
- ART for those who are eligible

To reduce MTCT, the woman should conceive when the viral load is low and the CD4 is high. She should be advised to ensure that:

- She is in good health in good health, without Opportunistic infections (OIs) or other illnesses due to HIV
- If eligible, she should be taking and responding to therapy with ARVs for several months.
- She needs to be assessed for TB and complete treatment as necessary
- She needs to be taking cotrimoxazole
- She needs to be treated for any existing STIs

Male Partner's Health

Before the woman tries to get pregnant, the man should be advised to:

- Be in good health and taking and responding to therapy with ARVs for several weeks if HIV-positive and eligible
- Be treated for any existing STIs
- Be circumcised if he is HIV-negative and this service is available

Safer Methods to Conceive

- Encourage **condom use during most of the month** to prevent transmission of HIV, re-infection with other strains of HIV, or STIs. Consider unprotected sex only when the woman is most fertile. (If cycles are 26-32 days, the fertile period is 8-19th day)
- In case of discordance consider artificial insemination

2. Antenatal Care

A pregnant woman identified to be HIV positive should have a full physical examination. In particular

Obstetric evaluation and care

- Assessment. This includes taking a complete history and physical examination.
- Antenatal profile including HIV testing for those who do not know their status
- They should have routine follow up visits. For HIV positive, additional visits for further counselling & Care sessions are recommended
- Avoid invasive procedures e.g. amniocentesis
- Avoid external cephalic version

Medical management

- Assess for HIV related symptoms and illnesses and signs of opportunistic infections (especially tuberculosis). Special attention should be paid to infections including STIs. Treatment should be given for any infections
- Laboratory investigations including full blood count (FBC), CD4 count, viral load, and Hepatitis B and C screening
- TB screening should be done and the positive clients referred for treatment
- Prophylactic treatment should include
 - Iron and folate
 - Multivitamin supplementation
 - TT immunization
 - Malaria prophylaxis (only for those who are HIV negative)
 - Co-trimoxazole prophylaxis
- Antiretroviral treatment or prophylaxis

Maternal nutritional counselling and support

HIV positive women will need advice on a healthy diet and may need nutritional support during pregnancy. Advice on healthy diet (depends on availability, cost, cultural considerations and HIV-related symptoms).

Multiple Micronutrient supplementations during pregnancy is encouraged as it results in better pregnancy outcome. It should include: zinc, calcium, magnesium, iron, vitamin A, folic acid, vitamin B 6, vitamin B 12, and selenium.

They should be advised to eat small frequent meals to increase absorption

Lifestyle and behaviour change

Behaviour change should be encouraged to reduce risk of transmission to the child. If possible the spouse should be involved.

- Discourage smoking and drug abuse
- Condom use
- Encourage couple counselling and testing
- Reduce number of sexual partners and risky sexual practices

MOH recommendations for PMTCT - 2010-12-23

- All pregnant women should be encouraged to start attending ANC as soon as they know they are pregnant; preferably in the first trimester
- All pregnant women should be counselled and tested for HIV during their first visit and retesting should be done in the 3rd trimester for HIV negative women
- All HIV +ve pregnant women should be evaluated for eligibility for HAART during the first ANC visit using WHO staging and /or CD4 testing where available
- Mothers in need of ART for their own health should get lifelong treatment

- Those already on HAART before pregnancy should continue with their ART

3. Use of ARVs in Pregnancy

ARV therapy (ART): This is the long-term use of antiretroviral drugs to treat maternal HIV and for PMTCT

ARV prophylaxis: Is the short-term use of antiretroviral drugs to reduce HIV transmission from mother-to-child

MOH guidelines for ARV prophylaxis in HIV +ve women in WHO stage 1 or 2, or CD4 count over 350

- Start Zidovudine (AZT) at 14 weeks of pregnancy or first contact thereafter and continue in labour
- Give single dose Nevirapine (sdNVP) at onset of labour
- Start Lamivudine (3TC) in labour
- Continue AZT and 3TC for 1 week after delivery
- HIV +ve women presenting for the first time at 38 weeks and not eligible for HAART should be offered ARV prophylaxis during labour and up to 1 week post partum

ARV prophylaxis in pregnancy

New recommendations (WHO 2009)

Mother

- **Antenatal:** Start AZT from 14 weeks or immediately thereafter up to 36 weeks
- **Intrapartum:** give AZT 600 mg stat (or 300mg BD) + 3TC 150mg BD + single-dose NVP 200 mg onset of labour
- **Post partum:** Give AZT 300mg BD +3TC 150mg BD for seven days

Baby

- **Breastfeeding infant:** Daily NVP from birth until one week after exposure to breast milk has ended.
- **Non-breastfeeding infant:** NVP daily for 6 weeks

Prophylaxis options

Option A: AZT	Option B: Triple ARV
Mother - Antepartum AZT (from 14 weeks) - sd-NVP at onset of labour* - AZT + 3TC during labour & delivery* - AZT + 3TC for 7 days postpartum* Infant Breastfeeding population - Daily NVP (from birth until one wk after all exposure to breast milk had ended) Non-breastfeeding population - AZT for 6 weeks OR - NVP for 6 weeks	Mother - Triple ARV (from 14 wks until one wk after all exposure to breast milk has ended) - AZT + 3TC + LPV-r - AZT + 3TC + ABC - AZT + 3TC + EFV - TDF + XTC + EFV Infant Breastfeeding population - Daily NVP from birth to 6 weeks Non-breastfeeding population - AZT for 6 weeks OR - NVP for 6 weeks

*sd-NVP and AZT+3TC can be omitted if mother receives > 4 wks AZT antepartum



ARV Therapy

When to initiate ARV Therapy in pregnancy

- If the CD4 count is available then all clients with CD4 $\leq$ 350 are started on ART irrespective of the WHO stage.
- For those in WHO stage 3 and 4, ART is started regardless of CD4.
- All patients with HIV and TB are also started on ART
- If the CD4 count is not available the all patients in WHO stage 3 and 4 are started on ART

The recommended regimen is AZT + 3TC + NVP or EFV* or LPV/r

*(EFV-not to be used in 1st Fourteen weeks of Pregnancy)

Benefit and impact of providing ART to eligible pregnant women

Pregnant women with CD4 $\leq$ 350 comprise:

- About 40% of HIV+ pregnant women
- Account for > 75% of MTCT risk
- Account for >80% of postpartum transmission
- Account for 85% of maternal deaths within 2 years of delivery
- Would have a strong benefit from initiating ART for maternal health and PMTCT during pregnancy, labour and delivery and breastfeeding

ARV therapy in pregnancy

If the woman becomes pregnant while on ARV therapy:

- She should continue to take ARV therapy throughout pregnancy, labour, delivery and postpartum
- If she is on Efavirenz (EFV) as a part of her ARV therapy and becomes pregnant:
 - Substitute NVP for EFV if pregnancy is recognized during 1st Fourteen weeks
 - Continue EFV if recognized during 2nd or 3rd trimester
- Adherence to ART may be more difficult in early pregnancy because of morning sickness in addition to nausea caused by ART.

Delay in starting ART

Delaying the start of ARV therapy can be considered if a pregnant woman:

- Suffers frequently from nausea, a common side effect of some ARVs
- Is in her first trimester and concerned about the effects of ARVs e.g. EFV on the developing foetus
- **HOWEVER**, if a woman's clinical or immune status suggests she is **severely ill**, the benefits of early ARV therapy outweigh any potential risk to the foetus

Induction of labour

Induction of labour may be associated with increased risk of HIV MTCT. Careful assessment of the need for and desirability of induction rather than CS is necessary. When induction of labour is chosen, membranes should be left intact for as long as possible. Remember that oxytocin should not be used with intact membranes.

Support during labour

Emotional support during labour is important for all women, and may be even more necessary for an HIV positive woman who is concerned about her condition and risk of HIV transmission to child. Whenever possible, during labour, ward staff must be sensitive to the fears and concerns of the HIV positive mother about her infection, and how much she had told her partner.

4. Intrapartum Care

Some practices may increase the risk of HIV transmission while having little or no proven obstetric value. Routine management should be modified for all women whether known to be positive or not.

- Use universal precautions for all patients. These include protective gear, safe use and disposal of sharps, sterilization of equipment and safe disposal of contaminated materials
- Minimize vaginal examination by performing them only when necessary and recording all vaginal examinations performed
- Use of the partograph: Proper and consistent use of the partograph in the monitoring progress of labour will improve the management and reduce the risk of prolonged labour in all women.
- Avoid artificial rupture of membranes unless necessary
- Avoid unnecessary trauma during delivery.
 - Avoid invasive procedures, such as using scalp electrodes or scalp sampling
 - Avoid routine episiotomy
 - Minimize the use of forceps or vacuum extractors
- Minimize risk of postpartum haemorrhage through:
 - Active management of the third stage of labour
 - Carefully remove all products of conception
 - Carefully repair genital tract lacerations and tears
- Use safe blood transfusion practices
 - Minimize use of blood transfusions
 - Use only blood screened for HIV, Syphilis, malaria, hepatitis B and C
- Elective C/S. Caesarean section performed **before the onset** of labour or membrane rupture has been associated with reduced MTCT. Broad-spectrum antibiotics should be used routinely after caesarean section. There is a higher prevalence of post-operative complications in HIV infected women. The decision to undertake caesarean

section delivery to prevent MTCT should be balanced against the immediate and long-term risks to the mother.

HIV testing during labour

A woman of unknown HIV status at labour should be offered HIV testing and counselling. ARV prophylaxis, when initiated during labour for the woman and just after birth for the infant, can reduce MTCT by as much as 50%

5. Postpartum Care

The postpartum period provides an opportunity to educate all mothers about HIV, to provide counselling and testing if it was not done previously, and to reinforce the education provided during the antenatal period. Both HIV infected and HIV uninfected mothers should receive this education and counselling before discharge.

Specific postpartum care includes

- Ongoing treatment, care and support for new HIV-positive mother, including referral for ARV therapy if eligible
- EID for HIV exposed infants
- Educate on personal hygiene to prevent contamination of baby with maternal blood and other secretions
- Nutritional counselling and support for both
- Early detection and seeking care for HIV-related conditions, including TB and malaria.
- Family planning options including dual protection
- Advice on breast care depending on her feeding option
- Discuss partner CT
- Cervical cancer screening at 6 weeks

6. Neonatal care

- Wipe the mouth and nostrils with gauze at delivery of the head.
- Clamp and cut cord immediately after birth and avoid milking the cord. Cover with gauze before cutting the cord
- Avoid suctioning unless there is a meconium or excess secretions. If you must suction, use low pressure or bulb suction.
- Avoid beating or turning baby upside down
- Wipe baby dry with particular attention to the mucous membranes. Wiping should be done carefully to avoid trauma to the skin. The preterm infant's skin bruises more easily.
- Feed the baby within one hour to avoid infection.
- Umbilical cord requires good hygiene; the mother should be instructed on how to clean the cord as per the recommended guidelines
- Prophylaxis for all HIV exposed infants is recommended

Cotrimoxazole Prophylaxis

All HIV exposed infants are given cotrimoxazole prophylaxis starting from 6 weeks. This is stopped the child is confirmed HIV negative and no longer breastfeeding.

Confirmation of HIV infection in children

Conduct Virologic Diagnostic Test (DNA PCR) at 6 weeks of age or at first contact after 6 weeks.

- If the virology test is positive then start the infant on ARVs and continue with cotrimoxazole
- If the virology test is negative follow up the child and conduct Diagnostic Antibody HIV Test at 9 Months irrespective of wellness of child or before 9 months if child develops signs or symptoms suggestive of HIV.
- If the antibody test is positive, confirm with a virology test and start on ARVs
- If the antibody test is negative the infant stops cotrimoxazole and continues with routine under 5 follow up
- For breastfeeding infants confirmatory testing is done 6 weeks after complete cessation of breastfeeding.

(Refer to Early Infant Diagnosis (EID) flow chart for details)

Infant feeding recommendations

For HIV infected mothers

- Exclusive breastfeeding is recommended for HIV-infected women for the first 6 months of life unless replacement feeding is Acceptable, Feasible, Affordable, Sustainable and Safe (AFASS) for them and their infants
- WHO recommends continued breastfeeding for up to 12 months with ARV prophylaxis until one week after breastfeeding ceases
- When replacement feeding is AFASS, avoidance of all breastfeeding by HIV-infected women is recommended

These mothers should receive counselling

- Information about risks and benefits of each option
- Specific guidance on selecting option most suitable for their situations

7. Contraception

Family planning services are among the core interventions of PMTCT provided to help women determine future childbearing patterns including the prevention of HIV-infected births. Reproductive health counselling can help a woman practice safer sex and determine her future childbearing patterns on a more responsible and informed basis.

HIV positive women can use all methods of contraception as long as they meet the eligibility criteria.

Below is the summary of the WHO Medical Eligibility Criteria for HIV positive women

Summary Chart	Condition				
	HIV-infected	AIDS	ARV therapy		
			NRTIs	NNRTIs	Ritonavir
DMPA	1	1	1	1	1
NET-EN	1	1	1	2	2
Implants	1	1	1	2	2
Oral contraceptives	1	1	1	2	3

IUCD	initiation	2	3*	2/3*	2/3*	2/3*
	continuation	2	2	2	2	2
Condoms		No restrictions; use is encouraged to prevent STI/HIV transmission.				
ECPs		No restrictions.				
Sterilization		No reasons to deny. Delay in case of acute HIV-related infection.				
FAB methods		Can use if menstrual cycle is regular. Encourage to continue using condoms outside the fertile window to prevent STI/HIV transmission.				
LAM		Advise on the risk of transmission; exclusive breastfeeding reduces risk compared to mixed feeding.				
Spermicides and diaphragm		Use is not recommended, may increase risk of HIV transmission/superinfection.				

* Category 2 if client with AIDS is clinically well on ARV therapy; otherwise category 3.

Interpersonal communication and Counselling

OUTLINE

1. Definition of terms used in interpersonal communication and counselling (IPCC)
2. Health activities that require IPCC
3. Counselling principles and IPCC skills and techniques
4. Purpose of counselling
5. Qualities of a good counsellor
6. Counselling process utilizing GATHER steps
7. Factors that facilitate and those that interfere with counselling
8. Elements of quality care

Definitions of terms used in IPCC

Interpersonal Communication

It is face-to-face verbal and non-verbal exchange of information or feelings between two people involving motivation, education and counselling.

Counselling

It is a person-to-person interaction in which the counsellor provides adequate information to enable the client to make an informed choice about the course of action that is best for him or her.

Interpersonal Communication and Counselling

It is the face-to-face verbal or non-verbal exchange of information or feelings between individuals or in groups, to enable the client or the group to make an informed choice about the course of action to take. The client also develops confidence in the service provider if the communication is effective.

Information

It is creating awareness on a particular issue.

Client's rights: Information access to services informed choice safe services privacy and confidentiality dignity comfort expression of opinion informed decision making continuity of care

Health activities that require IPCC

Interpersonal communication and counselling is required in all settings where health workers interact with clients or patients. Specific situations are during:

- History taking
- Examination
- Motivation
- Counselling e.g. during discharge time, rescheduling appointment, course of treatment and care.

Basic counselling principles and IPCC skills and techniques

For counselling to be effective, observe the following:

- The right to make an informed decision
- Process should be confidential
- Process must be truthful
- Freedom of expression
- Genuine communication without emotional involvement
- Auditory and visual privacy
- Receptive atmosphere
- Recognize limitations and refer when necessary

Examples of verbal and non-verbal communication include:

- Hand shaking
- Speaking and laughing
- Facial expressions (frowning, smiling)
- Eye contact (rolling eyes, gazing, staring)
- Nudging, kicking and crossing arms
- Crying and shouting.

Interpersonal communication counselling skills and techniques

Non verbal communication skills: -involves body language	Verbal Skills
ROLES are an acronym used for non - verbal behaviour that facilitates communication to occur.	CLEAR is an acronym used for verbal behaviour that facilitates communication.
R - Relax	C - Clarify
O - Open and approachable	L - Listen actively
L - Lean towards client	E - Encourage

E - Eye contact	A - Acknowledge
S - Sits squarely and smile	R - Repeat and Reflect

Purpose of Counselling

To provide accurate Safe Motherhood information to clients/patients to enable them make informed decisions with emphasis to the following priority groups:

- Women during intrapartum and postpartum period
- Adolescents
- Individual men, women and couples
- Women receiving post abortion care regardless of age
- Women with medical or obstetric conditions likely to worsen with pregnancy and childbirth.

Qualities of a Good Counsellor

A good counsellor is a person who is:

Counselling techniques

- | | |
|---|---------------------------------|
| - Praise and encouragement | - Questioning |
| - Probing | - Observation |
| - Paraphrasing | - Summarizing |
| - Active listening | - Reflecting |
| - Clarification | - Non-verbal response (nodding) |
| - Explaining in language the client can understand | |
| - Copying with special needs (facial expression showing pain) | |
| - Use of IEC support materials. | |

Honest: Always tells the truth to the client and provides them with care and information desired.

Understanding/empathic: Being able to put yourself in the place of the client; being able to feel what the client feels and to demonstrate to the client that you understand, and accept their feelings without bias or judgment.

Non-judgmental: The counsellor should treat the clients with respect and kindness, and give information in an unbiased manner.

Flexible: Counsellor should be able to recognize when he/she cannot sufficiently help a client to refer to someone who can.

Sensitive to clients' needs and concerns: The Counsellor should help clients to deal with rumours, misconceptions, needs and concerns by discussing fully their fears and anxieties and by providing facts in a sensitive, caring manner.

Genuine: The Counsellor must be a real person and not a role model and not a role player. He/ She uses the past experience and skills to facilitate the client/provider interaction.

Active Listener: Active listening facilitates communication and this will allow the client to express herself freely and adequately. Counsellor may nod and look at the client.

Accepting and respectful: A respectful Counsellor treats the client in a way that the provider would like to be treated if he/she were the client.

Counselling process utilizing GATHER

GATHER is an acronym for the Counselling Process it has been used in other areas of reproductive health but is relevant in providing services for maternal health:

- G** - Greet the client, welcome her and ask how you could help her.
- A** - Ask about themselves and the family
- T** - Tell what is going to happen during her visit
- H** - Help her to be comfortable to understand her situation and make a decision
- E** - Explain any pre & post procedure care/instructions including use & effects of drugs.
- R** - Return visit, referral and follow up.

Demonstration of the counselling process utilizing GATHER (Role Play)

Use the following two scenarios to demonstrate the counselling process through role-play. Try to equip the two clients to make informed choices.

Scenario 1: Mary, a 24 years old single mother of two in good health, comes to ANC at 28 weeks gestation. On examination, she is found with pallor and blood slide reveals that she has malaria parasites. Mary does not wish to have the baby due to financial difficulties. Using IPCC skills, demonstrate how you would counsel Mary to deal with her situation.

Scenario 2: Rose is a 21 year-old primipara who had a SVD 24 hours ago. She had no complications throughout the course of labour. During postnatal examination the midwife notes that Rose's pad is wet and dirty. Upon being asked, Rose explains that she has changed her pad once since delivery and has not taken a bath.

Elements of Quality Care

Elements of Quality of Care

- **Promotion and protection of health:** People need to know about pregnancy and childbirth and to understand the danger signs
- **Accessibility and availability of services:** *Women should be able to benefit from quality of care, understand the full range of services available & receive care at the lowest appropriate level of the system close to where they live.*
- **Acceptability of services:** Women need privacy, they may prefer to consult a female health worker, and they should be assured of confidentiality.
- **Technical competence of health care providers:** Technical competence depends on regular training and retraining and on clear guidelines for clinical treatment
- **Essential supplies and equipment:** Norms and standards should be established for the necessary equipment, supplies, drugs at each level of care and their availability should be ensured
- **Quality of client-provider interaction:** Providers must treat clients with respect, be responsive to their needs and avoid judgmental attitudes.
- **Information and counselling for the client:** *Clients* should have the opportunity to talk to health care providers and should be offered guidance on any health problems identified.
- **Involvement of clients in decision-making** Providers should see clients as partners in health care and should involve them in decision making as active participants in their own health care.
- **Comprehensiveness of care and linkages to other RH services:** Maternal health care is a unique opportunity to provide women with comprehensive RH care and to address other issues, such as nutrition and sexually transmitted diseases.
- **Continuity of care and follow-up:** Maternal health care should be part of continuing care comprising of antenatal, delivery & postpartum care. Clients must, however be seen as people with health needs that continue through their lives.
- **Support to health care providers:** Health Care providers at all levels need the backup and economic and social support of the State and the communities that they work.

MANAGEMENT OF LABOUR AND DELIVERY

Content Outline

1. Definition of and diagnosis of labour
2. Management of normal labour at different stages
3. The partograph
4. Management of abnormal labour including referral

Definition of Labour

Labour is a physiological process, characterised by rhythmic regular uterine contractions increasing in frequency and intensity, accompanied by progressive cervical effacement and dilatation, and descent of the presenting part. Labour may be spontaneous or induced.

Definition of Normal Labour

Normal labour is a physiological process, which commences spontaneously at term (37 completed weeks) with rhythmic regular uterine contractions of increasing intensity and frequency, accompanied by progressive cervical effacement and dilatation, and descent of the presenting part (preferably cephalic), resulting in expulsion of a healthy foetus, a complete placenta and membranes and a healthy mother.

Essentials of Diagnosis of Normal Labour

Diagnosis of labour includes: diagnosis and confirmation of labour, diagnosis of the stage and phase of labour, assessment of the engagement and descent of the foetus, and identification of presentation and position of the foetus.

Symptoms of normal labour may include history of: Intermittent low abdominal pains radiating to the back, blood-stained / mucoid vaginal discharge (show), watery vaginal discharge or a sudden gush of amniotic fluid (drainage of liquor)

Labour is confirmed by the presence of: cervical effacement and cervical dilatation.

Labour may be classified as true or false labour. The differences are outlined below.

True versus False Labour

Features	True Labour	False Labour
Contractions	Regular	Irregular
Interval between pains	Gradually shortens	Remains long
Intensity	Increases	Remains the same
Cervix dilatation/effacement	Present and progressive	Absent
Bulging membranes	Present	Absent
Sedation	Pain not stopped	Pain relieved
Descent of presenting part	Present and progressive	Absent

MANAGEMENT OF LABOUR

Admitting a Woman in Labour

When the mother comes in labour, the health service provider must provide a supportive, encouraging atmosphere for birth that is respectful of the woman's wishes. It is imperative that the health provider ensures privacy and confidentiality at all times. Cleanliness of the woman and her environment should be maintained at all times.

During history taking, the initial questions that should be asked, while observing her physical condition include:

Questions to ask	Issues to explore
1. When did your labour pains begin?	How long has the woman been in labour? How is she doing?
2. Has your bag of waters (membranes) broken?	If the water has broken, it is important to know how much time has elapsed, and what the fluid looked like (clear, greenish, or blood-stained?).
3. Have you bled from your vagina since you started feeling labour pains? Did you have any bleeding during your pregnancy?	Any bleeding during pregnancy or labour is a danger sign .
4. Do you feel any foetal movements?	Ask if foetal movements are normal or have reduced. If they are reduced find out if they are less than 10 in a day. Find out how long ago she felt the last foetal movement
5. Have you attended antenatal clinic?	If the woman has been attending antenatal clinic, examine her record for information about her history. • Ask about the gestation at first visit, the number of visits, and presence of complications e.g. vaginal bleeding, high blood pressure etc. • Check the results of antenatal profile • Confirm any interventions done in pregnancy • Review her Past obstetric history If she has not attended any antenatal clinic, she may have untreated or unidentified problems. Additional questions include: • How old are you? • Is this your first pregnancy? How many times have you been pregnant? • Past medical history
6. Have you had any discharge or bloody mucus (show)?	Unlike blood, the show is often sticky and stretches. It is a sign of early labour. It may be blood-stained
7. When did you last eat?	If she has not eaten, she may not have much strength. It is good to encourage the woman to eat and drink as she wishes. Nutritious liquid drinks are important even in late labour.
8. Have you taken any medicine, herbs or other treatment?	It is important to explore what other medicines or herbs may have been taken. Some may have a stimulating effect on labour
9. Have anyone given you care at home?	If yes, what kind of care was given and by whom?
10. Are you accompanied by your partner, friend or relative?	Encourage the woman to have personal support from a person of her choice throughout labour and birth.

The client should then be encouraged to empty her bladder and provide a urine specimen for testing for protein and sugar. The provider should explain all procedures, seek permission to perform them, and discuss the findings with the woman.

Physical Examination

The health provider should perform a full physical examination, including an abdominal examination and a vaginal examination in order to quickly determine: The stage of labour she is in, the presenting part, and to rule out maternal or foetal complications.

Physical examination focuses on the woman's vital signs and overall health.

- The health provider should wash his/her hands with soap before examining the mother
- Infection prevention protocols should be adhered to during physical examination
- The vital signs to be checked include; Blood pressure, pulse rate, respiratory rate, and temperature.
- The patient's general condition should be assessed for: general appearance, state of consciousness, pallor, cyanosis, oedema, respiratory distress, etc

The health provider should then perform a full systemic examination as far as possible.

Abdominal Examination helps the health service provider to confirm the gestation, rule out multiple pregnancy, determine the presenting part, the lie, the descent, the frequency and strength of contractions, and the characteristics of the foetal heart tones. It is important for the woman to be as relaxed and comfortable as possible during the examination. During this process, the provider should maintain open communication with the mother, explaining the findings and reassuring the mother. Thereafter appropriate action should be taken.

The vaginal examination is important for confirming labour and determining the stage and progress of labour. It is conducted in order to assess cervical dilatation and effacement, confirm the presenting part, the position in vertex and breech presentation, the state of membranes and the pelvic adequacy. Vaginal examination should only be performed on initial admission and after every four hours when a woman is in active labour. Too frequent vaginal examination may predispose to infection, therefore the provider needs to observe infection prevention and control precautions at all times. It may be uncomfortable for some women and there is need to ascertain that the woman is relaxed during this procedure.

If the cervix is not dilated on first examination, diagnosis of labour may be difficult. However if the contractions persist, re-examine the woman after 4 hours for cervical changes. At this stage if there is effacement and dilatation the woman is in labour, but if there is no change, the likely diagnosis is false labour.

Digital vaginal examination is contraindicated in case of preterm rupture of membranes, and Ante partum haemorrhage especially when placenta praevia is suspected.

RECORD! All findings during active labour should be recorded on the partograph accurately and promptly.

The woman needs prompt attention if she has any of the following signs: premature labour, blood stained mucous discharge (show) with palpable contractions, ruptured membranes, pallor, weakness, fainting,

severe headaches, blurred vision, vomiting, fever, respiratory distress, or active bleeding per vaginum. Such a patient should be picked up from the queue and rapid management instituted.

Stages of Labour

Labour is divided into four main stages:

- **1st Stage:** from onset of labour to full dilatation of the cervix.
- **2nd Stage:** from full dilatation to expulsion of the foetus.
- **3rd Stage:** from delivery of the baby, to delivery of placenta.
- **4th Stage:** Up to one hour after expulsion of placenta

MANAGEMENT OF NORMAL LABOUR

Management of First Stage of Labour

Note: Provide woman-centred individualized care.

During the first stage of labour, encourage the woman to:

- Empty her bladder regularly
- Freely move about
- Maintain oral intake of fluids and food as required
- Exercise breathing techniques
- Observe personal hygiene
- Have a chosen companion with her.

The health provider should:

- Practice universal infection prevention and control protocols
- Use partograph as appropriate for monitoring labour
- Listen to, encourage, support and reassure the woman continually
- Prepare for management for the other stages of labour
- Ensure privacy and confidentiality
- Make arrangements to accommodate the birth companion or male partner
- Anticipate the need for neonatal resuscitation and prepare for it

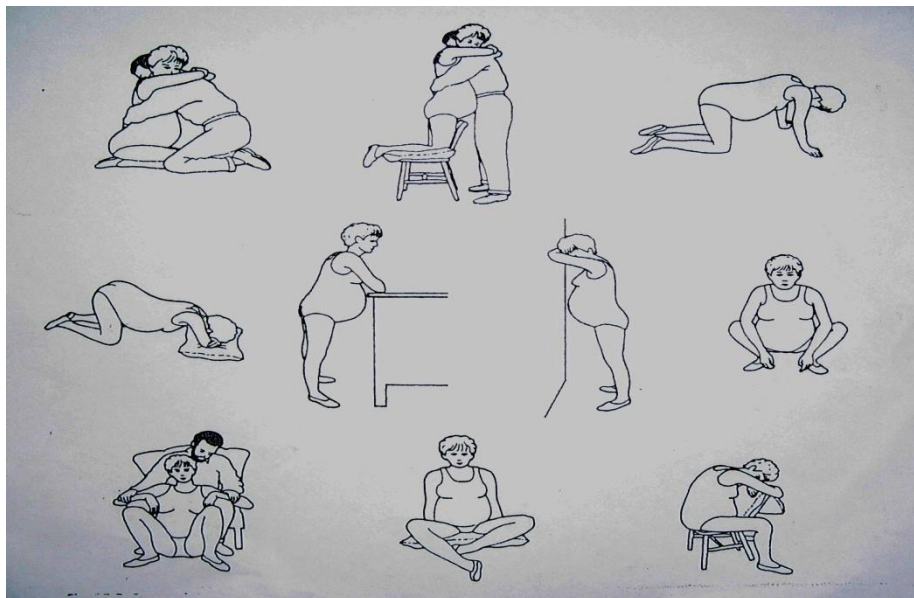
Control of pain may be achieved by:

- Change of position/ moving around,
- Touch and back massage from a companion,
- Breathing techniques
- Verbal coaching and relaxation to help draw her attention away from labour pain,
- Warm bath or shower
- Use of pharmacological agents e.g. tramadol 100mg 1M or slow IV 6-8 hourly, pethidine 50-100 mg 1M or IV slowly 6-8 hourly, inhalational nitrous oxide combined with 50% oxygen (Entonox) or epidural analgesia where available

Progress of First stage of labour:

Satisfactory progress in first stage of labour is indicated by: Regular contractions progressively increasing in frequency and intensity, cervical dilatation of at least 1cm per hour with the cervix well applied to the presenting part

Unsatisfactory progress of first stage of labour is when the contractions are infrequent and irregular after the latent phase, cervical dilatation is less than 1 cm per hour during the active phase and the cervix is poorly applied to the presenting part.

Examples of Positions for Labour and Delivery**Contents of a delivery kit:**

<i>a) Instruments</i> • Fetoscope • Artery forceps (2) • Cord scissors (1) • Episiotomy scissors (1) • Needle holder (1) • Toothed dissecting forceps • Small galipot (1) • Cord ligature (1) • Large kidney dish (1) • Suction/mucous extractor • Newborn Ambu-bag • Blood pressure machine • Stethoscope • Thermometer	<i>b) Supplies and drugs</i> • Gloves • Syringes (2ml and 10ml) • Needle (21G) • Lignocaine injection • Injection oxytocin (5iu/ml) • Suture No 2 • Pads/gauze • Infection prevention and control supplies and equipment • Baby weighing scale • Portable light
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Management of Second Stage of Labour**Diagnosis**

The second stage (full dilatation) is recognized by:

- Uterine contractions becoming strong and more frequent (4-5 per 10 minutes)

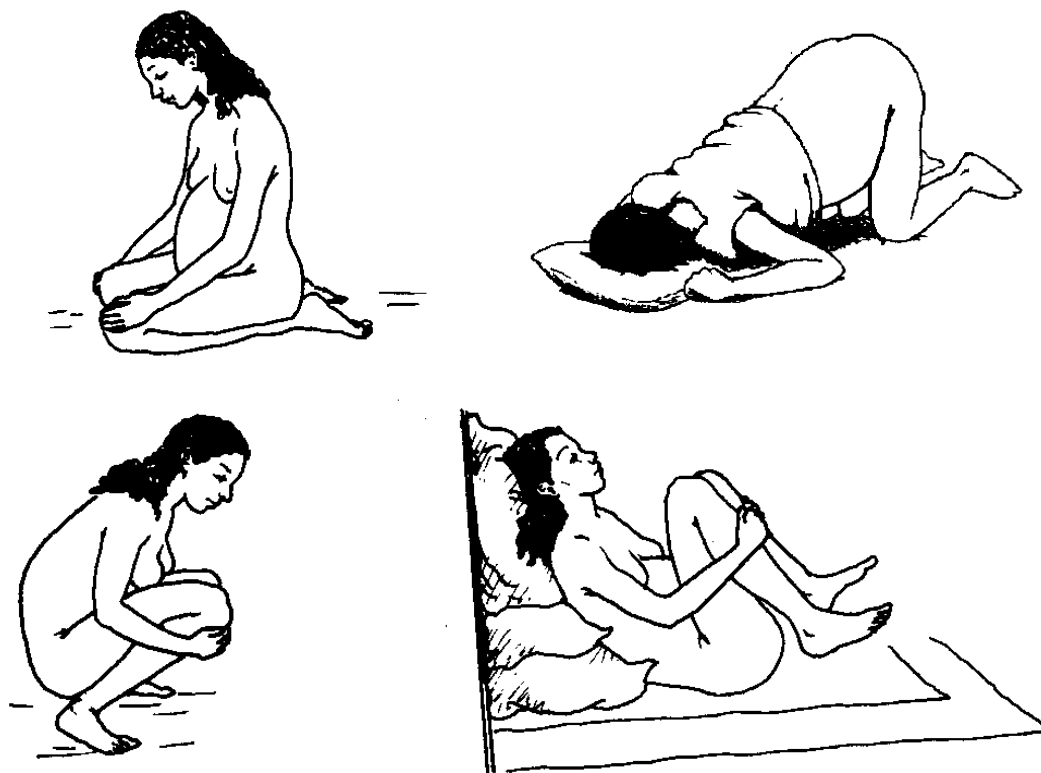
- The woman grunts or gets the urge to bear down
- The woman may retch or vomit
- The foetal head further descending into the pelvis
- The perineum bulging and the skin becoming tense and glistening
- The anus may gape and may pass faecal matter.

Management of Second Stage of Labour

Note: Deliver in the position the woman finds most comfortable. Allow and encourage her birth companion/ male partner to be present during childbirth

Once confirmation of full cervical dilatation is performed by digital vaginal examination (VE) and the woman is in the expulsive phase of second stage, she should be encouraged to *bear down only during contractions* and relax in between. At crowning, the perineum should be supported with a pad firmly held to prevent perineal tears (avoid obstructing the presenting part and allow foetal head to extend the perineum).

Examples of positions for childbirth



Note: Avoid routine episiotomy!

Perform episiotomy **only when it is clearly indicated**. Episiotomy should only be considered in case of: complicated vaginal delivery (breech, shoulder dystocia, forceps or vacuum delivery); scarring from previous female genital cutting or poorly healed perineal tears; and foetal distress.

Routine episiotomy is associated with increased third and fourth degree tears, and subsequent anal sphincter muscle dysfunction. Whenever episiotomy is given, administer local anaesthesia.

Delivery of the head:

To control birth of the foetal head, place the fingers of one hand against the baby's head to keep it flexed. Continue to support the perineum gently as the baby's head is born. After the head is delivered, check for the cord around the neck. If present but loose, slip it over the baby's head. If the cord is tight around the neck doubly clamp and cut it before unwinding it from the head.

Allow the baby's head to turn spontaneously. Once the head is delivered ask the patient not to push. Clear the airway of the newborn gently with sterile swab

Delivery of the body

Reduce the likelihood of tears by delivering one shoulder at a time. With a hand on each side of the baby's head, move the head posteriorly to deliver the anterior shoulder and vice versa. If there is difficulty in delivering the shoulders suspect shoulder dystocia. DO NOT USE FORCE. Support the baby's body as it slides out and place the baby on the mother's abdomen.

Immediate care of the newborn

Thoroughly but gently dry the baby. Drying helps to keep the baby warm and stimulates breathing. A newly born baby wet with amniotic fluid can become cold even in a warm room! Dry the body, arms legs and especially the head by gently rubbing with a cloth. Remove the wet cloth and wrap in a dry cloth. Thereafter evaluate if the baby is crying. A baby who is crying needs routine care. The elements of routine care include the following:

- Keep the baby warm
- Check breathing (Baby should be crying or breathing quietly and easily)
- Clamp and cut the cord (DO NOT MILK THE CORD)
- Encourage breastfeeding and routine newborn care.
- Anticipate the need for neonatal resuscitation and prepare in advance for it

How to clamp or tie the umbilical cord:

- a. Place 2 clamps or ties around the cord. The first clamp is placed about 2 finger breadths from the baby's abdomen while the second clamp is put 5 fingerbreadths from the abdomen
- b. Cut between the clamps/ ties with a clean scissors or blade. If bleeding occurs, place a second clamp between the first one and the baby's skin
- c. Leave the cut end of the umbilical cord open to the air to dry

It is recommended that as part of routine care, the provider waits at least 1 minute and up to 3 minutes to clamp/tie and cut the cord. There is now considerable evidence that early cord clamping does not benefit mothers or babies and may even be harmful.

The precise timing of clamping and cutting the umbilical cord is important as there is some evidence of potential benefits for the baby when the cord is not clamped and cut immediately after birth. Physiological studies have shown that there is a transfer from the placenta of about 80 ml of blood at 1 minute after birth, reaching about 100 ml at 3 minutes after birth (1, 2). These additional volumes of blood can supply extra iron amounting to 40–50 mg/kg of body weight. When this extra iron is added to the approximately 75 mg/kg of body iron that a full-term newborn is born with, the total amount of iron can reach 115–125 mg/kg of body weight, which may help prevent iron deficiency during the first year of life (3).

Perform APGAR scoring and show the baby to the mother. Let her confirm the sex of the baby. Apply an identification tag and wrap baby in warm soft, dry towels and give to the mother to initiate breastfeeding within the first one hour of life. Once stable, perform a full physical examination of the baby. To prevent ophthalmia neonatorum, apply 1% tetracycline eye ointment.

Palpate the abdomen to rule out the presence of an additional baby before proceeding with active management of third stage of labour.

Active Management of the Third Stage of Labour (AMTSL)

To prevent postpartum haemorrhage (PPH), it is recommended that active management of third stage of labour (AMTSL), be practiced at all times.

AMTSL includes:

1. Prophylactic use of oxytocin
2. Controlled cord traction for delivery of the placenta
3. Uterine massage

1. Prophylactic Oxytocin to Prevent Postpartum Haemorrhage

Within one minute of delivery of the baby, palpate the abdomen to rule out the presence of additional baby/babies.

Give oxytocin 10 IU intramuscular (IM)

Oxytocin is preferred because it is effective 2-3minutes after injection, has minimal adverse effects and can be used in all women.

If oxytocin is not available, ergometrine can be used as 0.25mg given IM.

However, ergometrine is contraindicated in women with pre-eclampsia/eclampsia, high blood pressure and cardiac disease because it increases blood pressure by peripheral vasoconstriction, and may increase the risk of convulsions and cerebrovascular accidents.

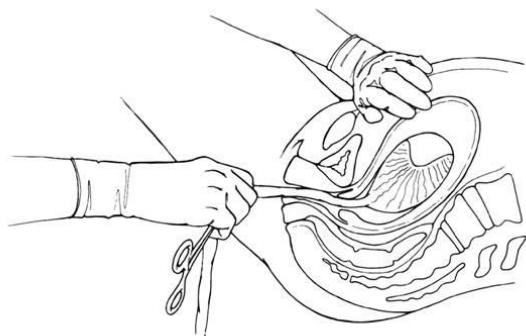


IM Oxytocin 10 IU

2. Controlled Cord Traction

Within one minute of delivery, clamp the cord close to the perineum using sponge forceps.

Hold the clamped cord and the end of the forceps with one hand.



Controlled cord traction

Place the other hand just above the woman's pubic bone and stabilize the uterus by applying counter traction during controlled cord traction. This helps prevent uterine inversion.

Keep slight tension on the cord and await a strong uterine contraction (2-3 minutes). When the uterus becomes rounded or the cord lengthens very gently pull downwards on the cord to deliver the placenta. Do not wait for a gush of blood.

If the placenta does not descend during 30-40 seconds of controlled cord traction (i.e. there are no signs of placental separation). DO NOT continue to pull on the cord. Gently hold the cord and wait until the uterus is well contracted again. If necessary, roll the cord on the forceps or clamp the cord closer to the perineum as it lengthens.

With the next contraction, repeat controlled cord traction with counter traction.

Never apply cord traction without applying counter traction above the pubic bone with the other hand.

To reduce the risk of the thin membranes tearing off as the placenta delivers, hold the placenta in two hands and gently turn it until the membranes are twisted. Slowly complete delivery of the placenta.

Inspect the maternal surface of the placental lobes for completeness and remove any retained fragments
Maintain infection prevention protocols at all times

3. Uterine Massage

Immediately after delivery of the placenta, massage the fundus of the uterus through the woman's abdomen until the uterus is contracted.

Repeat uterine massage every 15 minutes for the first 1-hour.

Ensure that the uterus does not become relaxed after you stop uterine massage.

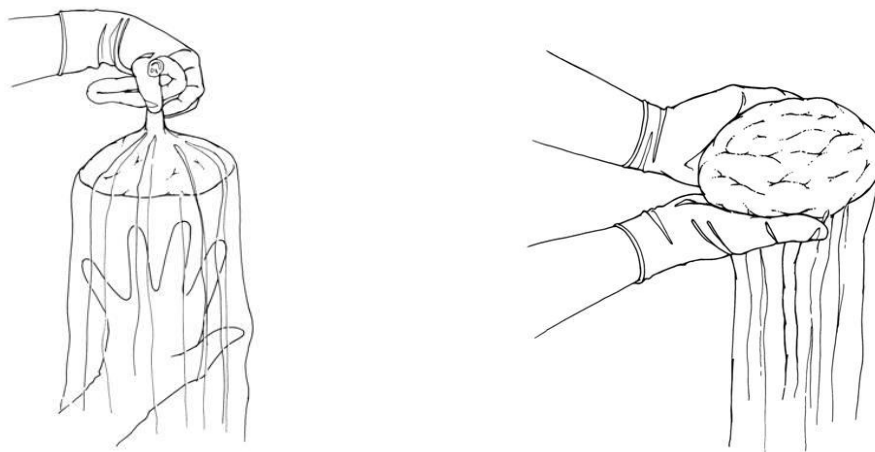
Ensure the urinary bladder is empty.



Uterine massage

Examination of the placenta

Carefully examine the placenta to ensure completeness and that no lobe is missing. If a portion of the maternal surface is missing or there are torn membranes, suspect retained placental fragments. In such cases examine the upper vagina and cervix and use a sponge forceps to remove any pieces of membranes that are present.



Examination of the placenta

Also examine for infarcts, presence of a retro placental clot and any other abnormalities e.g. extra lobes. Examine the blood vessels in the cord. Normally it has two arteries and one vein. The absence of one artery may be associated with congenital abnormality, particularly renal agenesis.

Weigh the placenta.

Record all findings

Examination for tears

Carefully examine the cervix, vagina and perineum and repair any tears present as appropriate.

Repair the episiotomy.



Explain all procedures to the mother.

Emergencies of Third Stage of Labour:

If uterine inversion occurs, reposition the uterus

If the cord is pulled off, manual removal of the placenta may be necessary

Management of 4th Stage of Labour

The fourth stage of labour is the first hour after delivery of the placenta. The mother should remain in labour ward where her condition should be assessed, the perineum, vagina, and cervix should be examined for tears.

During this time, observe the mother every 15 minutes for vital signs and vaginal bleeding. Monitor the newborn's condition for bleeding from the cord, maintenance of body temperature and where appropriate, encourage initiation of breastfeeding.

DRUGS FOR ACTIVE MANAGEMENT OF THE THIRD STAGE OF LABOR (AMTSL) ¹

Name of Drug / Preparation	Dosage & Route	Drug Action & Effectiveness	Side Effects & Cautions
Oxytocin Posterior pituitary extract: other names Pitocin or Syntocinon.	Give 10 units IM injection. ²	- Acts within 2 to 3 minutes. - Effect lasts about 15 to 30 minutes.	- First choice. - No known contraindications for postpartum use.³ - Minimal or no side effects.
Ergometrine Preparation of ergot. Usually comes in dark brown ampoule.	Give 0.2 mg IM injection.	- Acts within 6 to 7 minutes IM. - Effect lasts 2 to 4 hours.	- Causes tonic contractions (may increase risk of retained placenta). - Contraindicated in women with or history of hypertension, heart disease, retained placenta, pre-eclampsia, eclampsia.⁴ - Side effects: nausea, vomiting, headaches, and hypertension. - Greater incidence of retained placenta. DO NOT USE if drug is cloudy. This means it has been exposed to excess heat or light and is no longer effective.
Syntometrine Combination of 5 IU oxytocin plus 0.5 mg ergometrine.	Give 1 ml IM injection.	Combined rapid action of oxytocin and sustained action of ergometrine.	- Same cautions and contraindications as ergometrine. - Side effects: nausea, vomiting, headaches and hypertension.
Misoprostol E1 analog prostaglandin	Give 600 mcg (three 200 mcg tablets) orally or sublingually (under the tongue).	Orally: - Acts within 6 minutes. - Peak serum concentration between 18 to 34 minutes. - Effect lasts 75 minutes.	Side effects: shivering and elevated temperature. NEVER GIVE oxytocin until at least 6 hours after last misoprostol dose. Because you may not have used this before for this indication, be sure to carefully follow local guidelines when using.

Source: POPPHI 2007.

USING THE PARTOGRAPH

The first stage of labour is divided into **Latent** and **Active** phases. This is differentiated by the cervical dilatation. In Latent phase of labour the dilatation is less than 2cm while in active phase the cervical dilatation is 3- 4 cm and above.

Definition of partograph

The partograph is a graphic presentation, which outlines the progress of a woman in active labour including the foetal and maternal condition.

It serves as a management tool used for the detection of abnormal progress of labour.

The WHO composite partograph has been modified to make it simpler and easier to use

The events of active labour are plotted against time in hours. (All entries are recorded in relation to the time at which the observations are made.)

Conditions for starting a Partograph

A Partograph chart must only be started when a woman is in active phase of labour.

Plotting progress of labour on partograph

The following information is recorded on the partograph

1. Patient information:

Record Full Name, age, gravidity, parity, hospital number, date and time of admission and time of rupture of the membranes in hours in the space provided at the top of the partograph.

2. Foetal Condition:

The Foetal heart rate observed $\frac{1}{2}$ hourly and plotted with a dot (.) on the partograph. The normal foetal heart rate is between 120 - 160 beats per minute. Using the modified partograph range of 110 -170 taken for the country. If at level 2-3, refer to higher level if 3 consecutive readings 15 minutes apart reveal FHR <110 or >170 mm hg

3. Amniotic fluid and membranes

Record the state of the membranes and/or amniotic fluid /liquor on the partograph in the area provided as follows:

- I - Intact membranes
- C - Clear liquor on ruptured membranes
- M - Meconium stained liquor
- A - Absent liquor if membranes are ruptured
- B - Blood stained liquor.

This observation is made at each vaginal examination. If there is thick meconium at any time or absent liquor at the time of membrane rupture, rule out other signs of foetal distress and take appropriate action.

Moulding of the foetal skull bones

This is an important indication of how adequately the pelvis can accommodate the foetal head. Increasing moulding with the head high in the pelvis is a sign of cephalopelvic disproportion.

Moulding is observed 4 hourly.

There are four different ways to record the moulding on the partograph in the row indicated **moulding**:

- 0 If bones are separated and the sutures can be felt easily
- + If sutures are apposed but no overlap i.e. the bones are just touching each other
- ++ If there is overlapping of the sutures but it is reducible
- +++ If the sutures overlap but not reducible

Cervical dilation

The cervical dilation is assessed at every vaginal examination and is plotted with an (X).

The first vaginal examination, on admission, includes a pelvic assessment. Thereafter, vaginal examinations are done every 4 hours, unless contraindicated or as indicated e.g. if 2nd stage is imminent or there is evidence of rapid progress of labour as may occur in multiparous patients.

When using the **composite partograph**, plot dilatation of 0-2 cm in the latent phase area of the cervicograph starting at time 0. When labour progresses (i.e. when cervix is ≥ 4 cm with regular contractions) record the dilatation against the time and then transfer using a broken line to the alert line, using the letters **.TR. (TRANSFER)**, leaving the area between the transferred recordings blank. Note that the broken transfer line is not part of the process of labour. When a woman is admitted in the active labour (4-10cm) the dilatation of the cervix is plotted on the alert line and the clock time written directly under the X in the space for time.

Due to the confusion that was noted during transfer of the cervical dilatation, the **revised partograph** DOES NOT include the latent phase. The charting commences only when the cervical dilatation is 4cm and above (that is when the patient is in Active phase of labour). It is recommended that the revised partograph has been adapted for use in Kenya

The **Alert line** starts at 4cm of cervical dilatation to the point of full dilatation at a rate of 1cm per hour

The **Action line** is a parallel line draw 4 hours to the right of the alert line

When the cervical dilatation moves to the right of the alert line, this indicates prolonged Active Phase. In this instance, the woman must be referred to a comprehensive Emergency Obstetric Care facility.

The 4 hours between the alert and action lines allows time for the woman to be assessed and appropriate intervention taken including referral.

If during labour, the cervical dilatation reaches the action line a decision must be taken about the course of the progress and appropriate action taken. ***Under no circumstance should the cervical dilatation be allowed to cross the action line.***

Descent of the foetal head

For labour to progress well, dilatation of the cervix should be accompanied by descent of the head. Descent of the head is measured by abdominal palpation and is expressed in terms of fifths palpable above the pelvic brim. Abdominal palpation has been found to be a more reliable way of gauging descent than vaginal examination where large caput formation often leads inexperienced health providers to confuse scalp descent with skull descent.

Descent of the head should always be assessed by abdominal examination immediately before doing a vaginal examination. A simplified way is to use the width of the five fingers as a guide to the expression of

the fifths of the head above the brim. A head that is mobile and fully palpable above the pelvic brim will accommodate the full width of the five fingers. It is reported as 5/5 palpable. It is generally accepted that the head is engaged when the part above the brim is represented by 2 fingers width or less. When none of the head is palpable, this is reported as 0/5 palpable. Descent is plotted with an **(O)** on the respective area outlined on the partograph as the time of the observation.

Hours:

This refers to the time elapsed since onset of active phase of labour (observed or extrapolated)

Time:

This refers to actual time

Uterine Contractions

In normal labour the uterine contractions increase in frequency and intensity. The number of the uterine contractions is assessed and recorded *every half-hour* in the active phase of labour.

When charting the contractions, two important observations must be recorded:

(a) The frequency: How often are they felt (Usually this is the number of contractions palpated in ten minutes.)

(b) The duration: How long do they last (in seconds); the duration must also be palpated not just estimated by observation

The frequency of the contractions is assessed over a ten-minute period.

The duration of the contractions is from the time the contraction is felt abdominally to the time the contraction passes off.

Contractions are charted on the partograph in the area having the 5 blank squares high that go across the length of the graph (the left hand side is written 'contractions felt in 10 minutes').

Each square represents one contraction. If two contractions are felt then 2 squares are shaded.

The key for charting the duration of contractions is shown below:

Contractions lasting less than 20 seconds represented by 

Contractions lasting between 20 and 40 seconds represented by 

Contractions lasting more than 40 seconds represented by 

Maternal Condition

All the recordings for the maternal condition are entered at the foot of the partograph, below the recording of the uterine contractions. They include the following:

- **Oxytocin regime:** Indicates the amount of oxytocin per volume intravenous fluid as well as the rate of administration in drops per minute.
- **Drugs and IV fluids:** Record here any additional drugs administered during labour
- **Pulse rate:** Maternal pulse rate is observed every half hourly and marked with a dot (•)
- **Blood Pressure:** This is taken once every 4 hours and indicated with arrows for diastolic and systolic reading joined with a dotted line 

- **Temperature:** Ideally the temperature in °C should be taken every 2 hours and recorded in the space provided
- **Urine:** Encourage the woman to pass urine every 2-4 hours. Measure the volume of urine passed and check it for protein and acetone. Record in the space provided at the bottom of the partograph

The Composite Partograph

PARTOGRAPH

Name Age Gravida Para IP No.

Date of Admission Time of admission Ruptured membranes Hours on admission

FOETAL HEART RATE

LIQUOR C/B/M/F

CERVICAL DILATATION (CM)

Descent of Head Plot (cm)

CONTRACTIONS PER 10 MINS

Oxytocin U/ml Drops Min

DRUGS GIVEN AND J.V. FLUIDS

PULSE AND BP

TEMP AND RESP

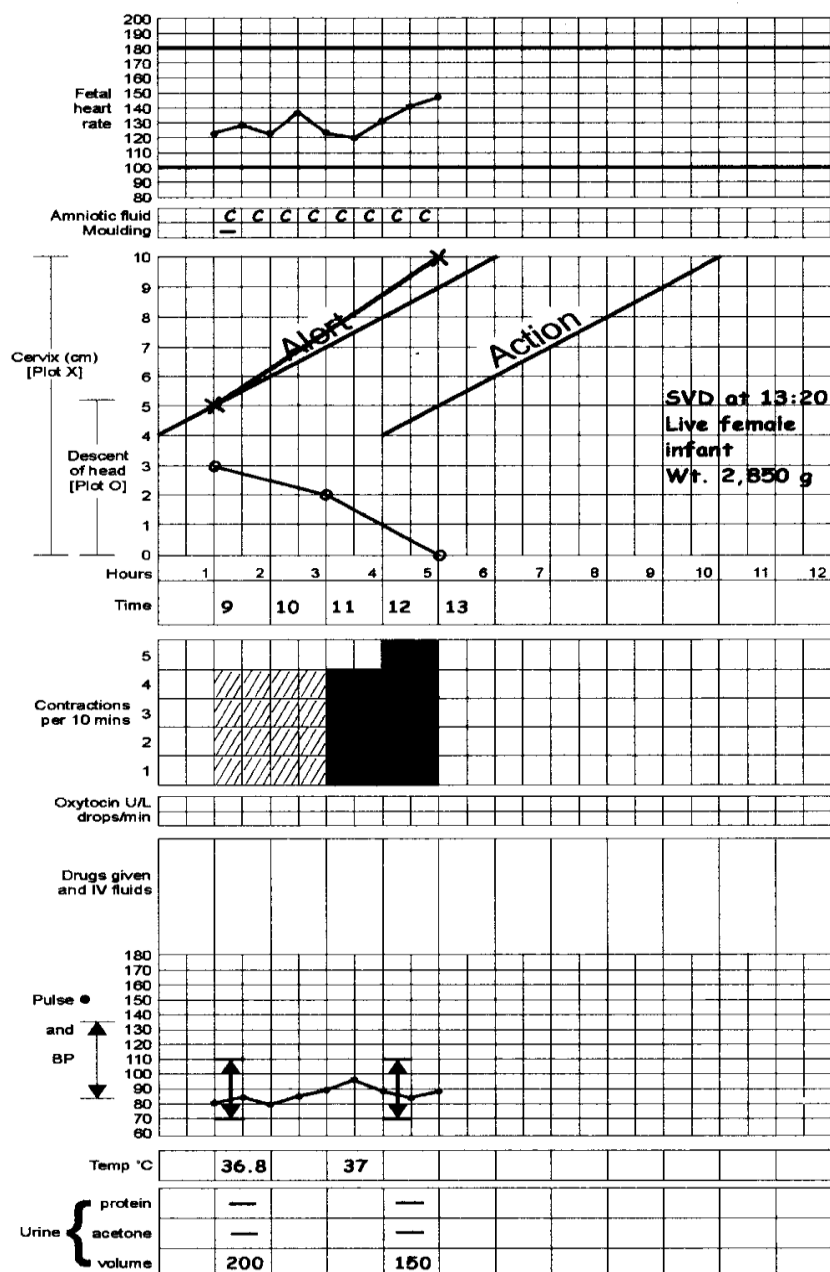
URINE (PROT, ACET, VOL)

SUMMARY OF LABOUR				
1st Stage	Induction labour Yes/No	Duration _____ Hrs	No. of VE _____	
2nd Stage	Mode of delivery _____	Duration _____ Mins	Syntometrine/Egometrine	IV/IM
3rd Stage	Baby Alive/SB M/F	Apgarscore 1 Min _____ 5 Min _____	Resuscitation Yes/No	Duration _____ Min
	Placenta complete/Incomplete	Membranes complete/Incomplete	Cord-normal/abnormal	Placenta Wt _____
	Blood loss _____ M/s.	Perineal tear/Episiotomy	Repair Yes/No	Mother BP _____ Pulse _____ Temp _____ Resp _____
	Baby Length _____	Weight _____ Gm.	HC _____ Cm	Drugs given _____
	Delivered by: _____ Time and Date of Delivery _____			

SUMMARY OF LABOUR:

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Example of a Completed Partograph in Normal Labour

Name **Mrs. S** Gravida **3** Para **2+0** Hospital number **7886**Date of admission **12.5.2000** Time of admission **5:00 A.M.** Ruptured membranes **1** hours

Identification of danger signs during labour and the need for timely referral

NOTE that there are particular problems, which may be identified before labour starts or during labour and which may need special action. Examples include:

- Ante partum haemorrhage
- Severe pre-eclampsia and eclampsia
- Foetal distress as in cord prolapse
- Previous caesarean section
- Severe anaemia
- Multiple pregnancies

- Malpresentation
- Very premature labour
- Obvious obstructed labour
- Patient who arrives in 2nd stage of labour (although the summary of labour can be filled in).

When a woman is admitted in labour, a rapid assessment must be done to quickly identify such special problems. Depending on the local situation this may require transfer of the patient to a hospital or immediate delivery. Due to the life threatening nature of some of the above problems, it may not be necessary in case of emergency to plot the progress of labour on the partograph as this action will unnecessarily lead to delays in taking prompt action that would be life saving for the patient.

Management of latent phase of labour

The initial phase of labor is termed the latent phase. It begins at the point at which the woman perceives regular uterine contractions. These contractions gradually soften, efface, and begin to dilate the cervix. Generally speaking latent phase ends when the cervix dilates to 4cm. Accurate assessment of the onset of latent phase is difficult since determining exactly when a patient has entered latent phase is primarily based upon the woman's history and the judgment of the attending provider. The latent phase of labour should not last longer than 8 hours.

When a patient is admitted in early labour, and on examination everything is found to be normal, only routine observations are done. The next complete examination is done four hours later or sooner if the patient starts to experience more regular and painful contractions. The patient should eat and drink normally, and should be encouraged to walk around. She need not be admitted to the labour ward unless distance from home is a factor.

At the second complete examination the following must be assessed.

1. The contractions: If the contractions have stopped the patient is no longer in labour, and if the maternal and fetal conditions are normal, she may be discharged. However, if the contractions have remained regular, then you must assess the cervix.
2. The cervix:
 - If the effacement and dilatation of the cervix have remained unchanged, the patient is probably not in true labour. If she is experiencing painful contractions, she should be given an analgesic, e.g. pethidine 100 mg and promethazine (Phenegan) 25 mg by intramuscular injection and, provided that all other observations are normal, the next complete physical examination is planned for four hours later.
 - If there has been progress in effacement and/or dilatation of the cervix, the patient is in labour and, provided that all other observations are normal, the next complete examination is planned for four hours later. If the cervix is 3 cm or more dilated, the patient has now progressed to the active phase of the first stage of labour.

If there is no progress to active labour 8 hours later:

1. The contractions may have stopped, in which case the patient is not in labour. If the membranes have not ruptured and if there is no indication to induce labour, the patient should be discharged.

2. The patient may still be having regular contractions. In this case, further management depends upon the state of the cervix:
 - If there has been no progress in effacement and/or dilatation of the cervix, the patient is probably not in labour. The responsible doctor should see and assess this patient, in order to decide whether labour should be induced.
 - If there has been progressive effacement and/or dilatation of the cervix, the patient is in labour. If the progress has been slow during the latent phase, it may be necessary to rupture the membranes and/or commence an oxytocin infusion

Management of Meconium Stained Liquor

Meconium staining is a frequent cause of anxiety in the delivery room due to its association with increased perinatal morbidity and mortality. Meconium staining is considered significant if it is dark green or black, with a thick, tenacious appearance. Meconium staining often occurs in conjunction with other causes of foetal distress.

It occurs in about 13% of all live births and it is rare in babies born at <34 weeks' gestation. Passage of meconium is increasingly common in pregnancies over 37 weeks and occurs in up to 50% of post mature infants (above 42 weeks).

Risk factors for meconium stained liquor include: Placental insufficiency as occurs in postdatism, Maternal hypertension / pre-eclampsia, Oligohydramnios , Smoking and Cocaine abuse

Components of the meconium, especially the bile salts and enzymes, can cause serious complications if they are inhaled by the foetus at any stage of labour. This can result in meconium aspiration syndrome (MAS) leading to obstruction of the airways, Loss of lung surfactants, chemical pneumonitis, and may in some cases result in chronic lung disease.

Intrapartum Management: If significant meconium staining is noted in labour, foetal monitoring should be more frequent. In case of additional signs of foetal distress, an emergency delivery should be expedited. The mode of delivery will depend on the stage of labour. *Suction prior to delivery has not been shown to reduce the incidence of MAS.* However every delivery unit should have appropriately trained staff and neonatal resuscitation equipment ready. If there is blood or lumps of meconium in the oropharynx, suction of the upper airways should then be done- in this case always suction the mouth first before the nose. (Suctioning the nose first may cause gasping and inhaling of secretions).

Amnioinfusion has been used in some settings to prevent or relieve umbilical cord compression and to dilute the meconium thus reducing the risk of meconium aspiration. The evidence for this is however conflicting.

CLASSIFICATION OF PRACTICES IN NORMAL BIRTH

CATEGORY A:

Practices that are demonstrably useful and should be encouraged

1. An individual birth plan determining where and by whom the birth will be attended, made with the woman and her partner during pregnancy. If the husband was not involved in making the

- individual birth plan then the woman should be encouraged to inform him and where applicable, the extended family.
2. Risk assessment of pregnancy during antenatal care, re-evaluated at each contact with the health system and at the time of the first contact with the caregiver during labour, and throughout labour.
 3. Monitoring the woman's physical and emotional well being throughout labour and delivery, and at the conclusion of the birth process.
 4. Offering oral fluids during labour and delivery.
 5. Respecting women's informed choices
 6. Providing care in labour and delivery at the most peripheral level where birth is feasible and safe and where the woman feels safe and confident.
 7. Respecting the right of women to privacy in the birthing place.
 8. Empathic support by caregivers during labour and birth.
 9. Respecting women's choice of companions during labour and birth.
 10. Giving the women as much information and explanation as they desire.
 11. Non-invasive, non-pharmacological methods of pain relief during labour, such as massage and relaxation techniques.
 12. Foetal monitoring with intermittent auscultation.
 13. Single use of disposable materials and appropriate decontamination of reusable materials throughout labour and delivery.
 14. Use of gloves in vaginal examination, during delivery of the baby and in handling the placenta.
 15. Freedom in position and movement throughout labour.
 16. Encouragement of non-supine position in labour.
 17. Careful monitoring of the progress of labour by use of partograph.
 18. Active management of third stage of labour.
 19. Sterility in the cutting of the cord.
 20. Prevention of hypothermia of the baby.
 21. Early skin-to-skin contact between mother and child and support of the initiation of breast-feeding within 1 hour of childbirth.
 22. Routine examination of the placenta and the membranes.

CATEGORY B:

Practices that are clearly Harmful or Ineffective and should be eliminated

1. Routine use of enema.
2. Routine use of pubic shaving.
3. Routine prophylactic insertion of intravenous canula.
4. Routine intravenous infusion in labour.
5. Routine use of the supine position during labour.
6. Administration of oxytocics at any time before delivery in such a way that their effect cannot be controlled.
7. Routine use of lithotomy position with or without stirrups during labour.
8. Sustained, directed bearing down efforts (Valsalva manoeuvre) during the second stage of labour.
9. Massaging and stretching the perineum during the second stage of labour.
10. Routine use of parenteral ergometrine in the third stage of labour.

CATEGORY C:

Practices for which Insufficient Evidence Exists to Support a Clear Recommendation and which should be used with Caution while Further Research Clarifies the Issue

1. Non-pharmacological methods of pain relief during labour, such as herbs, immersion in water and nerve stimulation.
2. Routine early amniotomy in the first stage of labour.
3. Fundal pressure during labour.
4. Manoeuvres related to protecting the perineum and the management of the foetal head at the moment of birth.
5. Active manipulation of the foetus at the moment of birth.
6. Early clamping of the umbilical cord.
7. Nipple stimulation to increase uterine contractions during the third stage of labour.

CATEGORY D:

Practices that are Frequently Used Inappropriately

1. Restriction of food and fluids during labour.
2. Pain control by systemic agents.
3. Pain control by epidural analgesia.
4. Electronic foetal monitoring.
5. Wearing masks and sterile gowns during labour attendance.
6. Repeated or frequent vaginal examinations especially by more than one caregiver.
7. Oxytocin augmentation.
8. Routinely moving the labouring woman to a different room at the onset of the second stage.
9. Bladder catheterisation.
10. Encouraging the woman to push when full dilatation or nearly full dilatation of the cervix has been diagnosed, before the woman feels the urge to bear down herself.
11. Rigid adherence to a stipulated duration of the second stage of labour, such as 1 hour, if maternal and foetal conditions are good and if there is progress of labour.
12. Liberal or routine use of episiotomy.
13. Manual exploration of the uterus after delivery.

INDUCTION OF LABOUR

Definition:

Induction of labour is defined as the process of artificially stimulating the uterus to start labour

General principles for induction of labour (WHO 2011)

1. Induction of labor should be performed only when there is a clear medical indication for it and the expected benefits outweigh its potential harms.
2. When inducing labor, consideration must be given to the actual condition, wishes and preferences of each woman, with emphasis being placed on cervical status, the specific method of induction of labor and associated conditions such as parity and rupture of membranes.
3. Induction of labor should be performed with caution since the procedure carries the risk of uterine hyper stimulation and rupture and fetal distress.
4. Wherever induction of labor is carried out, facilities should be available for assessing maternal and fetal well-being.
5. Women receiving oxytocin, misoprostol or other prostaglandins should never be left unattended.
6. Failed induction of labor does not necessarily indicate caesarean section.
7. Wherever possible, induction of labor should be carried out in facilities where caesarean section can be performed.

Indications

Over the years, various professional societies have recommended the use of induction of labour in circumstances in which the risks of waiting for the onset of spontaneous labour are judged by clinicians to be greater than the risks associated with shortening the duration of pregnancy by induction.

These circumstances generally include gestational age of 41 completed weeks or more, pre-labour rupture of amniotic membranes, hypertensive disorders, maternal medical complications, intrauterine fetal death, fetal growth restriction(IUGR), placental insufficiency, chorioamnionitis, multiple pregnancy, vaginal bleeding among other complications.

Although currently available guidelines do not recommend this, induction of labour is being used more and more at the request of pregnant women to shorten the duration of pregnancy or to time the birth of the baby according to the convenience of the mother and/or health-care workers

Contraindications to Induction of labor:

Absolute contraindications to induction of labour include: transverse foetal position, umbilical cord prolapse, active genital herpes infection, placenta previa, vasa praevia, pelvic structural abnormality, invasive cervical cancer and women who have had a previous myomectomy or more than 2 previous C/sections.

On the other hand, the following conditions constitute *relative* contraindications to induction of labour: Abnormal foetal heart patterns, breech presentation, maternal heart disease, polyhydramnios, and severe maternal hypertension

According to WHO guidelines for Induction of Labour 2011

- Induction of labour is not recommended for women with an uncomplicated pregnancy at gestational age less than 41 weeks.
- Induction of labour at term is not routinely recommended for suspected foetal macrosomia

- If gestational diabetes is the only abnormality, induction of labour before 41 weeks of gestations is not recommended. (other guidelines e.g. ACOG and RCOG however recommend early delivery of mothers with gestational diabetes before term)
- No recommendations were made with regards to induction of labour in-case of multiple pregnancy

Prior to inducing labour, it is important to perform bishops scoring of the cervix. This will help to determine the method of induction, whether cervical ripening is needed, as well as projecting the success of the induction. The table for Bishops scoring is outlined below:

Bishop System of Cervical Scoring

Assessment score	Dilation (cm)	Effacement (%)	Fetal station*	Consistency	Position
0	0	0 to 30	-3	Firm	Posterior
1	1 to 2	40 to 50	-2	Medium	Mid
2	3 to 4	60 to 80	-1, 0	Soft	Anterior
3	5 to 6	90 to 100	+1, +2, +3	--	--

NOTE: Add the score for each of the clinical assessments. If the total score is greater than 8, the success of induction approaches that of spontaneous labour.

*-- -3 = engaged; +3 = on the perineum.

(Adapted from Bishop EH. Pelvic scoring for elective induction. Obstet Gynecol 1964; 24:266-8).

WHO recommendations for cervical ripening and Induction

1. Low doses of vaginal prostaglandins are recommended for induction of labour. However, Prostaglandin preparations other than misoprostol are expensive and may not be a priority for implementation, especially in low- and middle-income countries. . When prostaglandins are used, close monitoring of the woman and fetus should begin immediately after administration of the drug.
2. Oral misoprostol (25 µg, 2-hourly) is recommended for induction of labour. Vaginal low-dose misoprostol (25 µg, 6-hourly) is also recommended for induction of labour. Misoprostol use is not recommended for women with previous caesarean section.
3. If prostaglandins are not available, intravenous oxytocin alone should be used for induction of labour. It should however be used with caution and careful observation due to risk of hyper stimulation and foetal distress and rarely uterine rupture. When oxytocin infusion results in good labour pattern, maintain the same rate until delivery
4. Amniotomy alone is not recommended for induction of labour.
5. Balloon catheter is recommended for induction of labour. The combination of balloon catheter plus oxytocin is recommended as an alternative method when prostaglandins (including misoprostol) are not available or are contraindicated. Balloon catheter may be preferred for women with scarred uterus, since it is less likely to be associated with hyper stimulation of the uterus.
6. In the third trimester of pregnancy, in women with a dead or anomalous foetus, oral or vaginal misoprostol are recommended for induction of labour
7. Sweeping membranes is recommended for reducing formal induction of labour. However, maternal discomfort and bleeding associated with the procedure should be balanced with the anticipated benefits. Since the interval between intervention and result (i.e. sweeping membranes

and initiation of labour) can be longer than with formal methods of induction of labour, this intervention would be suitable for non-urgent indications for pregnancy termination.

8. Regarding breast stimulation, sexual intercourse and other similar methods of pre-induction of labour, there is insufficient evidence for recommending those methods.
9. Betamimetics are recommended for women with uterine hyper stimulation during induction of labour. However caution should be exercised in using betamimetics because of their side-effects. Their contraindications (e.g. cardiac diseases) should be respected.
10. Outpatient induction of labour is not recommended.

Risks associated with induction of labour

1. Premature delivery
2. Sepsis
3. Foetal distress
4. Failed induction and Caesarean section
5. Hyper stimulation
6. Umbilical cord accidents
7. Uterine rupture

Details on selected drugs

Oxytocin:

Oxytocin is the most commonly used drug for induction of labour. Oxytocin may be used after ripening of the cervix using prostaglandins or other mechanical methods. If the bishop's score is favourable (≥ 6) labour is usually successfully induced with oxytocin alone. A lower score necessitates ripening.

Prior to administering oxytocin one needs to review for indications and rule out any contraindications to induction. Women receiving oxytocin must be carefully monitored throughout labour with special focus on maternal pulse, blood pressure, contractions and foetal heart rate.

In areas without an infusion pump, oxytocin is delivered as follows:

- Infuse oxytocin 2.5 units in 500mls of dextrose or normal saline at 10 drops per minute. (this is approximately 2.5mIU /min)
- Increase the infusion rate by 10 drops per minute (dpm) every 30 minutes until the patient has a good contraction pattern of 3 contractions in 10 minutes each lasting 40 seconds
- Maintain this rate until delivery
- If a good contraction pattern is not established with an infusion rate of 60dpm, increase the oxytocin concentration to 5units in 500 mls of dextrose or normal saline and adjust the rate to 30 dpm
- Increase the infusion rate by 10 dpm every 30 minutes until a good contraction pattern is established or the maximum of 60dpm is reached.
- If a good contraction pattern is still not reached: in multigravida and in women with a previous scar, the induction has failed and delivery should be by Caesarean section. In primigravida, one can increase the concentration of oxytocin to 10 units in 500 mls of dextrose or saline. If good contractions are not established with the maximum dose, deliver by caesarean section

In areas where there is an infusion pump:

Oxytocin is prepared for use by placing 10 U in 1 L of isotonic intravenous solution to achieve a concentration of 10 mU per mL. Because severe hypotension can occur, a controlled infusion device *must*

be used to determine its rate. It can be administered as a continuous infusion or in "pulsed" doses. Continuous infusions usually start with a dosage of 0.5 to 2.5 mU per minute, which is increased at the same increment every 15 to 60 minutes. The effect is noted within three to five minutes, and a steady state is achieved within 15 to 30 minutes.

The advantages of Oxytocin are: i) it doesn't cross the placental barrier; ii) it is potent and easy to titrate, iii) it has a short half-life (one to five minutes) and iv) it is generally well tolerated. However, because oxytocin is close to vasopressin in structure, it has an antidiuretic effect when given in high dosages (40 mU per minute); thus, water intoxication is a possibility in prolonged inductions. Uterine hyper stimulation and uterine rupture can also occur. When the resting uterine tone remains above 20 mm Hg, uteroplacental insufficiency and fetal hypoxia can result.

If a worrisome FHR occurs during induction, the oxytocin dosage can usually be lowered rather than stopped completely. This allows the fetus to recover without unnecessarily slowing the entire labor. In emergency situations, the infusion can be stopped. Minor FHR abnormalities such as variable decelerations or lack of accelerations can be corrected by changing the mother's position, administering oxygen and increasing intravenous fluid administration.

WHO recommends use of Oxytocin for AMTSL because it is:

1. Fast acting
2. Inexpensive
3. Minimal side effects
4. No contraindications
5. Stable in heat and light
6. Effective in preventing PPH
7. Large evidence base for its use

Comparison of Uterotonics

Characteristic	Oxytocin	Ergometrine	Misoprostol
Works fastest	X		
Has longest action		X	
Causes Tonic contraction		X	
Has a common side effect of shivering and elevated temperature			X
Has a common side effect of headache		X	
Is contraindicated in women with or having history of hypertension, heart disease, retained placenta, pre-eclampsia, eclampsia		X	
Has no contraindications when administered in the postpartum period	X		
Stability when exposed to heat* (most stable-1, least stable- 3)	2	3	1
Stability when exposed to light (most stable-1, least stable- 3)	2	3	1

Effectiveness after 1 year of controlled storage in relationship to light and temperature of storage area:

Drug	Dark 4-8°C	Dark 30°C	Light 21- 25°C
Ergometrine	5% loss	31% loss	90% loss
Oxytocin	0% loss	14% loss	7% loss

Misoprostol

Misoprostol is a synthetic analogue of PGE₁. When given orally, it is rapidly absorbed by the gastrointestinal tract. It can also be administered vaginally. The total systemic bioavailability of vaginally administered misoprostol is three times greater than that of orally administered misoprostol. It may be used both for cervical ripening and induction of labour. The primary advantages of misoprostol are cost and convenience.

The recommended dose for induction of labour at term is 25 µg, inserted once every six hours.. Close fetal monitoring is recommended. The patient should lie down for at least three hours after misoprostol application before the patient is allowed to ambulate. When oxytocin augmentation is necessary, a minimal interval of three hours is recommended after the last misoprostol dose

The use of misoprostol has been associated with an increased incidence of tachysystole, defined as six or more uterine contractions in 10 minutes for two consecutive 10-minute periods. Other uterine contraction abnormalities occur with misoprostol, such as hypertonus and hyper stimulation syndrome (contractions lasting longer than 90 seconds or more than five contractions in 10 minutes). They can be managed by changing the maternal position and administering oxygen by face mask, subcutaneous terbutaline (subcutaneously, or both, IV salbutamol, IV ritodrine, IV/IM magnesium sulphate. Other uncommon complications resulting from misoprostol use include uterine rupture and foetal demise

PROTOCOL FOR INDUCTION OF LABOUR WITH ORAL MISOPROSTOL SOLUTION

Confirm that there is an appropriate indication for induction of labour.

1. Confirm that there is no contraindication to induction of labour e.g. previous Caesarean Section, myomectomy, hysterotomy, fetus currently in breech presentation or transverse lie).
2. Induction of labour should be commenced in the ward i.e. admit the client
3. Preparation of solution should be done in the ward
4. Preparation: Dissolve one tablet of misoprostol 200mcg in 200mls of drinking water
5. Administration: Give 25mls of the prepared solution stat, then give 25mls every two hours to a maximum of ten (10) doses
6. Once contractions start, vaginal examination should be done to confirm labour
7. Monitor labour with partograph
8. If the mother has not gone into labour two hours after the 10th dose, critically reappraise and check the Bishop's score. If the Bishop's score is favourable (≥ 6) do ARM, augment with oxytocin and continue observations. If the Bishop's score is poor consider allowing the patient to rest for 24 hrs, then start again, or caesarean section depending on the indication for induction and urgency of delivery.

Note:

- When prostaglandins are used, close monitoring of the woman and fetus should begin immediately after administration of the drug.
- In case of uterine hyper stimulation stop further misoprostol and assess need for tocolysis with salbutamol, terbutaline, ritodrine, magnesium sulphate etc.
- The prepared oral solution must be used within 24 hours

PROTOCOL FOR INDUCTION OF LABOUR USING 25µg VAGINAL MISOPROSTOL TABLET

For induction of labour using **vaginal misoprostol**, use a **25µg** tablet/pessary inserted into the posterior fornix every six (6) hours

1. Confirm that there is an appropriate indication for induction of labour.
2. Confirm that there is no contraindication to induction of labour e.g. previous Cesarean section, myomectomy, hysterotomy, malpresentation, fetus currently in breech presentation or transverse lie etc.
3. Admit the client.
4. Administration: insert 1 tablet of **25 µg** of misoprostol in the **posterior fornix** stat. Repeat this dose every six (6) hours for a maximum of four (4) doses.
5. Once contractions start, perform vaginal examination to confirm labour
6. Monitor labour with partograph
7. If the mother has not gone into labour 6 hours after the 4th dose, critically reappraise and check the Bishop's score.
 - a. If the Bishop's score is favorable (≥ 6) perform ARM, augment with oxytocin and continue charting the partograph observations.
 - b. If the Bishop's score is poor, consider allowing the patient to rest for 24 hours, then restart the regimen or deliver by Caesarean section depending on the indication for induction and urgency of delivery.
 - c. If the second cycle of oral misoprostol fails, deliver by Caesarean section.

Note:

- Low-dose vaginal misoprostol (25 µg, 6-hourly) is recommended for induction of labour.
- When prostaglandins are used, close monitoring of the woman and fetus should begin immediately after administration of the drug.
- Remove any remaining tablet from the vagina
- In case of uterine hyperstimulation stop further misoprostol and assess need for tocolysis e.g. using salbutamol, terbutaline, magnesium sulphate etc.

COMPLICATIONS OF LABOUR AND DELIVERY

PROLONGED LABOUR

CONTENT OUTLINE

1. Definition of prolonged labour
2. Diagnosis of prolonged labour
3. Causes of prolonged labour
4. Management of prolonged labour
5. Criteria for referral

Definition of prolonged labour

Prolonged labour is active labour with regular uterine contractions and progressive cervical dilatation, which lasts for more than 12 hours in both multiparas and primigravidas.

Causes of Prolonged Labour

It is usual to describe this as due to the three "Ps":

- **Powers:** poor or uncoordinated uterine action
- **Passenger:** fetal head too large or position abnormal
- **Passage:** pelvis abnormal, or tumor or obstruction in pelvis or birth canal.

Diagnosis of Prolonged Labour

Findings from history and physical examination or as interpreted from the partograph that is correctly charted will guide in the diagnosis of prolonged labour.

History

- At what time did the contractions begin?
- How frequent are the contractions?
- When did the membranes (water) break?

Examination

- The frequency, duration and intensity of the contractions
- Determine the foetal position and identify any evidence of cephalopelvic disproportion and /or foetal malposition
- Evaluate foetal heart rate
- Determine whether the mother's bladder is full. Encourage the woman to empty the bladder frequently. If not able to pass urine then catheterize
- Inspect the external genitalia to determine the presence of liquid and /or blood
- Vaginal exam with sterile gloves every four hours (or at a different frequency when indicated).

Criteria for referral

Refer all patients with prolonged labour to a comprehensive EOC facility if not available in your facility.

Referral process

- Explain the dangers of prolonged labour to the family
- Write a referral note and refer immediately to the hospital.
- A skilled health care provider must escort the woman and continue to monitor her condition.
- Monitor maternal vital signs 1/2 hourly

- Monitor foetal heart rate 1/2 hourly
- Measure the urine volume
- Ensure IV fluids (5% dextrose) continue during transfer
- Broad-spectrum antibiotics should be started before departure.

Laboratory investigations

- Blood grouping and cross match two units
- Urine for albumin, sugar, acetone

Management of Prolonged labour

- Monitor maternal vital signs: Temperature 2-4 hourly, Pulse ½ hourly, Respirations 4 hourly
- Monitor foetal heart rate ½ hourly
- Measure the urine volume every 2-4 hours (encourage mother to void regularly)
- Start I.V fluid (5 dextrose)
- Start broad spectrum antibiotics
- Oxygen by mask

First choice antibiotics:

- IV Ampicillin 500mg 6 hourly for 3 days
- IV Gentamicin 80 mg 8 hourly for 7 days
- Followed by Amoxycilin 500mg oral 8 hourly for 7 days

Second choice line antibiotics

- IV second generation Cephalosporin
- IV amoxicillin/clavulanic acid 1.2g stat dose followed by oral preparation

Second stage

Maternal expulsive efforts increase fetal risk by reducing the delivery of oxygen to the placenta. While spontaneous maternal “pushing” should be allowed, prolonged effort and holding the breath should not be encouraged. If malpresentation and obvious **obstruction have been ruled out**, labor should be augmented with oxytocin.

If there is **no descent after augmentation** and:

- If the **head is not more than 1/5 above** the symphysis pubis or the leading bony edge of the fetal **head is at the 0 station**, delivery should be by vacuum extraction or forceps
- If the head is **between 1/5 and 3/5** above the symphysis pubis or the leading bony edge of the fetal **head is between 0 station and -2 station**, and birth is taking place in a facility where safe caesarean section is not possible, delivery should be by vacuum extraction and symphysiotomy
- If the service **provider is not proficient in symphysiotomy**, immediate referral is required for delivery by caesarean section
- If the head is **more than 3/5 above** the symphysis pubis or the leading bony edge of the fetal **head is above -2 station**, delivery must be by caesarean section.
- If the woman arrived very late and the foetus is dead, do destructive obstetric procedure.

Third Stage

Perform active management of third stage of labour.

Management of prolonged labour when there is uterine dysfunction

Hypotonic dysfunction

If the foetal heart rate is normal, the cervical Os is ≥ 4 cm and there is no evidence of foetal malpresentation or CPD, perform ARM then wait for 1-2 hours for improvement of contractions. If contractions do not pick up, start on 5IU oxytocin in 500ml of physiologic solution such as Normal Saline, Ringer's lactate or 5% dextrose at a rate of 10 drops per minute. Increase the rate of oxytocin administration at 10 drops per minute every 30 minutes to maximum 60 drops per minute or until 3 contractions every 10 minutes each lasting 20-40 minutes are achieved.

If the liquor is meconium stained, deliver by caesarean section if she is not fully dilated or there is evidence of Cephalo-Pelvic Disproportion (CPD).

OBSTRUCTED LABOUR

CONTENT OUTLINE

1. Definition of obstructed labour
2. Causes of obstructed labour
3. Diagnosis obstructed labour
4. Complications of obstructed labour
5. Management of obstructed labour
6. Referral procedure.

Rationale

Four to eight percent of all maternal deaths in developing countries are due to obstructed labour. It is an under estimation of the problem because deaths due to obstructed labour are often classified under other complications associated with obstructed labour such as ruptured uterus, puerperal sepsis.

Definition of obstructed labour

Obstructed labour means that, in spite of strong uterine contraction, the foetus cannot descend because of mechanical factors. Obstruction usually occurs at the brim, but it may occur in the mid cavity or pelvic outlet.

Definition of Cephalopelvic Disproportion (CPD): This occurs when foetal head is large in comparison with the pelvis. Cephalopelvic disproportion may be due to a small pelvis with a normal sized head, or a normal pelvis with a large foetus or a combination of a large baby and small pelvis. This means it is difficult or impossible for the foetus to pass safely through the pelvis.

Cephalopelvic disproportion may be:

- **Marginal CPD**, which means that the problem may be overcome during labour. The relaxation of the pelvic joints and moulding of the foetal skull may enable vaginal delivery. Half of these patients will need an operative delivery.
- **True CPD**: This means the pelvis is small or abnormally shaped and/or foetus is unusually large or abnormal e.g. hydrocephalus. Operative delivery will be needed.

Causes of obstructed labour

Common factors predisposing to obstructed labour include:

- Cephalopelvic disproportion
- Foetal macrosomia e.g. in poorly controlled diabetes mellitus in pregnancy
- Malpresentation e.g. brow, shoulder, face with mentoposterior, breech
- Foetal abnormalities e.g. hydrocephalus
- Multiple gestation with locked twins
- Abnormalities of the reproductive tract e.g. pelvic tumour, cervical or vaginal stenosis, tight perineum and FGM/FGC scar.
- Underdeveloped pelvis e.g. adolescent pregnancy
- Childhood malnutrition leading to contracted pelvis

Diagnosis of obstructed labour**History**

Relevant points to find out from the woman or her family are

- Her age, parity, gravidity
- History of previous operative delivery
- History of previous stillbirth
- Duration of previous labour and outcome
- Duration of current labour
- Duration of ruptured membranes

Physical Examination*General examination*

The following may be observed:

- Signs of physical and mental exhaustion
- Dehydration- dry mouth,
- Acetone breath due to keto-acidosis.
- Fever
- Shock - rapid pulse, anuria or oligouria, cold extremities, pale complexion, low blood pressure.

Shock may be due to a ruptured uterus or sepsis.

Abdominal examination

- The foetal head may be palpable above the pelvic brim
- There may be frequent and strong uterine contractions
- The uterus may have gone into tetanic contractions and sits tightly moulded around the foetus
- Bandl's ring may be evident. This is when the border of upper and lower uterine segments becomes visible and/or palpable during labour. It is usually seen as a depression across the abdomen at about the level of the umbilicus. This is a late sign of obstructed labour occurring mostly in primigravida.
- The uterus may stop contracting especially in primigravidas

Vaginal examination

Signs of obstruction include:

- Oedema of the vulva present, especially if the woman has been pushing for a long time
- Foul smelling - meconium stained liquor
- Absence of amniotic fluid (fluid has already drained away)
- Catheterization will produce concentrated urine which may contain blood
- Hot and dry vagina
- Oedema of the cervix.
- Incomplete dilatation of the cervix
- Large caput succedaneum can be felt
- May palpate a severely moulded head, or a shoulder presentation or prolapsed arm.

Partograph reading

Examination of the partograph may reveal:

- Foetal heart rate of more than 160/minute or less than 120/minute indicating foetal distress

- Foul smelling meconium-stained liquor
- Severe moulding
- Severe caput formation
- The rate of cervical dilatation slow or remains static in spite of strong contraction
- Maternal tachycardia and pyrexia
- Scanty urine with ketonuria.

Management of Obstructed labour

a) Resuscitation of the Mother

Perform a rapid assessment of the airway, breathing and circulation and manage as appropriate.

b) Rehydrate the patient

Aim to maintain normal plasma volume and to prevent or treat dehydration and ketosis. Put up an intravenous infusion; use a large bore needle or canula. If the woman is in shock give IV fluids e.g. normal saline. Run 1 litre in the first 15 minutes or as quickly as possible. If the woman is mainly starved and exhausted, give 1-2 litres 5 or 10% dextrose in 6 hours.

c) Catheterize

Insert an indwelling urinary catheter using aseptic technique and monitor urine output.

d) Give antibiotics

If there are signs of infection, or the membranes have been ruptured for 18 hours or more, or the period of gestation is 37 weeks or less, give antibiotics as follows:

- Ampicillin 2 g every 6 hours, **and**
- Gentamicin 5 mg/body weight IV every 24 hours.

If the woman is delivered by caesarean section, continue antibiotics **and** give metronidazole 500 mg IV every 8 hours until the woman is fever-free for 48 hours.

(e.) Deliver the baby

Cephalo-pelvic disproportion:

- If **cephalo-pelvic disproportion is confirmed**, delivery should be by caesarean section
- If the **fetus is dead**: - delivery should be by craniotomy - if this is not possible, delivery should be by caesarean section.

Obstruction:

- If the **fetus is alive, the cervix is fully dilated** and the **head is at 0 station or below**, deliver by vacuum extraction
- If the fetus is alive and the cervix is fully dilated and there is evidence of or indication for **symphysiotomy** for relatively minor obstruction (if safe caesarean section is not possible) and the fetal **head is at -2 station**, then delivery should be by symphysiotomy and vacuum extraction.
- If the **fetus is alive but the cervix is not fully dilated** or if the **fetal head is too high for vacuum extraction**, referral should be made immediately for delivery by caesarean section
- If the fetus is dead: - delivery should be by craniotomy - if this is not possible, delivery should be by caesarean section. Destructive obstetric procedures such as craniotomy should be performed by a competent health provider using the appropriate equipment.

Complications of obstructed labour**Maternal complications**

- Maternal death
- Chorioamnionitis
- Uterine rupture
- Obstetric fistula
- Puerperal sepsis
- Neurological injury e.g. foot drop
- Spontaneous symphysiotomy and/or osteitis pubis

Foetal complications

- Intrauterine foetal death
- Foetal distress
- Foetal injury
- Birth asphyxia
- Neonatal sepsis

Factors associated with obstructed labour

- Childhood malnutrition leading to contracted pelvis
- History of previous still birth, or previous prolonged labour
- Young age of mother (under 17 years)
- Female genital mutilation/cutting
- Some medical illnesses like diabetes mellitus
- Pelvic abnormalities following childhood illnesses like polio or pelvic injuries

Referral process

- Explain the dangers of obstructed labour to the family
- Write a referral note and refer immediately to a hospital with comprehensive obstetric care.
- A skilled health care provider must escort the woman and continue to monitor her condition.
- Monitor maternal vital signs 1/2 hourly
- Monitor foetal heart rate 1/2 hourly
- Ensure IV fluids (5% dextrose) continue during transfer
- Start on intravenous antibiotics (Ampicillin 500mg and Gentamicin 80mg)

OBSTETRIC FISTULA

Obstetric fistula is predominantly caused by prolonged obstructed labor, which is one of the five major causes of maternal mortality and accounts for 8 percent of maternal deaths worldwide. In Kenya the incidence is about 5000 per year

There are areas in the country where the problem of obstetric fistula is more pronounced particularly the pastoral regions of West Pokot, Garissa, Kitui, and Machakos and in South Nyanza.

The reliance on TBAs over skilled attendants contributes to the occurrence of obstetric fistula and maternal deaths, since they are not qualified to handle obstructed labor or other complications during delivery.

When the fetal head is stuck in the pelvis for a long time, portions of the bladder, cervix, vagina and rectum are trapped between the fetal head and the pelvic bones and are subjected to excessive pressure. Because the circulation is impaired, oxygenation of these tissues is inadequate and necrosis occurs, followed in a few days by the formation of a fistula between the woman's vagina and bladder (vesico-vaginal fistula or VVF) or between the vagina and rectum (recto-vaginal fistula or RVF) or both. This leaves the woman leaking urine and/or feces continuously from the vagina.

Most fistulas can be repaired surgically even if they are several years old. Success rates for fistula repair by experienced surgeons can be as high as 90 percent

Complications of Fistula:

- Without surgical repair, the physical consequences of fistula are severe, and can include a fetid odor, frequent pelvic or urinary infections, painful genital ulcerations, burning of thighs from the constant wetness, infertility, nerve damage to the legs, and sometimes early mortality.
- Many women interviewed also complained of difficulty walking because the skin on their thighs stung so intensely.
- Many women suffering from obstetric fistula limit their intake of water and food because they do not want to leak. This can lead to dehydration and malnutrition.
- The majority of women and girls who were married or in sexual relationships complained of pain and discomfort during sex.
- Fistula has a huge psychological impact on women and girls, sometimes leading to depression and suicide.
- Women and girls living with fistula are often ostracized largely because of the foul odor they produce
- Women and girls with fistula are often abused, beaten, abandoned, and divorced by their husbands or are isolated in their homes or shacks outside their homes
- Fistula places a huge financial burden on poor families e.g. frequent infections mean women and girls regularly need medical attention.

(Am not dead but Am not living- Kenya Human Rights Watch- July 2010)

NB: The importance of monitoring of labour with use of a partograph cannot be overemphasized

IMMEDIATE CARE / EARLY INTERVENTION**Principles for the immediate care of women who have survived prolonged or obstructed labor**

In order to try to prevent fistula formation, or to encourage very small fistula to close spontaneously, it is important that all women who have survived prolonged or obstructed labor, with or without a caesarean section, be treated by the following regime immediately after delivery, or as soon as they present to a health-care facility:

- An appropriate size (Foley size 16-18) indwelling bladder catheter should be inserted to enable free drainage of urine. Opinions vary as to the length of time this should remain in place; in the case of a small healing fistula it may be from four to six weeks, but if no apparent damage has been shown to have occurred it may be suitable to remove the catheter after 14 days.
- The perineum and vagina should be cleaned with salty water (sitz-baths), or a solution of mild detergent in water, twice a day.
- The woman should be encouraged to drink a large volume of fluids, around four to five liters a day.
- The vagina should be examined as soon as possible, by speculum, and any necrotic tissue gently excised. This should be performed under aseptic conditions and may need to be repeated until the vagina is clean.
- Any intercurrent infection should be treated according to local protocols, as should routine prophylaxis against urinary tract infections, if used.
- The need to deliver future babies in a unit equipped and staffed to undertake emergency caesarean sections should be emphasized as well as the need to seek antenatal care in future pregnancies.

Principles for the management of women who present immediately after delivery with an obstetric fistula

The following should be the early intervention (treatment) for those women who present within 3 months after delivery:

1. Insert a catheter for a period of 4 - 6 weeks.
2. Encourage Oral fluid intake of at least 5 litres daily. In this way 15 - 20% of the women can be cured with catheter treatment only.
3. Perineal toilet and Sitz baths with a simple detergent/liquid soap 2 - 3 times daily.
4. Perform a speculum examination after 2 - 3 days and remove any slough and necrotic tissue (debridement), when present. This can be repeated weekly, if necessary.
5. As soon as the fistula edge is clean early closure should be performed

With this regimen the vagina will be clean in 4 - 6 weeks. If the fistula has not healed, early repair should be performed at that time (to avoid fibrosis and tissue formation).

The advantage of the early treatment is that it is highly successful (success rate 95%) and prevents the woman from becoming an outcast. A long wait results in the formation of fibrosis and scar tissue.

It is extremely important that at all levels (community as well as various levels of health facility) all the possible preventive measures be taken so that women have focused ante-natal care, well monitored labour with the use of partograph, a clean and safe delivery and are attended to by a skilled health care provider.

Pre-discharge health education

- Prior to discharge, the woman and her partner, if present, should receive basic health and nutritional education to ensure she maintains her overall general health.
- Further, she and her partner should receive full advice on family planning, contraception (with supplies if available) and the management of any subsequent pregnancies.
 - Women and their families should be advised on the importance of having adequate antenatal care in subsequent pregnancies.
 - She must deliver in a hospital equipped to undertake caesarean sections.
- In case she had a fistula which was repaired, she should be advised not have intercourse for three months to allow for complete healing to take place and ideally not to become pregnant for six months to a year following this period. This should also be explained to her partner if possible. Once intercourse has resumed this should be gentle, and with consideration for the woman.
- Each woman should be given a card to take home with details of her history, and the management given. Thereafter, any time she goes to a clinic for maternity care she can present this card so that those caring for her will be able to take necessary precautions on her behalf to avoid further injuries in childbirth.

RUPTURE OF THE UTERUS

CONTENT OUTLINE

1. Definition of ruptured uterus
2. Predisposing factors for ruptured uterus
3. Diagnosis of ruptured uterus
4. Management of ruptured uterus
5. Referral procedure

Definition of ruptured uterus

Rupture of the uterus is defined as a complete separation or tear in the wall of the uterus with or without expulsion of the foetus. It may be complete when the visceral peritoneum is involved or incomplete when the visceral peritoneum is intact. In complete uterine rupture, the uterus communicates directly with the peritoneal cavity and bleeding occurs into the peritoneal cavity. In incomplete rupture, bleeding occurs behind the visceral peritoneum.

Predisposing factors for uterine rupture

- Neglected obstructed labour
- Previous operations on the uterus (e.g. caesarean section, myomectomy, previous uterine rupture)
- Obstetric manoeuvres on the uterus (e.g. external cephalic version, breech extraction, internal podalic version)
- Harmful obstetric practice e.g. Application of fundal pressure
- High parity
- Multiple pregnancies
- Large foetus

Diagnosis of ruptured uterus

A patient with ruptured uterus may present with hemorrhagic or neurogenic shock from bleeding or vasovagal stimulation, respectively. Resuscitate and manage maternal shock expeditiously as per guidelines. It is important to note that even though rupture of the uterus is more commonly associated with labour, it can occur before onset labour or even long before term pregnancy especially when the uterus has been scarred.

History

During history taking, explore the presence of risk factors listed above.

Suspect rupture of the uterus if the following signs and symptoms are present:

- Shock (Signs of hypovolemia and shock include: tachycardia, hypotension, cold clammy extremities, sweating, restlessness and confusion).
- Abdominal distension/free fluid (Paracentesis may be positive in the presence of haemoperitoneum but its absence does rule out ruptured uterus.
- Abnormal uterine contour (Bandl's ring)
- Tender abdomen and especially tenderness over the lower segment of the uterus and abdominal distension.
- Easily palpable fetal parts or dislodged presenting part

- Absent fetal movements and fetal heart sounds
- Rapid maternal pulse (Suspect rupture if the fetus suddenly becomes distressed and the mother's pulse starts rising).
- Speculum vaginal examination may reveal vaginal bleeding. (Digital vaginal examination must be avoided unless placenta previa has been ruled out).

Investigations

- Blood for grouping and cross matching
- Urinalysis for Haematuria, protein, sugar and acetone.

Differential Diagnosis

- Placenta praevia
- Abruptio placentae
- Extra uterine pregnancy
- Ruptured spleen or liver
- Acute abdomen in pregnancy.

Management of ruptured uterus

a) Emergency Treatment

- Start resuscitation.
- Set up IV line with a wide bore cannula and start Ringer's lactate solution or normal saline
- Give oxygen by face mask
- Transfuse blood
- Catheterise for continuous bladder drainage
- Provide loading dose of parenteral antibiotics
- Monitor vital signs

b) Definitive management

Surgery-laparotomy

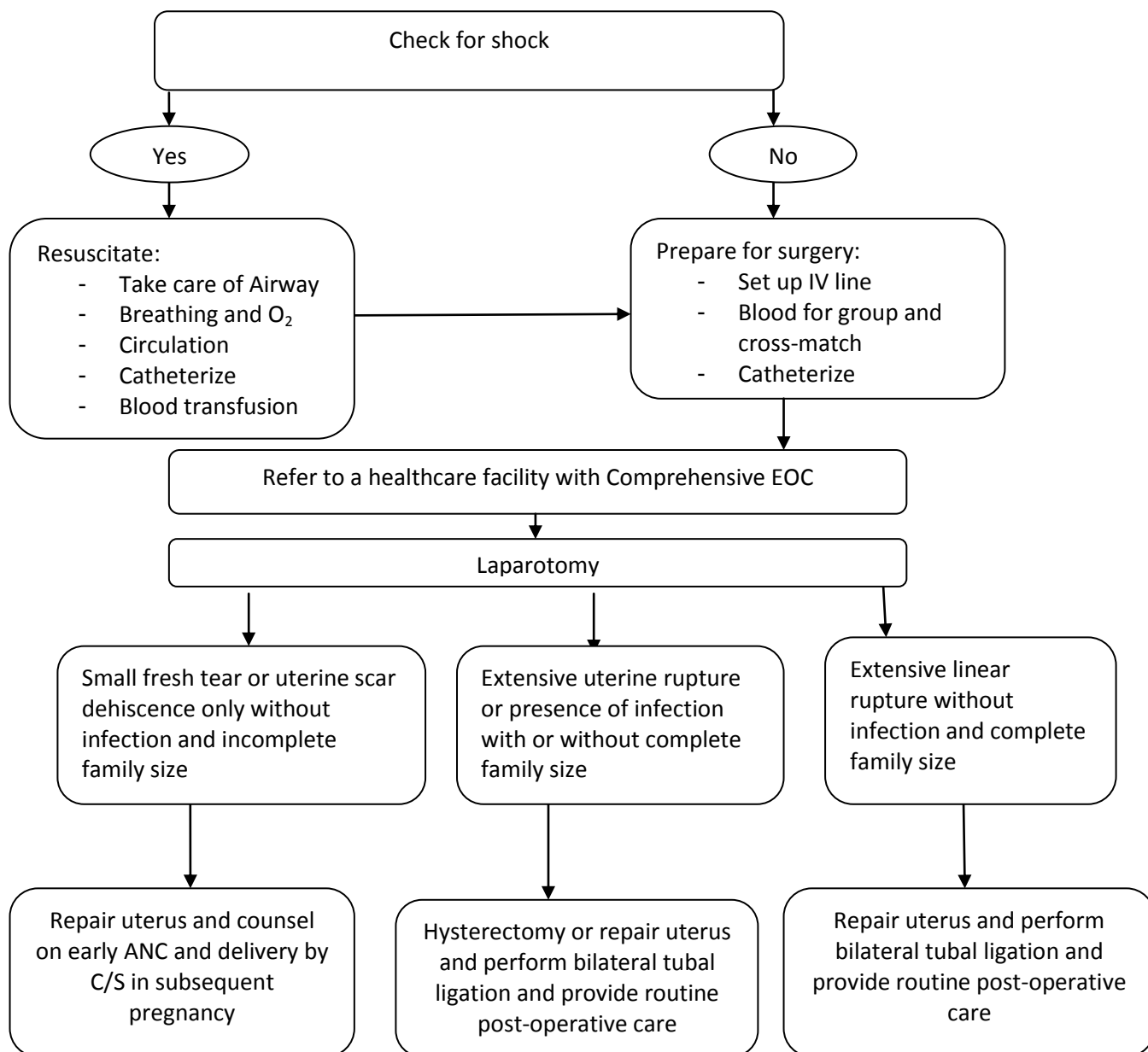
- Perform the quickest and safest operative procedure (e.g. repair with or without tubal ligation, or subtotal hysterectomy)
- Continue with IV fluids
- Broad-spectrum parenteral antibiotics
- Continuous bladder drainage (keep bladder catheter for 10-14 days)

c) Precautions to take in order to avoid complications

- Resuscitate patient adequately before surgery
- Cross match enough blood
- Administer parenteral broad spectrum antibiotics
- If the uterus was repaired and tubal ligation was not performed for desired for future fertility, counsel the patient on need for both future antenatal care and delivery by elective caesarean section in a level 4 or above health care facility. If hysterectomy was done, counsel woman on consequences (amenorrhea, infertility).

d) Follow up

Postpartum care: Review within one week, and as may be appropriate.

Management of ruptured uterus

FETAL DISTRESS**CONTENT OUTLINE**

1. Definition of foetal distress
2. Causes of foetal distress
3. Diagnosis of foetal distress
4. Management of patients with foetal distress.

Definition of foetal distress

Foetal distress is defined as depletion of oxygen and accumulation of carbon dioxide resulting from interference with gaseous exchange and leading to a state of acidosis. The resulting oxygen deprivation leads to foetal hypoxia.

Causes of foetal distress**(a) Antepartum causes:**

- Foetal congenital malformations
- Cord accidents (e.g. cord tight around the neck; compression of the cord by baby; cord forms a knot)
- Obstetric complications:
 - Utero-placental insufficiency
 - Pre-eclampsia/eclampsia
 - Malaria in pregnancy
 - APH (vasa previa, placenta previa, abruptio placenta)

(b) Intrapartum causes:

- Prolonged/obstructed labour
- Cord presentation/prolapse
- Antepartum haemorrhage.

Essentials of Diagnosis of Foetal Distress

- Detection of an abnormal foetal heart rate or rhythm
 - Foetal tachycardia (foetal heart rate more than 180/min, a early sign of foetal distress)
 - Foetal bradycardia (foetal heart rate less than 100/min, a late sign of foetal distress)
 - Foetal heart rate deceleration after a uterine contraction, followed by a delayed recovery over 20 seconds or late deceleration
 - Variable decelerations as detected by cardiotocograph (CTG) where available
- Passage of meconium-stained amniotic fluid in cephalic presentation
- Biophysical profile score less than 6/10 (especially with reduced amniotic fluid)

Differential Diagnosis

- Breech presentation with passage meconium
- Effect of drugs administered to a mother (tocolytic agents e.g. salbutamol causing maternal tachycardia).
- Maternal fever, hypertension or amnionitis may also result in foetal tachycardia

Management of Foetal Distress

The method of choice for the monitoring of the foetus during labour is **intermittent auscultation** using the Pinnard stethoscope. CTG with foetal heart rate tracing is an acceptable alternative, where available.

If the foetal heart rate **remains abnormal** for 3 consecutive contractions:

- Explain condition of the foetus to the mother and possible complications
- Change the mother's position (left lateral position preferred)
- Stop oxytocin if it was being administered, until foetal heart rate returns to acceptable level
- Hydrate with IV dextrose 5%
- Give oxygen to the mother by face mask
- Examine to rule out predisposing factors
- If in second stage with no malpresentation or severe CPD, deliver quickly with the aid of episiotomy and assisted vacuum delivery
- After hydration with at least 1 litre in 30 minutes and foetal heart remains abnormal, perform an emergency caesarean section if still in first stage
- Refer to a healthcare facility capable of providing comprehensive EOC if unable to provide Emergency Caesarean section.

Management of the newborn:

- Resuscitate the baby as need be
- Offer Immediate Essential Newborn Care
- Observe baby in nursery for 24 hours if 5-minute APGAR score is less than 7
- Give antibiotics to baby if membranes have ruptured for more than 6 hours before labour starts
- Refer any severely ill baby
- Explain and counsel grieving parents if baby has died.

Precautions to take in order to avoid complications

- Use partograph in management of labour
- Be prepared for quick delivery
- Be prepared to resuscitate baby at delivery
- Rule out cord presentation or compression during routine management of labour.
- Record foetal heart rate every quarter hour if there is meconium stained liquor or irregular foetal heart rate pattern
- Test urine for acetone and correct any dehydration/ketosis
- Deliver promptly; using the most appropriate route
- Manage any other identified maternal causes of foetal distress.

Follow Up

- If the baby was born with asphyxia neonatorum, regular check up and prolonged follow up for 5 years is recommended.
- Advise the mother and her partner on delivery of subsequent babies.

CORD PRESENTATION AND CORD PROLAPSE

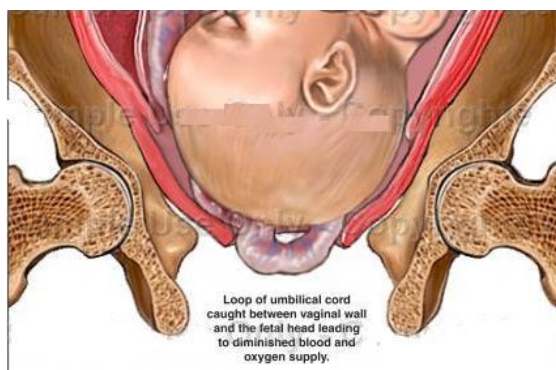
CONTENT OUTLINE

1. Definition of cord presentation and cord prolapse
2. Diagnosis of cord presentation and cord prolapse
3. Management of patients with cord prolapse and cord presentation

Definitions of cord prolapse and cord presentation

Cord prolapse is when the cord lies in front of the presenting part of the baby **after** the membranes have ruptured.

Cord presentation is when the cord lies in front of the presenting part of the baby **before** the membranes have ruptured.



Cord prolapse

Diagnosis of cord presentation and cord prolapse is made on:

- Vaginal examination by palpating cord under the intact membranes (cord presentation)
- Vaginal examination after rupture of the membranes reveals loops of the cord in the birth canal (cord prolapse).

Potential predisposing risk factors include:

- Premature rupture of the amniotic sac
- Polyhydramnios (having a large volume of amniotic fluid. The cord may be forced out with the more forceful gush of waters.
- Long umbilical cord
- Foetal malpresentation
- Multiparity
- Multiple gestation

Differential Diagnosis

- Foetal membranes
- Footling breech or compound presentations.

Management of cord prolapse and cord presentation

Emergency Treatment

The aim of management is to deliver the foetus as quickly as possible before hypoxia and death occurs due to cord compression.

- Remove pressure by elevating the buttocks or putting patient in knee chest or exaggerated left lateral position
- Give oxygen to the mother by mask
- Establish IV line with 5% dextrose
- Monitor the foetal heart appropriately, every 5 minutes
- Counsel mother on the condition of the foetus.



Knee chest position

If the cord is pulsating and patient is in first stage of labour:

- Replace the cord into the vagina.
- Transfer the mother to a healthcare facility capable of providing comprehensive emergency obstetric care for urgent caesarean section.
- Carry a delivery kit during transfer and maintain knee chest position during transfer.

In the comprehensive Emergency Obstetric Care facility, deliver by emergency caesarean section if the baby is alive and the patient is not in second stage of labour.

If the cord is pulsating and patient is in second stage of labour:

- Rule out cephalopelvic disproportion and other malpresentations
- If in doubt about pelvic capacity, perform caesarean section
- If pelvis and presentation are normal, deliver by assisted vacuum extraction.

If the cord is not pulsating and patient is in first or second stage of labour:

- Rule out any contraindication to vaginal delivery (e.g. CPD, mal-presentation)
- Allow labour to progress.

Subsequent Management

- Postpartum and neonatal care as appropriate
- Counsel mother on infant feeding and care, diet, family planning and sexual relationships
- Provide supportive counselling if baby is dead.

Precautions to take in order to avoid complications

Apply any of the following principles prior to definitive management:

- Avoid iatrogenic cord prolapse (correct skill for artificial rupture of membranes –ARM)
- Remove pressure from the cord
- Keep the cord warm
- Refer promptly
- Deliver quickly
- Be prepared for neonatal resuscitation.

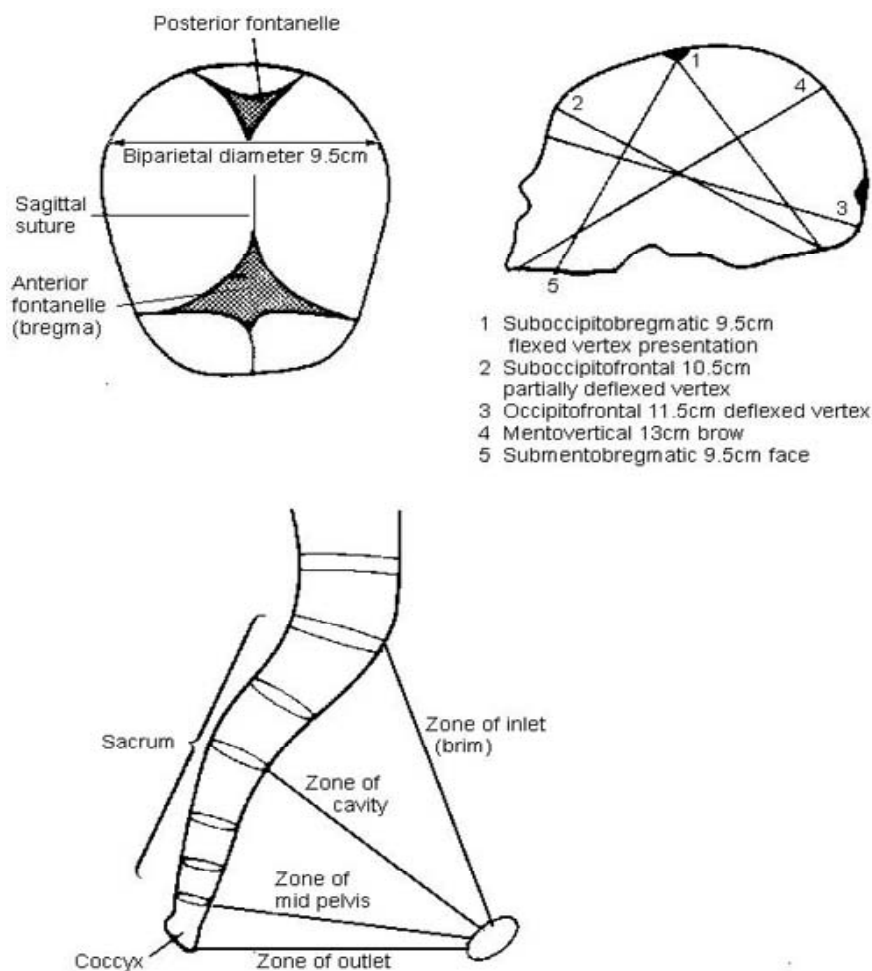
MALPRESENTATIONS AND MALPOSITIONS

Content Outline

1. Anatomical considerations
2. Malpresentation Causes, diagnosis, management and complications
 - Breech
 - Transverse presentation
 - Compound presentation
3. Malposition Causes, diagnosis, management and complications
 - Face presentation

Usually the foetal head engages in the occipito-transverse position. With descent the foetal head rotates so that the occiput is anterior in the maternal pelvis.

Please refer to the anatomy section for better understanding of diameters involved. A summary is given below.



Malpresentation

Malpresentations are all presentations of the foetus other than vertex.

They may occur in the following instances

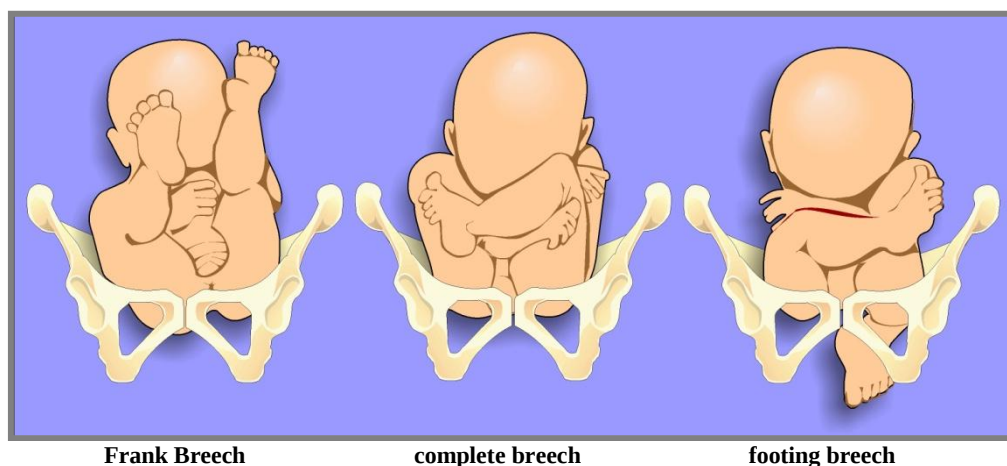
1. Breech presentation
2. Compound presentation
3. Transverse lie and shoulder presentation

Predisposing factors to malpresentation include:

- Prematurity
- Multiple pregnancy
- Abnormalities of the uterus, e.g. fibroids, Partial septate uterus
- Foetal abnormalities
- Placenta praevia

1. Breech presentation

This occurs when the buttocks and /or feet are the presenting part. It is the most common malpresentation; and much more common in preterm labour.



Diagnosis:

The majority are discovered before labour. At this time the head is felt in the upper abdomen and the breech in the pelvic brim. On auscultation the foetal heart tones are heard higher in the abdomen. Approximately one third are diagnosed in labour when the buttocks or feet will be felt during vaginal examination. Presence of thick dark meconium is normal in breech presentation.

Management

1. **External version may be attempted if:** The gestation is at or after 37 weeks, there are no contraindications for vaginal delivery, membranes are intact, amniotic fluid volume is adequate, and there are facilities for Emergency Caesarean section. It may however complicate with placental abruption, foetal bradycardia, knotted or entangled cord, amniotic fluid embolism and foetal or maternal death.
2. **Vaginal assisted breech delivery by an experienced health provider is safe and feasible if:** it is a complete or frank breech, estimated foetal weight is between 2500- 3500, there is adequate pelvic

pelvimetry, the head is well flexed, and there is no history of previous C/S or myomectomy. Approximately 50% women aiming for vaginal delivery will achieve this. Vaginal delivery is contraindicated in case of: Unfavourable pelvis, Macrosomia, Severe prematurity, IUGR, placental insufficiency, Footling breech, Hyperextension of foetal head, Foetal anomalies, Nuchal arm, PROM or non-progressive labour and lack of birth attendant skills

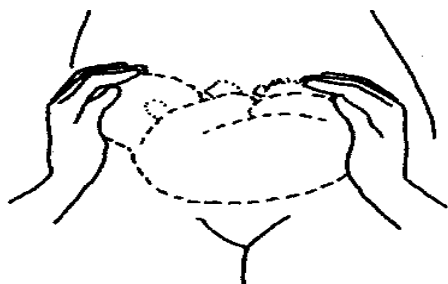
3. **Caesarean section** is safer than assisted vaginal breech delivery and is recommended in case of: double footling breech, small or malformed foetus, very large foetus, previous C/S or myomectomy, and hyper extended / deflexed head.

Foetal complications of breech presentation include:

- Cord prolapse
- Birth trauma e.g. damage to abdominal organs, fractures, shoulder dystocia
- Asphyxia

2. Transverse lie

This occurs when the long axis of the foetus is transverse. In this case the shoulder is typically the presenting part. The amniotic membranes usually rupture early. The cord or arm may prolapse.



Transverse lie

Diagnosis:

This is easily made antenatally when the head is felt in the flank. On vaginal presentation, neither the head nor the breech is felt. Rather the shoulder, elbow, arm or hand may be felt in the vagina.

Management:

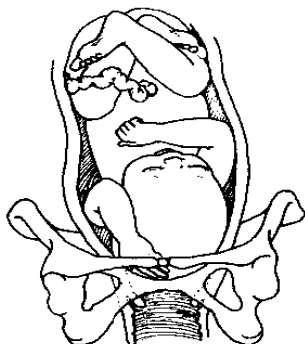
- Internal podalic version is no longer attempted.
- One may attempt external version if the woman is in early labour and the membranes intact
- Otherwise delivery is by Caesarean section
- Refer to health facility capable of providing CEOC.

Complications may include:

- Cord prolapse
- Ruptured uterus

3. Compound Presentation:

This occurs when an arm prolapses alongside the presenting part so that the two are felt simultaneously in the pelvis.



Compound presentation

Diagnosis

Diagnosis is usually in labour when the presenting parts are felt simultaneously on vaginal examination

Management:

1. With the woman in knee chest position, push the arm above the pelvic brim and hold it there until a contraction pushes the head into the pelvis. When this occurs, manage as routine childbirth
2. If procedure fails, cord prolapses or other complications occur, deliver by caesarean section.

MALPOSITION

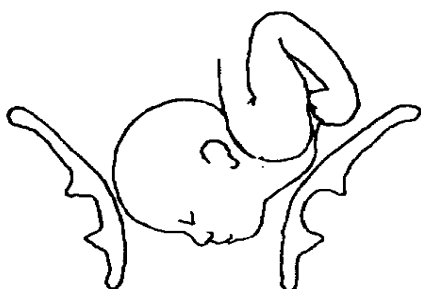
Malpositions are abnormal positions of the vertex of the foetal head relative to the maternal pelvis.

The malpositions discussed are:

1. Face presentation
2. Brow presentation
3. Occiput posterior position and
4. Occiput transverse position

1. Face Presentation:

This occurs when there is hyperextension of the foetal head. It occurs in about 1 in 300 deliveries. The chin serves as the reference point.



Face presentation

Diagnosis:

This is usually done during labour on vaginal examination. At this time the face is palpated with the examiner's fingers entering the mouth easily. The bony jaw is also felt. It is important during examination to distinguish mento-anterior from mento-posterior position. Prolonged labour is common

Management**1. Mento- Anterior position**

- a. Allow to proceed with normal childbirth
- b. If poor progress but no obstruction, augment labour with oxytocin

2. Mento posterior position:

- a. Deliver by Caesarean section (the fully extended head is blocked by the sacrum thus preventing descent)
- b. If foetus dead may perform craniotomy if competent

Vacuum extraction is contraindicated in face presentation.

2. Brow presentation:

This is caused by partial extension of the head. It occurs in about 1: 500 deliveries. It presents the largest diameters (mento- vertical) such that normal delivery is impossible.

**Brow presentation****Diagnosis**

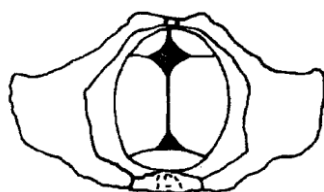
Brow presentation is almost never possible to diagnose before labour begins. Abdominal examination will reveal a high presenting part. On vaginal examination the **anterior** fontanelle may be felt on one side and the orbital (eye) ridges felt on the other side of the presenting part.

Management:

1. If foetus is alive, deliver by caesareans section
2. If foetus is dead and the cervix fully dilated, perform craniotomy if the provider is competent.
3. **Do not** attempt to deliver brow presentation by vacuum extraction, forceps delivery or symphysiotomy!

3. Occiput posterior Position

This is the most common malposition. It occurs in about 10% of women in labour. The occiput-posterior (OP) position results from a poorly flexed vertex. In this case head initially engages normally but then the occiput rotates posteriorly rather than anteriorly. It may occur as a result of a flat sacrum or weak uterine contractions being unable to push the head down into the pelvis with sufficient strength to produce the correct rotation. Occasionally, epidural analgesia relaxes the pelvic floor such that the occiput sinks into it instead of being pushed to the correct position. Typically it results in prolonged labour, foetal distress or obstructed labour.



Occiput posterior

Diagnosis

The patient may complain of Backache and difficulty finding a comfortable position

- On abdominal examination:

The head feels high and very large because the deflexed head is presenting a larger circumference.

There may be a depression at or below the umbilicus. Sometimes the bladder may appear full, because the high head with depression above it looks like a full bladder.

The back of the foetus may be difficult to feel, and the foetal limbs may be palpable anteriorly

- On vaginal examination:

The Anterior fontanelle (four radiating sutures/ diamond shaped) is easily felt towards the pubis. The posterior fontanelle (three radiating sutures) may also be palpable towards the sacrum

Management

Spontaneous rotation to the occiput anterior position occurs in 90% of cases.

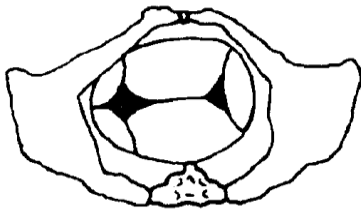
However, close maternal and foetal monitoring is required. The mother may get the urge to push before full dilatation but this must be discouraged.

Ensure that adequate fluids are given to the mother.

1. If there are signs of obstruction or the foetal heart rate is abnormal, deliver by caesarean section
2. If there are no signs of obstruction and foetal heart rate is normal, rupture membranes and augment with oxytocin. Encourage the mother to walk around or change position to facilitate spontaneous rotation
3. If the cervix is fully dilated and the head is engaged, one can perform a vacuum extraction.

4. Occiput-transverse position

This occurs when the occiput is transverse to the maternal pelvis. The head initially engages correctly but fails to rotate and remains in transverse position.



Left occiput transverse

Diagnosis:

On vaginal examination, the anterior and posterior fontanelles are felt on the lateral sides of the pelvis

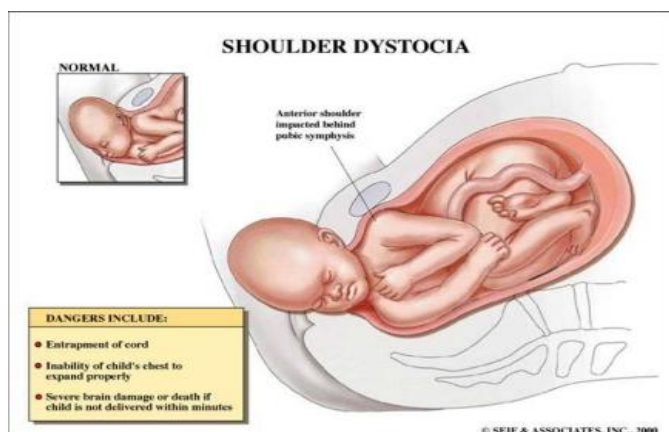
Management

1. If the cervix is fully dilated, the head is engaged and there are no signs of obstruction, the head may be manually rotated with Kielland's forceps or delivered using vacuum extraction. This is contraindicated if there is any foetal acidosis because of the risk of cerebral haemorrhage.
2. Otherwise deliver by caesarean section

SHOULDER DYSTOCIA

Definition

This describes the Impaction of the anterior shoulder against the symphysis pubis after delivery of the fetal head. The overall incidence of shoulder dystocia varies based on foetal weight, occurring in 0.6 to 1.4 percent of all infants with a birth weight of 2,500 g to 4,000 g, increasing to a rate of 5 to 9 percent among foetuses weighing 4,000 to 4,500 g born to mothers without diabetes. However, most cases occur in foetuses of normal birth weight and are not anticipated, limiting the clinical usefulness of risk-factor identification. Shoulder dystocia occurs with equal frequency in primigravid and multigravid women.



Risk factors

Several prenatal and intrapartum factors have been associated with an increased incidence of shoulder dystocia. The single most common risk factor for shoulder dystocia is the use of a vacuum extractor or forceps during delivery. They may be classified as follows:

Maternal

- Abnormal pelvic anatomy
- Gestational diabetes
- Post-dates pregnancy
- Previous shoulder dystocia
- Short stature
- High pre pregnancy weight and increased weight gain
- Abnormal pelvic anatomy

Fetal

- Suspected macrosomia

Labor related

- Assisted vaginal delivery (forceps or vacuum)
- Protracted active phase of first-stage labor
- Protracted second-stage labor
- Prior shoulder dystocia

Diagnosis

The following signs are indicative of possible shoulder dystocia

- The shoulders fail to deliver shortly after the foetal head.
- The fetal head retracts against perineum (**"turtle sign"**)
- The face of the baby becomes erythematous, red and puffy - indicative of facial flushing.
- Gentle traction does not effect delivery

Management:

Shoulder dystocia is an obstetrical emergency, with foetal demise occurring within about 5 minutes if the infant is not delivered, due to compression of the umbilical cord within the birth canal. Several algorithms have been proffered to facilitate rapid delivery in case of shoulder dystocia. The basic principles are similar.

A common treatment algorithm is **ALARMER**; which stands for:

- Ask for help. This involves requesting the help of an obstetrician, a paediatrician for subsequent resuscitation of the infant and anaesthesia in case if surgical intervention.
- Leg hyper flexion (McRoberts' manoeuvre)
- Anterior shoulder disimpaction (apply suprapubic pressure)
- Rubin manoeuvre
- Manual delivery of posterior arm
- Episiotomy
- Roll over on all fours (Gaskin Manoeuvre)

Also commonly used is the **HELPERR Mnemonic**. This is a clinical tool that offers a structured framework for coping with shoulder dystocia. These manoeuvres are designed to do one of three things:

1. Increase the functional size of the bony pelvis through flattening of the lumbar lordosis and cephalad rotation of the symphysis (i.e., the McRoberts manoeuvre);
2. Decrease the bisacromial diameter (i.e., the breadth of the shoulders) of the fetus through application of suprapubic pressure (i.e., internal pressure on the posterior aspect of the impacted shoulder);
3. Change the relationship of the bisacromial diameter within the bony pelvis through internal rotation manoeuvres.

The HELPERR Mnemonic

H Call for help.

This refers to activating the pre-arranged protocol or requesting the appropriate personnel to respond with necessary equipment to the labor and delivery unit.

E Evaluate for episiotomy.

Episiotomy should be considered throughout the management of shoulder dystocia but is necessary only to make more room if rotation maneuvers are required. Shoulder dystocia is a bony impaction, so episiotomy alone will not release the shoulder. Because most cases of shoulder dystocia can be relieved with the McRoberts maneuver and suprapubic pressure, many women can be spared a surgical incision.

L Legs (the McRoberts maneuver)

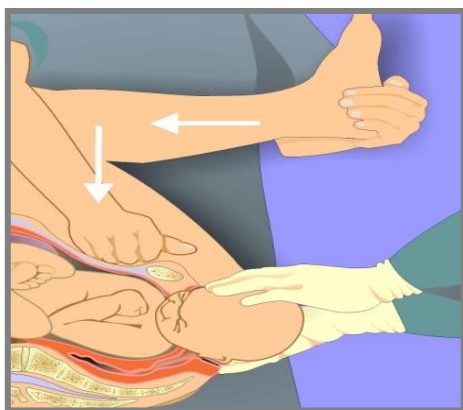
This procedure involves flexing and abducting the maternal hips, positioning the maternal thighs up

onto the maternal abdomen. This in effect straightens the lumbosacral lordosis, Increases AP diameter of pelvis, Flexes the fetal spine and as a result Reduces >40% of shoulder dystocia.

Nurses and family members present at the delivery can provide assistance for this maneuver.

P Suprapubic pressure

The hand of an assistant should be placed suprapubically over the fetal anterior shoulder, applying pressure in a cardiopulmonary resuscitation style with a downward and lateral motion on the posterior aspect of the fetal shoulder. The aim is to adduct the anterior shoulder. This maneuver should be attempted while continuing downward traction. Initially this is continuous, but may involve a rocking motion

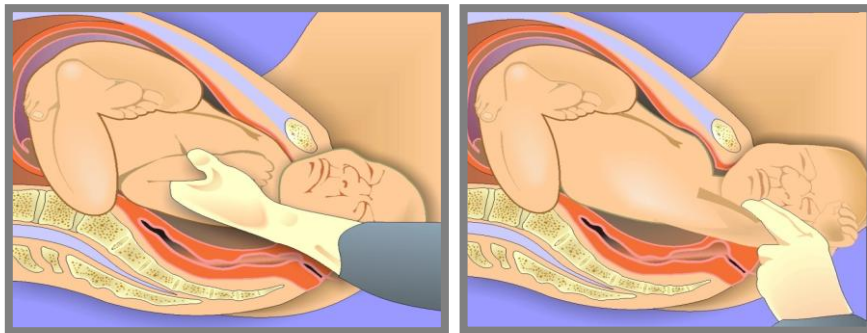


E Enter maneuvers (internal rotation)

These maneuvers attempt to manipulate the fetus to rotate the anterior shoulder into an oblique plane and under the maternal symphysis. In the **Rubin maneuver**, the anterior shoulder should be approached from behind and the scapula adducted and rotated to oblique position. If this fails, the **Woodscrew maneuver (Enter II)** may be applied. In this case the posterior shoulder is approached from the front and gently rotated towards the symphysis pubis. When this fails, the **Reverse woodscrew maneuver (Enter III)** may be applied; In this instance the posterior shoulder is approached from behind and rotated in the opposite direction from Rubin or woodscrew maneuvers. These maneuvers can be difficult to perform when the anterior shoulder is wedged beneath the symphysis. At times, it is necessary to push the fetus up into the pelvis slightly to accomplish the maneuvers. McRoberts maneuver should continue throughout this process.

R Remove the posterior arm.

Removing the posterior arm from the birth canal also shortens the bisacromial diameter, allowing the fetus to drop into the sacral hollow, freeing the impaction. The elbow then should be flexed and the forearm delivered in a sweeping motion over the fetal anterior chest wall. Grasping and pulling directly on the fetal arm may fracture the humerus.



R Roll the patient.

The patient rolls from her existing position to the all-fours position. This usually increases the pelvic diameters. Often, the shoulder will dislodge during the act of turning, so that this movement alone may be sufficient to dislodge the impaction. In addition, once the position change is completed, gravitational forces may aid in the disimpaction of the fetal shoulders.



Manoeuvres of Last Resort for Shoulder Dystocia

Deliberate clavicle fracture

Direct upward pressure on the mid-portion of the fetal clavicle; reduces the shoulder-to-shoulder distance.

Zavanelli maneuver

Cephalic replacement followed by cesarean delivery; involves rotating the fetal head into a direct occiput anterior position, then flexing and pushing the vertex back into the birth canal, while holding continuous upward pressure until cesarean delivery is accomplished. Tocolysis may be a helpful adjunct to this procedure, although it has not been proved to enhance success over cases in which it was not used. An operating team, anesthesiologist, and physicians capable of performing a cesarean delivery must be present, and this maneuver should never be attempted if a nuchal cord previously has been clamped and cut.

Use of General anesthesia

Musculoskeletal or uterine relaxation with halothane (Fluothane) or another general anesthetic may bring about enough uterine relaxation to affect delivery. Oral or intravenous nitroglycerin may be used as an alternative to general anesthesia.

Abdominal surgery with hysterotomy

General anesthesia is induced and cesarean incision performed, after which the surgeon rotates the infant transabdominally through the hysterotomy incision, allowing the shoulders to rotate, much like a Woods

corkscrew maneuver. Vaginal extraction is then accomplished by another physician.

Symphysiotomy

Intentional division of the fibrous cartilage of the symphysis pubis under local anesthesia has been used more widely in developing countries. It should be used only when all other maneuvers have failed and capability of cesarean delivery is unavailable

Complications of Shoulder dystocia:

Maternal

Postpartum hemorrhage –commonest (11%)

Rectovaginal fistula

Symphyseal separation or diathesis, with or without transient femoral neuropathy

Third- or fourth-degree episiotomy or tear with anal sphincter damage

Uterine rupture

Soft tissue injuries

Fetal

Brachial plexus palsy- commonest 3-15%

Clavicle fracture

Fetal death

Fetal hypoxia, with or without permanent neurologic damage

Fracture of the humerus

Prevention

If shoulder dystocia is anticipated on the basis of risk factors, preparatory tasks can be accomplished before delivery. Key personnel can be alerted, and the patient and her family can be educated about the steps that will be taken in the event of a difficult delivery. The patient's bladder should be emptied, and the delivery room cleared of unnecessary clutter to make room for additional personnel and equipment.

One method of preliminary intervention for shoulder dystocia in a patient with risk factors involves implementing the “head and shoulder manoeuvre” to “deliver through” until the anterior shoulder is visible. This step is accomplished by continuing the momentum of the foetal head delivery until the shoulder is visible. After controlled delivery of the head, the physician proceeds with immediate delivery of the anterior shoulder without stopping to suction the oropharynx.

Glycaemia control and weight control for at risk patients is also helpful in preventing foetal macrosomia. Patients may also be encouraged to deliver in alternative positions that favour increased pelvic diameters.

VACUUM EXTRACTION (V E)

Introduction

Assisted delivery is an important skill for managing second stage of labour. Presently, both the forceps and the vacuum extractor are in use as delivery instruments.

The retirement of classically trained obstetricians, the inability to conduct training operations, the medical-legal climate, and other changes in practice, including the high incidence of caesarean deliveries, now collectively contribute to a reduction in utilisation of all types of instrumental delivery, including vacuum extraction. Yet, a need still remains for delivery assistance that can be safely and expeditiously provided by an instrumental delivery while avoiding the risk and expense of a caesarean operation.

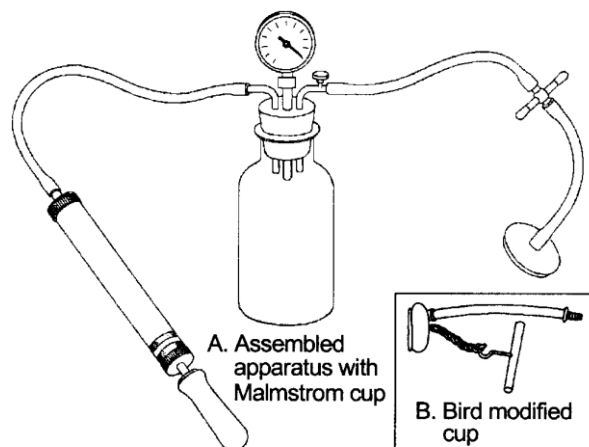
Over the recent decade, VE has progressively replaced forceps as the assisted delivery approach of choice for many practitioners in Kenya.

A successful extraction requires the vaginal application of a cup to the foetal head, a means to apply traction, and the ability to periodically reinforce the vacuum.

The vacuum Extractor

Modern extractors are constructed of varied materials including polyethylene or silastic and stainless steel. Several features are found in all VE designs. These include:

- A mushroom shaped vacuum cup of varied composition and depth
- A cup including a fixed internal vacuum grid or guard
- A combined vacuum pump / handle or a vacuum port to permit a vacuum hose attachment
- A handle, wire or chain for traction



Prerequisites for vacuum

1. Informed consent is required for any surgical procedure, including an instrumental delivery. The process involves an explanation of the need for the operation, a discussion of risks and benefits, and a presentation of alternative modes of treatment, and an opportunity for the patient to ask questions
2. The clinician must be competent in the use of the vacuum extractor and knowledgeable of the VE indications. Most importantly, they must be prepared to reconsider or abandon any operation that proves difficult.

3. The pregnancy should be term, the foetus alive or FSB (foetal heart stopped during labour) and in vertex presentation
4. The patient should have an empty bladder either by catheterization or spontaneous voiding, full cervical dilation, ruptured membranes, an engaged foetal head, and no suspicion of cephalopelvic disproportion.

Indications for Vacuum extraction

Maternal indications

- **Prolonged second stage of labour** (In general, second stages of more than 2 hours without epidural anaesthesia and 3 hours with are the acceptable measures for nulliparas. One hour less in each category is the limit for multiparas). This may occur in case of: Drug-induced analgesia, Maternal exhaustion or Soft tissue resistance with failure to descend
- **Shortening of the second stage of labour:** This may be necessary in case of Maternal illness (e.g. cardio-respiratory, neuromuscular, cerebrovascular when voluntary expulsive efforts are contraindicated); Haemorrhage; Severe Pre eclampsia.
- **Presumed foetal jeopardy/foetal distress:** That is in case of Foetal compromise necessitating immediate delivery in 2nd stage or Non-reassuring FHR tracing. For most practitioners however, cord prolapse, abruptio placentae, or persistent bradycardia at a high station, even at full dilation with an engaged head are best managed by caesarean delivery.

Contraindications to Vacuum Extraction

Vacuum operation is contraindicated in the following instances:

- Operator inexperience
- Inability to achieve a correct application
- An inadequate trial of labour
- Lack of a standard indication
- Gestational age less than 37 weeks
- Uncertainty concerning foetal position and station
- Known or suspected foetal coagulation defects
- Suspicion of cephalopelvic disproportion
- Non-vertex presentation(e.g. breech, face, brow)
- Absence of contractions
- Incomplete cervical dilation
- Unengaged head

Relative contraindications are as follows:

- Prematurity (foetus <36 wk gestation): Vacuum extraction (VE) applications are not recommended at less than 36 weeks' gestation. The physics of scalp entrapment by the cup mechanism and the known fragility of intracranial vascular structures in the premature infant mitigate against such applications unless special circumstances exist.

- **Prior failed forceps:** Prior failed forceps is usually a contraindication to any VE effort. As a practical matter, the forceps can generate more traction force than the VE. Thus, to follow a forceps effort with a VE trial is not inherently reasonable unless circumstances have prevented the successful application of a forceps before traction has been attempted.
- **Overlapping cranial bones, heavy caput:** Overlap of cranial bones, the inability to palpate the standard landmarks, and cranial oedema (caput/cephalohematoma) are suggestive of at least relative disproportion. When these findings are combined with poor progress, the clinician may find that the presenting part is substantially higher than initially anticipated. True disproportion may be present, precluding any vaginal trial.
- **Known or suspected foetal macrosomia:** A large infant (estimated foetal weight >4,500 g in a non-diabetic) can only be considered as a relative contraindication to instrumental delivery. This is primarily because inaccuracies in estimation of foetal bulk.

The process of Vacuum Extraction:

The ABCDEFGHIJ Mnemonic has been used to facilitate the remembering of the steps in VE. These can be summarised as follows

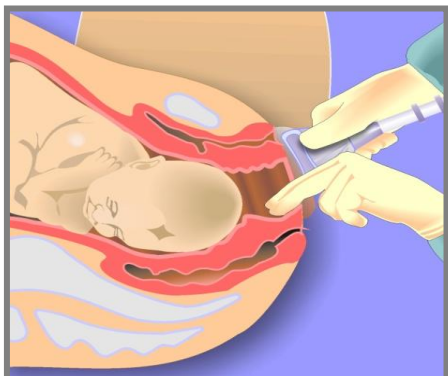
A: **Ask** for help; **Address** the patient (counsel on procedure and obtain informed consent); ensure adequate **Anaesthesia** as necessary

B: Empty the **Bladder**

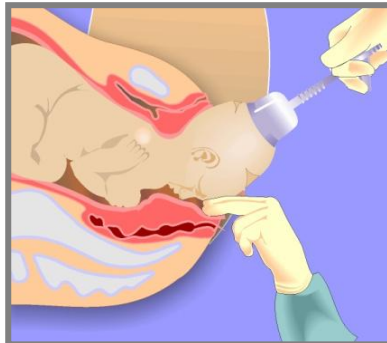
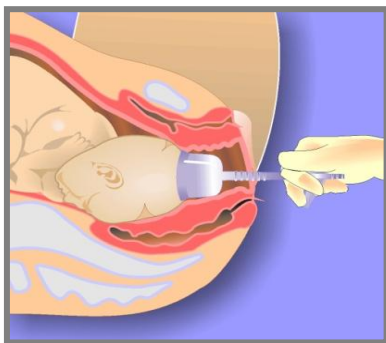
C: Confirm that the **Cervix** is fully dilated

E: Prepare the **Equipment** and **Extractor** ensuring that they are ready to use

F: Apply the vacuum cup over sagittal suture 3cm in front of posterior **Fontanel**. This is known as the “**Flexion point**” – (proper application results in flexion of foetal head when traction applied). During insertion the cup needs to be compressed (see diagram below)



G: Apply **Gentle traction** at right angles to plane of cup only during contractions. Note that Bending, rotary force, or paramedian application will cause detachment!! (See diagrams below)

**H= Halt**

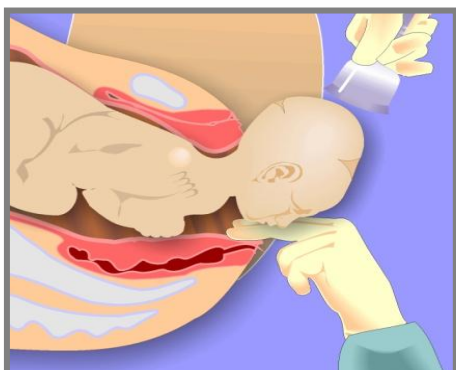
- Further attempts at vacuum extraction should be stopped in the following circumstances:
Halt traction after a contraction and Reduce pressure between contractions
- **Halt** procedure if there is:
 - Disengagement of cup 3 times
 - No progress in 3 consecutive pulls
 - Total time that has elapsed after application is more than 20 minutes– foetal injuries increase after 10 minutes of application time

I= Incision

Evaluate for **Incision** (episiotomy) when the head is being delivered. An episiotomy may not be necessary for vacuum per se, but in case of subsequent shoulder dystocia or difficult delivery

J = Jaw

It is recommended that the vacuum cup is removed when the **Jaw** is reachable (see below)

**Complications of vacuum Extraction****Foetal**

The following foetal complications may occur as a result of vacuum extraction:

- Small increase in cephalohematoma
- Haemorrhage: (Subgaleal haemorrhage; Subarachnoid bleeding; Retinal haemorrhage)
- Neonatal injury (linear occult cranial fractures; Scalp bruising or lacerations)
- Oedema of the scalp
- Neonatal death

Maternal complications.

These may include:

1. Maternal perineal lacerations or tears
2. Rectal injuries involving anal sphincter injury and Stress urinary and anal incontinence

CAESAREAN SECTION

Outline:

- Definition
- Indications
- Types of C/ Section
- Patient evaluation
- The Caesarean section Procedure
- Post operative care
- Complications of Caesarean Section

Definition

A **Caesarean section** also **C-section**, etc., is a surgical procedure in which one or more incisions are made through a mother's abdomen (laparotomy) and uterus (hysterotomy) to deliver one or more babies, or, rarely, to remove a dead fetus. Surgical delivery of a previsible foetus using Caesarean section procedures is termed **hysterotomy**.

Indications for Caesarean Section:

These may be divided into maternal, foetal or combined.

A) Maternal Indications

1. Previous uterine scar
 - a. Previous Lower Uterine Segment C/S due to a recurring reason e.g. contracted pelvis or a previous scar with a concomitant obstetric complication
 - b. History of two (2) or more previous C/S
 - c. After High vertical /classical C/S
 - d. Previous ruptured uterus
 - e. Previous myomectomy
2. Severe Pre eclampsia (PET) or eclampsia with unfavourable cervix
3. Life-threatening antepartum haemorrhage (APH) or Placenta praevia type IIb-IV
4. Contracted pelvis (congenital, fracture)
5. Following repair of obstetric fistula (VVF, RVF)
6. Medical illness; severe heart or respiratory disease, severe hypertension, cerebral aneurysm, musculoskeletal disorders, severe neurological disorders (C/S is then safer than vaginal delivery).
7. Prolonged labour, uterine inertia, cervical dystocia and failed induction
8. Pelvic tumours obstructing labour (fibroids, entrapped ovarian tumour, genital warts)
9. Invasive carcinoma of the cervix
10. Infections: (HIV, active Herpes Simplex Virus II, Human Papilloma Virus, Hepatitis B Virus)

Relative indications

C/ Section may also be considered in the following conditions

1. Postdatism
2. Elderly primigravida
3. Prior infertility
4. Bad obstetric history

B) Foetal

1. Foetal distress /Poor biophysical profile score
2. Malpresentation and malposition;
3. Cord presentation and/or cord prolapse
4. Multiple pregnancy: (1st non-cephalic, retained 2nd twin, extreme prematurity, discordant foetal growth, single amniotic sac, conjoined twins, >2 foetuses)
5. Foetal Macrosomia: estimated weight > 4000g
6. Foetal anomalies: (e.g. hydrocephalus, sacral tumour, Conjoined twins)
7. Others: (e.g. Intrauterine Growth Retardation, oligohydramnios)

C) Feto-maternal

- 1) Failure to progress in labour
- 2) Perimortem C/ Section
- 3) Lack of competency by service provider in assisted delivery techniques

Types of C/S**Based on timing of the operation, C Section maybe:**

- a) Elective C/S (planned procedure) or
- b) Emergency C/S

Based on uterine incision

- a) Transverse lower uterine segment C/S (Kerr)
- b) Classical (vertical upper uterine segment C/S). This type of C/S is associated with more bleeding, cutting of the sutures through during uterine repair, poor healing hence higher likelihood of scar dehiscence even before labour, and higher likelihood of adhesions that may cause intestinal obstruction. All subsequent deliveries following classical C/S must be by elective C/S.

Patient Evaluation

Patient evaluation follows the steps of history taking, physical examination and laboratory investigations.

- History
 - Past surgical, medical, obstetric, gynaecologic
 - Length of labour, rupture of membranes
 - Medications, allergies, transfusions, anaesthetic reactions
- Physical Exam
 - Vaginal exam before initial incision
- Labs
 - Haemoglobin, blood group and Rhesus factor,
 - HIV

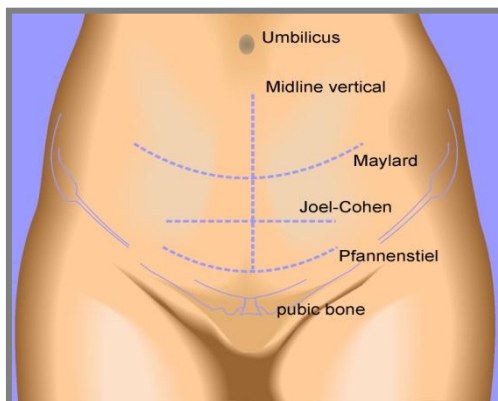
Procedure for C/S**Preoperative Preparation**

- i. For elective C/S, review the indication and ascertain foetal maturity through review of mother – baby booklet (history of early ANC), physical examination and early U/S scan.
- ii. Obtain informed written consent (explain to patient the procedure)
- iii. Review lab results for Hb and U/E. Draw blood for group and cross-match.
- iv. Give a sedative/anxiolytic the night before surgery
- v. In the morning of surgery, ask the patient to take a warm bath.

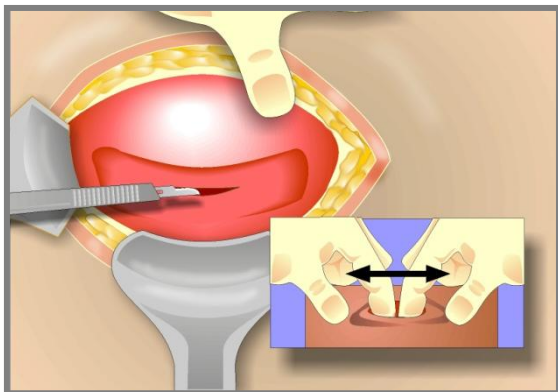
- vi. Take preoperative observations and urinalysis (sugar, protein)
- vii. Premedicate with atropine sulphate 0.6mg ½-h before theatre (hyoscine in cardiac disease)

In Theatre

- i. Perform aseptic catheterization of the urinary bladder
- ii. Place the patient on the operating table in supine position with a 15° left lateral tilt
- iii. After scrubbing, the surgical team must ensure that the subsequent steps are aseptic.
- iv. Clean the abdomen with antiseptic solution and drape
- v. Provide anaesthesia (spinal is preferable to general), maintaining 100% O₂ until delivery. Give prophylactic antibiotics.
- vi. Abdominal incision (Pfannenstiel, midline sub umbilical); skin, subcutaneous tissue/fat, rectus sheath, muscle, extra peritoneal fat, peritoneum

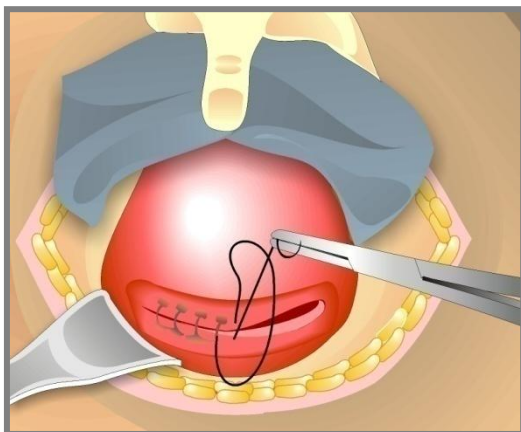


- vii. Pack the paracolic gutters and retract bladder downwards (Doyens retractor)
- viii. Reflect uterovesical peritoneum and push bladder away
- ix. Delicately incise the lower uterine segment and extend the incision with your fingers.



Low uterine segment Caesarean section

- x. Deliver the foetus and give oxytocin 10IU.
- xi. Use Green-Amytage forceps to clamp the midpoint of lower edge of uterine incision and the bleeding points.
- xii. For elective C/S, dilate the cervix manually.
- xiii. Close the uterus in 1 or 2 layers.



Closing the uterus

- xiv. Inspect the adnexae and abdominal organs, perform BTL if indicated
- xv. Close the abdomen in layers

Post-operative Care

- i. Where available, provide continuous monitoring for vital signs otherwise take observations quarter hourly until fully awake then 4-hourly
- ii. Give IV fluids, at least 3 litres per day.
- iii. Introduce oral fluids early (6h) then solid food gradually
- iv. Pain control- opioids e.g. pethidine 50-100mg 8 hourly for 24-36 hours then non-opioids.
- v. Continue antibiotics
- vi. Inspect wound on 3rd-4th postoperative day and discharge in the absence of complications. Counsel on postnatal care, FP, timing and mode of delivery of subsequent pregnancy.

Complications

Maternal Complications

Immediate

- i. Anaesthetic - difficult intubation, Mendelson's syndrome, hypotension, spinal headache
- ii. Haemorrhage – lacerations, uterine atony, placenta praevia or accreta
- iii. Complications of blood transfusion
- iv. GI and urinary tract injuries
- v. Death (risk of death is 7x that of vaginal delivery)

Late

- i. General post-op. complications; atelectasis, pneumonia, paralytic ileus, UTI, thromboembolism
- ii. Infection (endometritis, wound infection)
- iii. Intestinal obstruction (adhesions especially after classical)
- iv. Uterine scar dehiscence /rupture in subsequent pregnancy (10x more likely in classical than LUSCS)
- v. Chronic abdominal pain

Fetal Complications

- i. Prematurity
- ii. Respiratory depression
- iii. Intracranial haemorrhage (due to small incision)

VAGINAL BIRTH AFTER CAESAREAN SECTION (VBAC) - Also commonly referred to as Trial of scar**Conditions for trial of scar**

- i. Only one previous C/S which must be LUSCS
- ii. Non-recurring indication for previous C/S; foetal distress, cord prolapse, malpresentation, placenta praevia etc.
- iii. No post-operative sepsis after previous C/S
- iv. Parity <5
- v. Cephalic presentation
- vi. Estimated foetal weight $\leq 3500\text{g}$
- vii. Adequate pelvis with true conjugate $\geq 10.5\text{cm}$
- viii. No other indication for C/S
- ix. Facilities for blood transfusion available
- x. Ready theatre, available immediately

Predictors of successful trial of labour

1. Prior vaginal delivery
2. Prior VBAC
3. Spontaneous labour
4. Favourable cervix
5. Non recurring indications like breech, praevia, herpes
6. Preterm delivery

Predictor of decreased chances of success

1. Maternal obesity
2. Short maternal stature
3. Macrosomia
4. Increase maternal age >40yrs
5. Recurring indications e.g. CPD, failed second stage
6. Gestational age >41wks
7. Pre-conceptional or gestational diabetes mellitus
8. Increased inter-pregnancy weight gain

Increased rate of uterine rupture

1. Classical hysterotomy
2. Single layer closure
3. Induction of labour
4. Use of prostaglandins
5. Short inter-pregnancy interval
6. Infection at prior C/S

Management

- a. Early ANC (first half of pregnancy)
- b. Review history
- c. Obstetric U/S scan in first half of pregnancy
- d. ANP
- e. Counsel patient on the risks and benefits of undergoing trial of scar

- f. Pelvic assessment at 36 weeks; clinical/radiological
- g. Estimate weight of baby
- h. Admit in early labour
- i. IV line and GXM
- j. Consent for C/S
- k. Partograph (pulse, BP, FHR, contractions, descent, cervical dilatation, colour of liquor, PV bleed)

Clinically, observe the patient closely for signs of uterine rupture. Harbingers of uterine rupture are as follows:

- Acute abdominal pain
- A "popping" sensation
- Palpation of foetal parts outside the uterus upon Leopold maneuvers
- Foetal heart rate deceleration and bradycardia
- High presenting part on vaginal examination
- Vaginal bleeding

Treat any of these findings as uterine rupture until another source for the finding has been identified. Rupture requires immediate delivery.

PERIMORTEM CAESAREAN SECTION

This is a C/S performed when the survival of the mother is in doubt. Previously referred to as post-mortem C/S but has changed due to recent advances in cardiopulmonary resuscitation and neonatal intensive care which has improved the potential for survival of both the mother and foetus.

Offers improved chance of infant survival and increases chances of maternal recovery (relieves aortocaval compression). CPR must continue and delivery fast (within 1 minute) via midline sub umbilical incision.

Not commonly performed due to difficulty in making timely decision.

About 50% of all reported cases have yielded a live neonate. Perinatal outcome is directly related to:

- i. Gestational age
- ii. Duration since maternal collapse/death with best results if within 4 min and no survival after 25 min (<5 excellent, 5-10 good, 10-15 fair, 15-20 poor, 20-25 unlikely).
- iii. Nature of maternal insult (better foetal prognosis following sudden death of a healthy mother or one on life support awaiting foetal viability than after prolonged or debilitating illness)
- iv. Availability of neonatal intensive care facilities

Obtain consent from relatives if available. This practice has received some criticism however no physician has been found liable, yet!

Destructive obstetric procedures

Destructive delivery – also known as embryotomy – is usually indicated for delivery of a dead foetus vaginally. It must always be performed with the mothers consent.

There are in principle three acknowledged types of embryotomy:

- 1) **Craniotomy** – This is perforation of the skull and emptying the head of brain tissue so that the head collapses. It is used when the fetus presents with the head or in a case of retained head in a breech. It is mainly applicable if the fetus is dead and there is CPD or hydrocephalus
- 2) **Decapitation** – This involves cutting the neck and separating the head from the trunk. It is for management of IUFD in cases of neglected obstructive labour with shoulder presentation.
- 3) **Evisceration** – perforation of the truncus (chest or abdomen) with removal of all internal organs so that the body collapses and a version and extraction can be done without the risk of rupturing the uterus. It is used when decapitation is not possible as in a transverse presentation

TARGETED POSTNATAL CARE

Content Outline

- Definition of postnatal care
- Aims of postnatal care
- Rationale of postnatal care
- Elements of targeted postnatal care
- Timing of postnatal care
- Management of Normal Puerperium

What is postnatal care?

The postnatal period is the time beginning immediately after the birth of a baby and extending for about six weeks thereafter. Another term commonly used is the **postpartum period**, which refers to the mother (whereas postnatal refers to the infant). Less frequently used is the **puerperium**. Biologically, it is the time after birth when the mother's body, including her hormone levels and uterus size, return to pre-pregnancy conditions.

Postnatal care is given by a skilled attendant to meet the needs of both the mother and the baby from birth to reduce their risk of morbidity and mortality as well as to promote the health and wellbeing of the mother and baby. Postpartum care is care given to the mother from the time of placental expulsion up to 6 weeks after delivery.

Epidemiology:

Globally over 500,000 women die as a result of pregnancy related conditions. About 60% of these deaths occur within the first week following childbirth. One million newborn deaths occur within the first 24 hours after birth and 75% of neonatal deaths occur during the first week of life. Almost two thirds of infant deaths occur in the first month of life. The situation is similar in Kenya with most maternal and newborn deaths occurring in the early postnatal period. Currently in Kenya Neonatal mortality rate is contributing to 60% of infant mortality rate.

When do maternal and newborn deaths occur, and why?

Mother	Day 1	Day 2-4	Day 5-7	Day 8 - 14	Day 15 - 42
Post Partum Hemorrhage					
Pregnancy Induced Hypertension					
Sepsis					
Newborn					
Asphyxia					
Trauma					
LBW/small					
Sepsis					
Tetanus					

To significantly reduce maternal and neonatal mortality, greater attention must be given to post partum and postnatal care

Elements of targeted postnatal care

These include the following:

Maternal care:

- Health promotion using health messages and counselling (e.g. on nutrition and resumption of sexual activity)
- Assist the mother and her family to develop a personalised PNC plan
- Provision of Essential postpartum care by a skilled attendant
- Early detection of danger signs and treatment of problems
- Prevention of mother to child transmission of HIV (PMTCT)
- Emergency Preparedness and Complication readiness
- Counselling and service provision for Postpartum FP / healthy timing and spacing of pregnancy
- Screening for other conditions e. g cervical cancer, breast cancer, STI/RTI's

Newborn care:

- Provision of Essential Care of the Newborn.
- Counselling on infant and young child feeding
- Early detection of danger signs and treatment of problems
- Immunisation.

Schedule of targeted postnatal care visits

Targeted postnatal care is an approach, which defines a set of postnatal care services delivered to both the mother and baby in a minimum of four visits spread throughout the first six months.

The recommended schedule for Kenya is as follows:

1. Within 48 hours
2. 1 to 2 weeks
3. 4 to 6 weeks
4. 4 to 6 months

History taking

At each postpartum assessment the history taking should include questions on:

- The mode and place of delivery; who assisted during childbirth; Any complications/problems that occurred during pregnancy, labour and delivery;
- Whether she is experiencing any of the following:
 - Excessive tiredness,
 - Fever,
 - Sleep disturbances etc;
- Whether she is practicing exclusive breastfeeding or using breast milk substitutes, and If she has breast problems
 - (Painful nipples or breast, engorgement, cracked nipples),
- If she has any problems of the lower limbs
 - (Varicose veins or swelling deep in the calf or thigh muscles)
- Whether she is experiencing any bowel and /or urinary problems
 - (Constipation /diarrhoea, dysuria, haematuria or frequent micturition);
- Whether lochia is still present, its colour, amount and odour and whether menses have resumed;
- If she is experiencing any pain or tenderness over the pelvic region/lower abdomen;
- If she has resumed sexual activity and whether there is any problem;
- And whether she is using or would wish to initiate any family planning method

The initial assessment should be carried out as soon as possible after delivery. In case of a facility birth, the mother and baby should be checked again before discharge. Where delivery has occurred at home, both mother and baby should be reviewed by a skilled provider as soon as possible within 24/48 hours

TARGETED POSTNATAL CARE

Targeted postnatal care is an approach, which defines a set of postnatal care services delivered to both the mother and baby in a minimum of four visits spread throughout the first 6 months.

Key elements and timing of Postnatal care for the mother and Baby:

Timing	Mother	Baby
Within 24 - 48 hours*	Check / perform: • Mental status assessment • Physical assessment: Pallor, Temperature, Blood Pressure, uterine involution, • Inspection of the C/S wound- if present- for bleeding • Assess lochia and blood loss • Breast examination for establishment of lactation, • Calf tenderness • Record in PNC register and mother Child booklet Provide: • Pain management • Screening for TB and treat as appropriate • Vitamin A (200 000 iu) • Iron/folic acid supplements • LLITN • Treat or refer if any complications are detected • Appropriate FP method • If HIV positive give ARV's for prophylaxis or treatment Counsel on: • HIV Counselling and testing /re-testing • FP Counselling (healthy Timing & spacing of pregnancy) Advice on; • Danger signs for mother • Personal hygiene and hand washing, • Breast care • Exercises • Care of the perineum • Harmful practices • Maternal nutrition • Use of Insecticide Treated Nets. • Return date	Check / perform: • Apgar scoring • Take temperature • Take and record birth weight • Head to toe examination • Assess for danger signs for baby • Observe a breast feed • Record in PNC register and mother Child booklet Provide: • Ensure warmth and put hat on baby • Delay baby's first bath for the first 24 hours • If pre term encourage skin-to-skin care • Encourage early initiation of, and exclusive breastfeeding • Tetracycline eye ointment 1% • Vitamin K • Immunization (BCG & birth Polio) • Infant prophylaxis for HIV as indicated • Treat or refer the infant if any complications are detected • Encourage and facilitate birth registration Counsel on: • Cord care • Hand washing for care giver • Return date

Key elements and timing of Postnatal care for the mother and Baby:

Timing	Mother	Baby
Within 1-2 weeks	Check /perform: • Mental status • Pallor, BP, temperature, pulse rate • Lochia loss- (colour, amount, smell) • Assess for calf tenderness • Infection /pus from C/S site or perineal wound • Breast condition • Uterine involution • Observe a breast feed • Record in PNC register and Mother Child booklet Provide: • Vitamin A supplementation (if not yet given) • Haematinics • LLITN (if not yet given) • Treatment for any complications detected • Referral as appropriate Counsel on: • Danger signs for mother • CT for HIV • Family Planning / HTSP • Maternal Nutrition • Personal hygiene and hand washing for caregiver • Breast care and Exclusive breast feeding • Harmful practices • Cervical cancer screening • Return date	Check /perform: • Growth monitoring; chart weight • Head to toe examination • Assess for danger signs for baby • Check eyes for discharge • Immunisation status • Observe a breast feed • Record in PNC register and Mother Child booklet Provide: • Vitamin A if not yet given • Immunisations if not yet started • INH prophylaxis as appropriate • Treatment of any complications detected • Referral as appropriate • Birth registration if not yet done Counsel mother on: • Danger signs for Baby • Exclusive breast feeding • Hand washing for caregiver • Keeping baby warm • Cord care • Adherence to ARV prophylaxis as appropriate • Return date

Key elements and timing of Postnatal care for the mother and Baby:

Timing	Mother	Baby
4 -6 weeks	Check: • General condition of mother • Mental status • BP, Weight, temperature • Uterine involution • Lochia (amount /colour) • Observe a breast feed • Record in PNC register and Mother Child booklet Provide: • FP method of choice • CT for HIV • Screening for cervical • Clinical breast examination • Screening for STI/ RTI • Screen for TB • Treatment for any complications detected • Referral as appropriate Counsel on: • Danger signs for the mother • Exclusive breast feeding and Breast care • Family Planning (HTSP) • Maternal nutrition • Harmful practices • Personal hygiene and hand washing for the caregiver • Return date	Check: • Growth monitoring; chart weight • Head to toe examination • Assess for danger signs for baby • Immunisation status • Record in Integrated register and Mother Child booklet Provide: • Immunizations as per schedule • INH prophylaxis as appropriate • Treatment of any complications detected • Referral as appropriate • Early infant diagnosis (EID) for HIV • Management of HIV positive infant • Birth registration if not yet done Counsel mother on: • Danger signs for Baby • Exclusive breast feeding • Hand washing for caregiver • Hygiene • Return date
4 - 6 months	Check: • General health of mother Provide: • FP method of choice • Screening for RTI /STI • Screening for cervical cancer –if not done • Screening for TB • Clinical Breast examination • CT for HIV • Treat any complications that are detected • Refer as appropriate • Record in PNC register and Mother Child booklet Counsel on: • Continued breast feeding • Complimentary feeding • Maternal Nutrition • Harmful practices • Family Planning /HTSP • Hygiene and hand washing for the caregiver	Check: • Growth monitoring; chart weight • Head to toe examination • Assess for danger signs for baby • Immunisation status Provide: • Vitamin A supplementation • Immunizations as per schedule • INH prophylaxis as appropriate • Treatment of any complications detected • Referral as appropriate • Birth registration if not yet done • Record in Integrated Register and Mother Child booklet Counsel mother on: • Danger signs for Baby • Hand washing for caregiver • Continued breast feeding • Complementary feeding • Treatment adherence for HIV positive infant
	*The first assessment should be carried as soon as possible after deliver. If facility birth the mother and baby should be checked at 1 hr, 6 hrs and again before discharge. If home delivery refer to health facility as soon as possible within 24/48 hours	

MANAGEMENT OF THE NORMAL PUERPERIUM

In the early postpartum period there may be a slight deviation of the vital signs from the normal; however these should return to their normal levels within 72 hours.

General condition:

Ensure that the patient is feeling well and relaxed, has no signs of anaemia or jaundice, The vital signs of temperature, pulse, BP and respiration are within normal range, and the uterus is well contracted. While the mother should be encouraged to rest adequately, early ambulation and exercise should be encouraged.

Lochia

The colour of the lochia varies with the involution of the uterus and is referred to as:

Rubra- red (Day 0-3), **Serosa**- yellow (Day 3-7) **Alba**- white (Day 7-14)

Normal lochia does not have an offensive odour

Perineum

Initially there may be vulval oedema.

Signs of infection include redness, persistent swelling, presence of pus and severe pain

Ensure that the episiotomy or any tears /lacerations are repaired and healing;

Note that delayed healing may be a sign of infection

The mother needs to be counselled on hygienic perineal toilet and safe disposal of sanitary wear.

Breast

Usually the breasts are soft on palpation during the first 24 hours post delivery; there may or may not be any colostrums at this time. But by day 3 they normally becomes swollen, warm and increased vascularity is demonstrated.

From Day 2-4, milk secretion is established in most cases.

It is important that the mother is shown the correct technique for proper positioning of the baby and attachment to avoid cracking of the nipples. (Refer to the breastfeeding guidelines in the Essential newborn care section)

Appetite

This is usually good although it may be reduced if the woman is constipated around day 3

Excretion

Urine output, urination and passage of motions is usually normal; however these need to be monitored and the mother encouraged to void regularly.

Counselling on postpartum care and hygiene

It is important that after delivery the woman is counselled comprehensively on the following topics:

- Explain the importance of having someone nearby for the first 24 hours/subsequent few days to monitor any change in her condition
- Nutrition counselling should include: the importance of eating more and healthier foods and drinking plenty of fluids. Explore and dispel any myths on particular food taboos. (For details refer to Nutrition section of this manual)
- Counsel the woman on the importance of maintaining personal hygiene. This includes discussing with women the type of pads they will use, the frequency of changing the sanitary wear (4 to 6 hourly) and their disposal;
- Counsel the woman on how to care for the perineum (or episiotomy) when she goes home, taking into consideration her home environment. She needs to know the importance of not inserting anything into the vagina
- Hand washing is particularly important to prevent infection. This is also imperative when handling the baby.
- Advise her to avoid sexual intercourse until the perineal wound has healed
- Discuss return to fertility – (as soon as 4 weeks after delivery if not exclusive breast feeding)
- Discuss breast care (and infant feeding) and the importance of exclusive breast-feeding).
- Discuss the importance of the home environment for promoting the health of the baby and recovery of the mother. For example, discuss the need for warmth, good ventilation and hygiene for both mother and baby.
- If the client does not know her HIV status, she should be counselled and tested for HIV. Her Partner or spouse will also need HIV counselling and testing.
- Obtain her contacts for follow-up after delivery: at least two to three days, 6-7 days and 4-6 weeks. If she has any problems (e.g. LBW or mothers living with HIV) she should have two or three additional visits to the routine.
- Advise her on Pelvic floor exercise to strengthen the perineal muscles.

Recognition of danger signs

In addition, the woman should be counselled on recognition of danger signs of the puerperium. SHE SHOULD NOT WAIT IF SHE HAS ANY OF THESE SIGNS but should proceed directly to the hospital.

- Increased vaginal bleeding (more than 2 or 3 pads soaked in 20-30 minutes after delivery OR bleeding increases rather than decreases after delivery)
- Fits (convulsions)
- Fast or difficult breathing
- Fever and
- Excessive body weakness (e.g. too weak to get out of bed)
- Severe abdominal pain
- Severe headaches with blurred vision

In addition advise woman to go to the health centre as soon as possible if she has any of the following signs:

- Swollen, red or tender breasts or nipples
- Problems urinating, or leaking of urine and/or faeces
- Increased pain in the perineum
- Infection in the area of the wound (redness, swelling, pain, or pus in wound site)
- Foul smelling vaginal discharge.

Essential Care of the Newborn – (Details may be found in the guidelines for Essential Newborn Care).

The key interventions include:

- Keeping the baby warm to prevent hypothermia
- Promotion, protection and support for early initiation and exclusive breastfeeding
- Monitoring and assessment of well-being and detection of complications
- Infection prevention and hygienic practices (cord/ eye care, hand washing by the caregiver, and safe disposal of baby's stool)
- Avoiding contact with sick family members
- Advise the mother and household on recognition of danger signs and emergency preparedness
- Give routine immunization and counsel mothers on immunization according to DVI schedule
- Provide Vitamin A supplementation at six months
- Continuing health education and promotion for the caregiver

Enhancing the mother-child relationship (Bonding)

It is important to enhance the mother's self confidence as she assumes her role after delivery especially if she is a primigravida. This self-confidence will in turn enhance the bond between the mother and the baby.

The provider should:

- Maintain a supportive non judgmental attitude
- Encourage the mother to handle her baby frequently, and talk to the baby while looking into their faces
- Encourage mother to assume responsibility for their baby and gradually involve other family members in the new baby's care.
- Encourage Mother to make time for themselves and to resume some social contacts
- Encourage mother to feel free to discuss and share information with other mothers while taking care that they are not misled by myths and misconceptions about the postnatal period and baby care.
- Praise the mother liberally for any positive steps she takes.
- Provide all information to the mother in an un-hurried way and repeat any instructions

Post partum blues (Baby blues) (see section on mental health for details)

Many women find themselves crying easily and feeling overwhelmed by the many responsibilities. Hormonal shifts and exhaustion play a major role in postpartum blues. Generally, these symptoms subside within one to two months.

Post partum blues may be diagnosed by the presence of two or more of the following symptoms during a two week period:

- Inappropriate guilt or negative feeling towards self,
- Decreased interest or pleasure in normal activities,
- Mother feels tired and /or agitated all the time,
- Disturbed sleep (too much or too little, waking early),
- Diminished ability to think or concentrate,
- Marked loss of appetite, loss of libido,
- Rejection of the baby and
- Mother cries easily.

The woman needs to be assured that the experience is quite common and that many women experience the same thing. The provider should listen to her concerns and give her emotional encouragement and support. The partner and family need to be counselled to provide assistance to the woman. She should be followed up in two weeks and referred if no improvement is noted.

Postpartum depression

Postpartum depression is less common as compared to postpartum blues. However, it can be very serious. Women with history of depression, those whose children have died or those whose babies have been born with a serious medical or genetic problem are more susceptible.

The service provider should:

- Provide psychological support and practical help (with the baby and with homecare).
- Listen to the woman and provide encouragement
- Assist the woman to rethink her image of motherhood
- Assist the couple to think through their roles as new parents
- Link the woman to local support groups for women who have had similar experiences

Promising but yet unproven, psychosocial and psychological interventions that may prevent postpartum depression include supportive home visits, antenatal and postnatal classes, lay home visits, early postpartum follow-up by family physicians, midwifery-led debriefing, and continuity of care provided by midwives and other health care professionals.

If the depression is severe referral for psychiatric review should be considered and antidepressant drugs administered. Remember that some of these medications can be passed to the baby through breast milk, so breastfeeding options may need to be reassessed for women on antidepressants.

Discharge plan

After a normal delivery if there are no problems the mother can be discharged after 24 - 48 hours. Counselling of the mother on what she should do at home to maintain an optimum level of health status or both herself and the baby is a critical aspect of the postpartum care provided on the wards. If the birth occurred at home then the mother should be encouraged to go to health facility within 48 hours of the birth for a check up for both her and the baby. All newly postpartum women and their infants should be visited/assessed again at around one week.

Return to sexual activity after delivery

When to resume sexual activity after delivery is a commonly asked question by many women.

There is little agreement in the findings of research on the resumption of sexual activity following childbirth. Studies suggest that about 50 percent of women resume sexual intercourse within 6 weeks of childbirth (J. Byrd et al 1998). In a study done in Eastern province /Kenya, 40% of the women had resumed sex before 2 months and at 6 months this had risen to 80% (Mwangi et al 2008).

Women should be advised to wait 4-6 weeks before resuming sexual activity to allow the cervix to close, bleeding to stop, and tears to heal. Delay in resumption of vaginal intercourse after childbirth can be attributed to: pain related to an episiotomy; vaginal bleeding or discharge; fatigue due to lack of sleep; and discomfort related to inadequate lubrication of the vagina due to low levels of oestrogen in the postpartum period. Performing pelvic floor muscle exercises appears to improve sexual function and painful sex and vaginal dryness can be reduced using different sexual positions and lubricants.

Women with damage or tears to their perineum tend to resume sex later than women with an intact perineum and women who needed perineal sutures report poorer sexual relations. Perineal damage has also been associated with painful sex. Women who have an anal tear are less likely to have resumed sex after six months and one year, but they have normal sexual function 18 months later.

Assisted vaginal delivery using vacuum or forceps has been associated with increased painful sex, delay in resuming sex, and other sexual problems. Caesarean section may result in less painful sex during the first 3 months, and there is no difference in sexual function or symptoms by six months although women who delivered by caesarean report greater sexual satisfaction relating to vaginal tone six years on. Among the complications of having sex early after pregnancy are tears to incisions and infection of the uterus

Oral sex by the male partner on the woman (cunnilingus) is not recommended in the puerperium as it could introduce infection into the vagina and womb. Even more seriously, it has occasionally led to death. This has occurred because the man has (often accidentally) managed to blow air into the vagina. Air can very easily get into the blood vessels of the newly-delivered womb - and lead to 'air embolism'. However the opposite (Fellatio) has been found to be safe.

Knowing when you might return to sexual activity can also help you make decisions about when to initiate FP and which family planning method to use

Reduced Libido

Having given birth within the previous year is associated with persistent low sexual desire. More than a third of first-time mothers report a loss of libido at eight months post delivery, though only 1 in 7 of experienced mothers have a loss of libido. Women often have a poor body image after giving birth and are often uncomfortable with their physical changes and appearance after birth. Many mothers are sleep deprived and have little time for themselves; this further augments a changed sexual pattern. Discordance of sexual desire with their partner is frequent. Another potential cause of low libido is postnatal depression. Depressed women are less likely to have resumed sex at six months and report more sexual health problems.

It is important to counsel the couple that continuing a sexual relationship after delivery is a gradual process. Therefore patience and understanding between the partners should be encouraged.

Prevention of post partum complications

Women, health workers and the communities need to know the danger signs of the postpartum period. Women should be encouraged to attend postpartum care within the first 24 -48 hrs of delivery to prevent complications and to ensure prompt management of the problems detected.

Danger signs that the women should be aware of include: Fever, chills, foul-smelling vaginal discharge, anaemia, bleeding, facial swelling, hand swelling, elevated blood pressure, headaches, decreased urinary output, convulsions or fits, coma, signs of shock (sweating coldness, clammy hands, fainting attacks, weak rapid pulse), soft uncontracted uterus, placenta not delivered within 30 minutes of birth of baby.

Health workers should be competent in detecting and managing postpartum haemorrhage, retained placenta, puerperal sepsis and eclampsia. (Note that eclampsia may occur in the postpartum period).

There is need to establishing effective referral systems in order to improve access to emergency care

Addressing family planning needs through strengthened postpartum care

Unmet need for postpartum contraception

Un-met need for family planning is high among all women during the first year after childbirth. However postpartum contraceptive programmes are convenient for and meet the needs of women, and are a cost-effective strategy for increasing contraceptive use (Vernon 2008). Data from 27 countries indicate that two thirds of women who are within a year of their last birth have an unmet need for family planning and almost 40% say they plan to use a method in the next 12 months, but are yet to do so (Ross and Winfrey 2001). Examples of unmet need for postpartum women include: 60% in Bangladesh; 62% in Nigeria; 68% in Kenya and 73% in Uttar Pradesh in India¹ (Borda and Winfrey 2006-07).

Couples are advised to wait at least two years after the birth of their last infant before they try to conceive again to reduce risks of adverse maternal, perinatal and infant outcomes (WHO 2005, Conde-Agudelo et al 2006). For children conceived less than six months after a prior birth, the odds of low birth weight are 42 percent greater than that of the reference group. For children conceived within an interval of 6 to 11 months, the odds are 16 percent higher (Rutstein 2008).

Many new mothers use the return of their menstrual period as a signal to begin using contraception, yet the return of menses may indicate that fertility returned several weeks before, thus leaving up to 10 percent of women at risk of becoming pregnant before their menses resume (Becker and Ahmed 2001).

Women can get pregnant again once they have resumed sexual relations from as early as one month after delivery, unless the mother is using a family planning method. Therefore all women should be counselled on healthy timing and spacing of pregnancy during pregnancy as part of antenatal care and in the postpartum period.

Strengthening postpartum family planning services

Providing FP in the immediate postpartum period can be more cost-effective than providing them after the six-week post-delivery period and can also contribute to higher contraceptive prevalence rates (Vernon 2008)

Providers should systematically offer contraceptive services in the first year after an obstetric event regardless of the reason for the visit, and especially to women taking children under one year of age for services. Units providing antiretroviral therapy (ART) should also incorporate FP counselling and services, because often they only emphasize consistent condom use and even seem to discourage the use of other contraceptive methods (Vernon et al 2008; Vernon and Rivero-Fuentes 2009).

Post partum family planning is the initiation and use of family planning methods during the first year after delivery. The timing and choice of family planning method depends on;

- Breastfeeding status
- Method of choice
- Reproductive health goal/fertility desires

Strengthening family planning during the postpartum period:

- Check if client has made any requests for long acting and permanent methods of FP to be commenced following admission during early labour
- Perform sterilization immediately postpartum if the woman chooses female sterilization if there is no sign of infection (ideally within 7 days, or delay for 6 weeks).
- Insert intrauterine device (IUD) immediately postpartum if the woman chooses this method and there is no sign of infection (following expulsion of placenta and up to 48 hours, or delay 4 weeks).
- Advise a woman that for maximum protection she should not wait until return of her menses to start contraceptive method but should start as soon as guidance allows (depending on breast feeding status)
- Method options for breastfeeding women can be used immediately postpartum and include:
Lactational amenorrhoea method (LAM), condoms, female sterilization (within 7 days or delay 6 weeks), intrauterine device (IUD) (by 48 hours or delay 4 weeks)
- Method options for non-breastfeeding women can be used immediately postpartum and include:
Condoms, progestogen-only oral contraceptives, progestogen-only injectables, implant, Female sterilization (within 7 days or delay 6 weeks), intrauterine device (IUD) (within 48 hours or delay 4 weeks)
- Method options for breastfeeding women to be delayed:
6 weeks delay: progestogen-only oral contraceptives, progestogen-only injectables, implants,
6 months delay: combined oral contraceptives, combined injectables, fertility awareness methods
- Method options for non-breastfeeding women to be delayed
3 weeks delay: combined oral contraceptives, combined injectables, diaphragm, and fertility awareness methods
- Advise on correct and consistent use of condoms for dual protection from sexually transmitted infections or HIV and pregnancy
- Use every opportunity to discuss FP including when women bring their infants for immunization or when they are sick
- Non-hormonal methods are preferred for breastfeeding women during the first 6 weeks. These include LAM, sterilization, Intrauterine device and barrier methods. Details of these methods can be found in the National Family Planning guidelines. The basic principles are explained below

Lactational Amenorrhoea (LAM):

The principles of LAM are as follows:

- The woman must be exclusively breastfeeding on demand
- The infant should be less than six months old
- And Menstrual Periods should not have resumed

Intra uterine Contraceptive Device (IUCDs)

IUCD's can be inserted immediately after birth or delayed for later insertion as follows;

- Immediate post placental insertion - within 10 minutes after a vaginal delivery or during a C/Section
- Post partum within 48 hours of delivery
- Interval insertion at 4-6 weeks postpartum

Voluntary surgical contraception (tubal ligation and vasectomy):

This method offers permanent protection against pregnancy in a single procedure that can be provided at any health care facility with basic surgical capacity.

Counselling is very important and clients should understand that these are permanent methods, which are not reversible especially in our set up.

Tubal ligation can be performed immediately following delivery (Ideally within 48 hours of delivery) or during C/Section. However, it can also be performed within 7 days or delayed until after 6 weeks.

Barrier Methods

Male and female condoms are available in Kenya and may be used alone as a form of Family planning.

It is also recommended that condoms should be used with ALL methods to protect the woman from acquiring sexually transmitted infections and HIV/AIDS. This is known as dual contraception.

Hormonal contraceptives

Breastfeeding women can use Progestin-only contraceptives (POPs) after 6 weeks post partum. WHO recommends a delay of 6 weeks after childbirth before starting progestin-only methods to avoid newborn exposure to the progestin.

At 6 weeks post delivery POPs have no effect on breastfeeding, milk production or infant growth and development.

Note: Combined hormonal contraceptives (COCs -containing both oestrogen and progestin) are not good choices for breastfeeding women because the oestrogen can reduce the woman's milk supply

Women who are not breastfeeding may use any method of family planning provided that they conform to the medical eligibility criteria for that method.

Use of family planning also reduces the risk of perinatal and neonatal mortality, preterm births, low birth weight, small for gestational age babies as well as malnutrition and other childhood illnesses for the older child.

Fewer children in a family mean more resources for each child, and more time for the parents to dedicate to each child and to the family at large.

FP Counselling for women living with HIV /AIDS

Reduction of unwanted pregnancies by increasing contraceptive use among HIV-positive women is a key component of the WHO comprehensive PMTCT strategy (WHO 2004; Richey and Setty 2007). The prevention of unintended pregnancies for WLHA has been described as an undervalued and little-used strategy (Reynolds and Wilcher 2006). WLHA require correct and comprehensive information on FP and contraceptive choices, including the effectiveness, side effects and possible interaction of contraceptive drugs with ARVs; the advantages of dual protection; and measures to reduce perinatal HIV transmission when WLHA choose pregnancy (Sripipatana, et al 2007).

In Kenya the unmet need for contraception among women living with HIV/ AIDs is over 60% as compared with 26% in the general population. Family Planning is the second prong for prevention of mother to Child transmission of HIV.

Availability of FP services for WLHA in the postpartum period

Accessing and using PMTCT services does not necessarily appear to influence postpartum use of contraceptive methods (except for condoms) in settings of low contraceptive prevalence, scarce resources, and high HIV prevalence (Peltzer et al 2007). Often, in these settings, family planning and PMTCT services are generally organized in parallel rather than integrated. In such settings, (such as Zambia and Kenya) WLHA were no more likely than HIV-negative women to be using a modern method of family planning (Rutenberg et al 2003).

Misconceptions about the safety of different methods for HIV-positive women are widespread among both providers and clients. Long-acting and permanent methods (LAPM), such as the IUD and sterilization, are generally neither recommended nor accessible to WLHA (Farrell et al 2008, Hatzel et al 2008, Warren Tsukulu et al 2008, Mwangi et al 2008).

Post delivery it is important for the service provider to counsel the HIV positive clients on the health risks for both herself and her baby associated with future pregnancies.

Generally the HIV-positive woman can use most methods of FP provided that they meet the MEC. The medical eligibility criteria for Family planning method use in HIV positive women are outlined in the National FP guidelines. A few special cases are mentioned here.

- Fertility awareness-based methods may be unreliable to use if she has AIDS or is taking ARVs because of changes to the menstrual cycle and higher body temperature.
- Women with HIV should not use spermicides or diaphragms with spermicides.
- Women who have HIV and Tuberculosis, any women on Rifampin for TB treatment, or women on Ritonavir should not use COCs.
- If a woman has completed her desired family size, it is best to counsel on use of permanent methods.
- Finally HIV positive clients should always be encouraged to use dual method use.

COMPLICATIONS AND DANGER SIGNS IN PUERPERIUM

Background/Rationale

The average maternal mortality ratio in the African region has risen from 870 deaths per 100,000 live births in 1990 to 1,000 deaths per 100,000 live births in 2001. Of the estimated 529,000 maternal deaths [of which 60% die in the first week after birth] that occur globally every year, 48% are in the African region, a region that constitutes only 12% of the world's population and 17% of all births in the world. Poor women in the region are especially vulnerable. In many countries in the region, between 25% and 33% of all deaths of women of reproductive age are the results of a complication of pregnancy or childbirth, whereas in industrialized countries the risk of maternal death is very low.

The lifetime risk of maternal death in the African region is estimated at 1:16 compared to 1:3500 in North America, 1:2400 in Europe, 1:160 in Latin America and the Caribbean, and 1:100 in Asia. 13% of all maternal deaths are due to unsafe abortion among adolescents. For every maternal death, there are at least thirty women who suffer short or long term disabilities.

The most common cause of death across Africa and Asia is Post Partum Haemorrhage followed by Hypertensive disorders in pregnancy then by sepsis. In Latin America -however Hypertensive disorders in Pregnancy are the commonest cause of maternal death.

MAJOR MATERNAL HEALTH COMPLICATIONS IN THE POSTPARTUM PERIOD

In this section major life-threatening complications in the postpartum period are discussed. They include;

Postpartum haemorrhage (PPH)

Hypertensive Disorders in pregnancy

Puerperal Sepsis and infections

Puerperal Psychosis

Postpartum haemorrhage (PPH)

Epidemiology

Worldwide, haemorrhage is the most important cause of pregnancy-related mortality¹ (Khan et al 2006 Lancet maternal health series). The majority of these deaths (88%) occur within 4 hours of delivery (Kane et al 1992), indicating that they are a consequence of events occurring in the third stage of labour. The first hours post partum are especially critical in the diagnosis and management of abnormal bleeding². Those that survive PPH will suffer residual severe anaemia and other major health problems

Globally, there are an estimated 14 million cases of pregnancy-related haemorrhage every year. Of these women at least 150 000 die. In Kenya, the maternal mortality ratio is at 488 per 100 000 live births [KDHS, 2008/9] with the risk of dying being 1:20. Close to 60% of all deliveries are conducted at home by an unskilled attendant and the Post natal care attendance within 48 hours of delivery is at 42%. PPH contributes to 34% of maternal deaths and it is the most common cause of maternal mortality in Kenya

The basic determinants of these deaths are broadly due to the “three delays”; these are: delay in deciding to seek care, delay in reaching care and delay in receiving care. The greatest challenge in managing PPH is at Levels One, Two and Three of health care services, where systems are weak. In addition, weak referral

systems between the community and the nearest facility and in between facilities further augment death and disability due to PPH.

Key interventions that have been shown to reduce the incidence of PPH include- the use of Active management of Third Stage of Labour (AMTSL), and timely management of incomplete abortion. In several countries, studies have been conducted on the use of Misoprostol for prevention of PPH in the community. Current evidence is however conflicting. Consequently WHO recommendations do not support use of misoprostol unless in emergency situations, to give time for transportation to a facility. (Refer to WHO guidelines for Prevention of PPH)

Definition

This is blood loss in excess of 500mls following vaginal delivery or 1000mls following caesarean section. Some problems have been associated with this definition; Estimates of blood loss are notoriously low, often half of the actual loss. This is because blood is mixed with amniotic fluid and sometimes with urine. It is also dispersed on sponges, towels and linen, buckets and on the floor. The importance of a given volume of blood loss varies with the woman's Haemoglobin level. A woman with a normal Haemoglobin will tolerate blood loss but can be fatal for a woman with low Haemoglobin

All women should be considered at risk of PPH and hemorrhage prevention must be a part of every birth.

Types of Postpartum haemorrhage

Primary PPH: Excessive vaginal bleeding within 24 hours of childbirth

Secondary PPH: Excessive vaginal bleeding 24 hours following childbirth until 6 weeks after childbirth

Causes of PPH

The causes of PPH are classified into 4 groups. For ease of recall, the MNEMONIC **4Ts** is used.

Main causes of PPH (4T's)	Specific causes	Relative frequency %
Tone	Atonic uterus	70
Trauma (Genital)	Cervical, vaginal and perineal laceration, vulval / pelvic haematoma, uterine inversion and ruptured uterus	20
Tissue	Retained tissue/membranes, retained placenta	10
Thrombin	Coagulopathies (blood clotting disorders)	1

1. Uterine Atony

Definition

This is when the uterus fails to contract adequately. Any condition that interferes with uterine contractions will predispose to atonic uterus. The result is excessive blood loss that can result in maternal death within 2 hours.

Predisposing factors to uterine atony:

- Retained placenta, placental fragments, tissue/membranes, blood clots
- Overdistention of the uterus due to multiple gestation, excess amniotic fluid or a large baby.
- High parity.
- Prolonged labour
- Induction or augmentation of labour
- Precipitous labour (labour lasting less than 3 hours)
- Full bladder

2. Trauma

Trauma to the perineum, vagina, cervix or uterus is the second most frequent cause of PPH. Tears may co-exist with atonic uterus. One should always suspect a cervical or a vaginal tear whenever there is postpartum bleeding with a contracted uterus. Unrepaired or poorly repaired episiotomies or tears can also cause severe bleeding.

3. Tissue

Retained placenta,

This is defined as failure to deliver the placenta within 30 minutes of childbirth. This interferes with uterine contractility. Retained placental fragments, as well as retained membranes also result in PPH by predisposing to uterine atony.

Predisposing factors to tissue retention include:

- Previous C/S
- Previous history of retained placenta
- Previous dilatation and curettage
- Previous placenta praevia

4. Thrombin

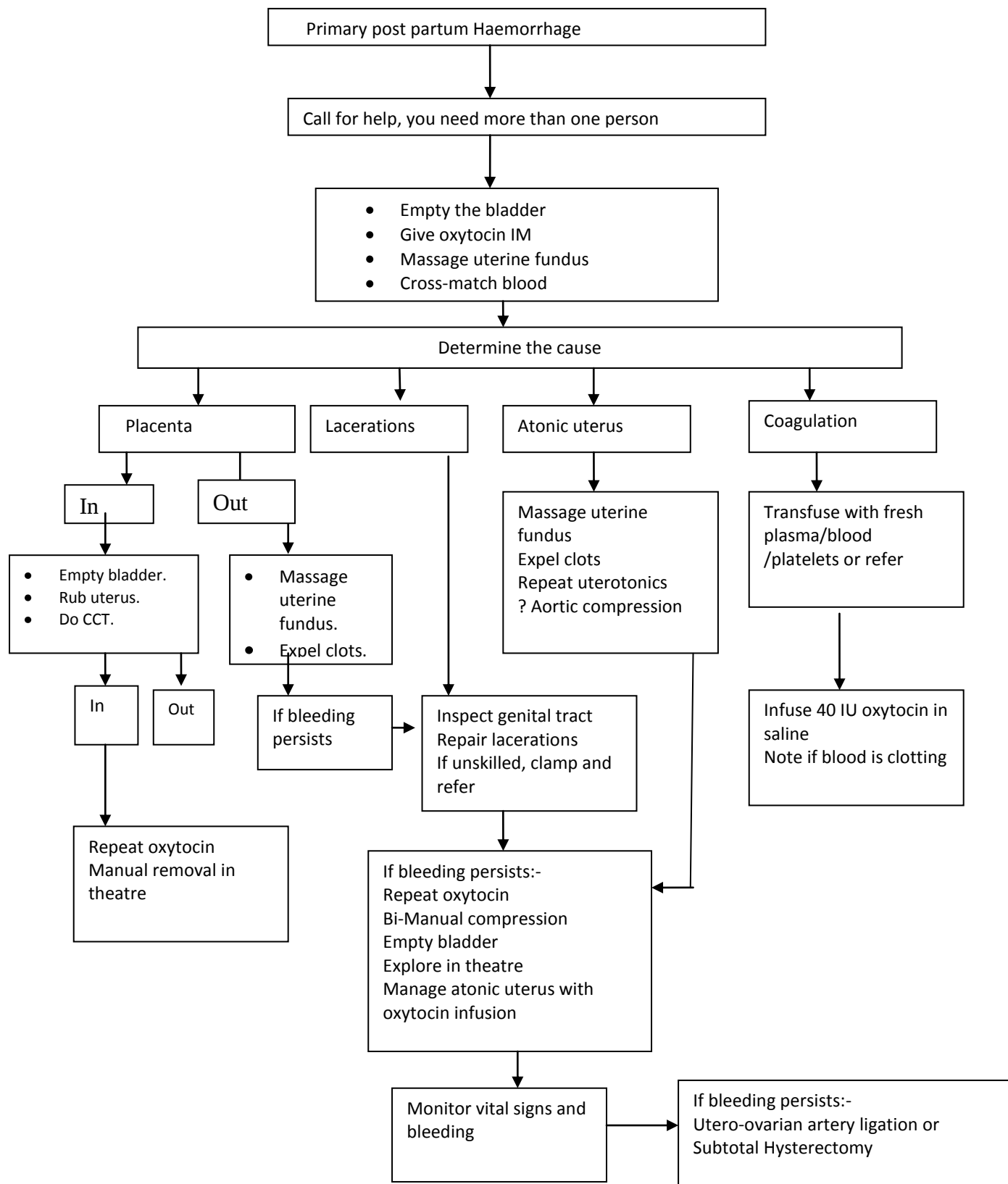
Coagulation disorders are rare causes of PPH accounting for only 1% of PPH. When the blood fails to clot despite the routine interventions, a coagulation disorder should be suspected.

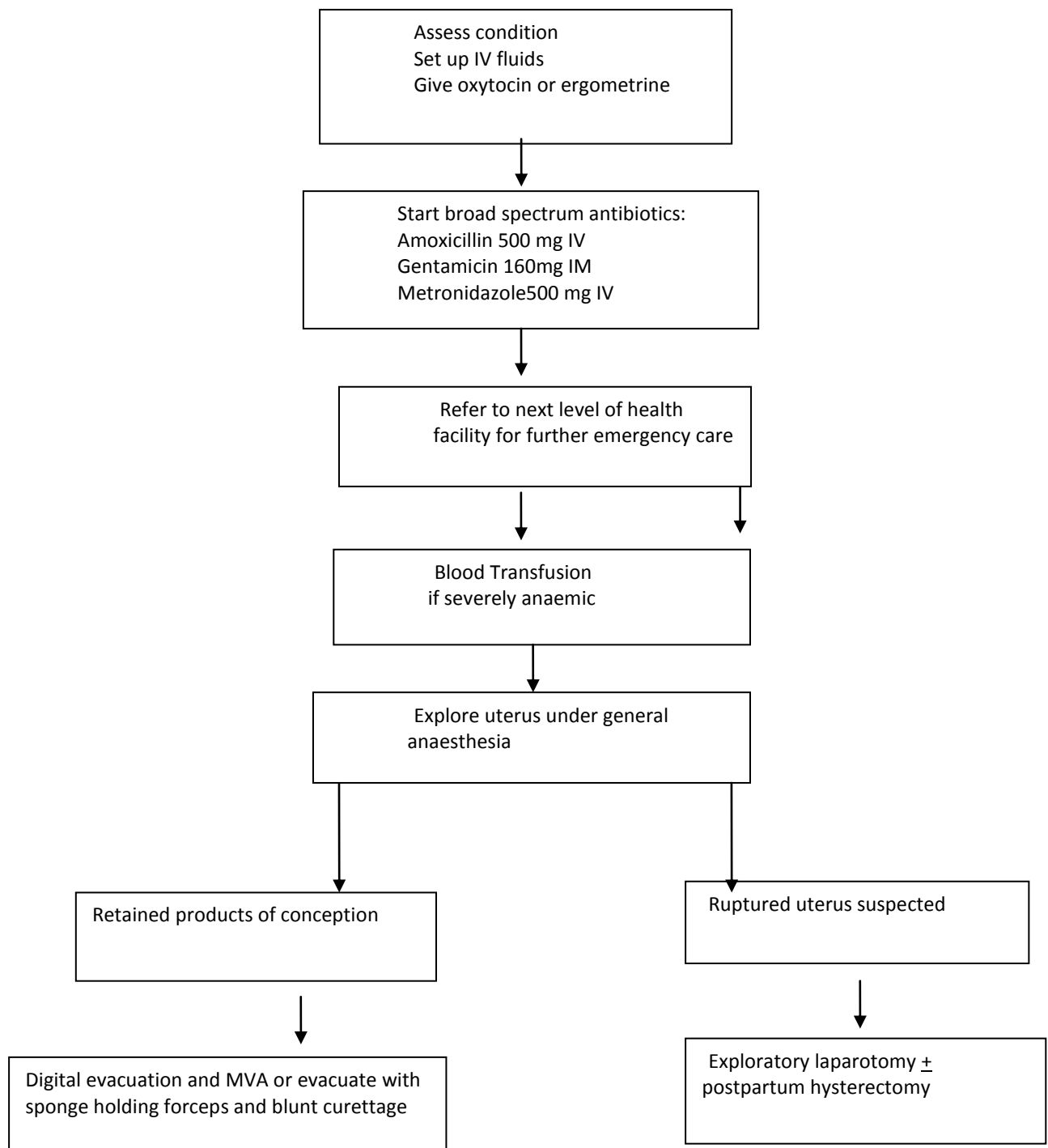
Predisposing factors for disseminated intravascular coagulation include:

- Severe pre-eclampsia,
- Placenta abruption,
- Intrauterine foetal death
- Amniotic fluid embolism.
- Excessive bleeding can deplete coagulation factors and promote further bleeding.
- Infection
- Genetic factors

NB. MANAGEMENT OF PPH REQUIRES A MULTIDISCIPLINARY APPROACH.

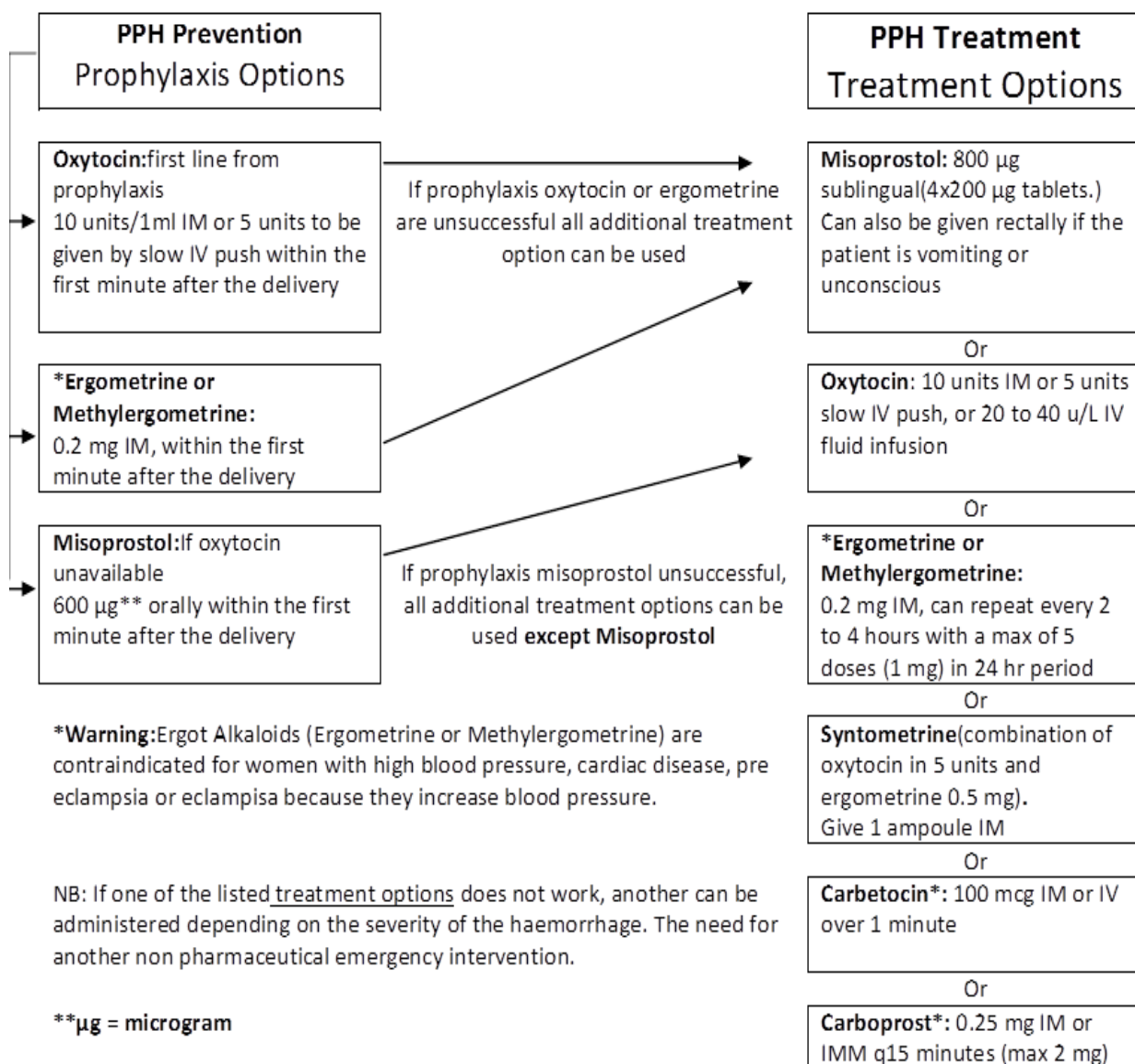
MANAGEMENT OF PRIMARY PPH



MANAGEMENT OF SECONDARY PPH

FIGO recommendations

Drug Regimens for the prevention and the treatment of PPH



WHO Recommendations on Use of Misoprostol in Management of PPH

WHO recommends the use of Misoprostol in settings where it is not possible to use Oxytocin or another injectable uterotonic such as Ergometrine, or Oxytocin / Ergometrine fixed-dose combination in the circumstances outlined below

- In the absence of personnel to offer active management of the third stage of labour.
- Difficulties in ensuring safe injection practices and/or refrigeration preventing the use of Oxytocin.

Prevention of postpartum hemorrhage

It is recommended that the trained health worker should offer **Misoprostol 600 micrograms** orally immediately after the birth of the baby. In such cases no active intervention to deliver the placenta should be carried out. (WHO/RHR/09.22)

Treatment of postpartum hemorrhage

The use of Misoprostol in addition to other injectable uterotonics is not recommended since it does not add any additional protection.

In the absence of any other uterotonic or if all other measures fail, Misoprostol can be offered at a dose between **200 and 800 micrograms orally or sublingually** as a last resort. (WHO/RHR/09.22)

WHO recommended drug doses for management of PPH

	Oxytocin	Ergometrine/ Methyl-ergometrine	15-Methyl prostaglandin F2a
Dose and route	IV: Infuse 20 units in 1 l IV fluids at 60 drops per minute	IM or IV (slowly): 0.2 mg	IM: 0.25 mg
Continuing dose	IV: Infuse 20 units in 1 l IV fluids at 40 drops per minute	Repeat 0.2 mg IM after 15 minutes If required, give 0.2 mg IM or IV (slowly every 4 hours	0.25 mg every 15 minutes
Maximum dose	Not more than 3 l of IV fluids containing oxytocin	5 doses (Total 1.0 mg)	8 doses (Total 2 mg)
Precautions/ contraindications	Do not give as an IV bolus	Pre-eclampsia, hypertension, heart disease	Asthma

Prostaglandin F2a should not be given intravenously. It may be fatal. *Managing complications in pregnancy and childbirth*. Geneva, World Health Organization, 2000, page S-28, table S-8.

IV intravenous

IM intramuscular

WHO recommendations for other management modalities for PPH

Tranexamic acid may be offered as a treatment for PPH if: (i) administration of oxytocin, followed by second-line treatment options and prostaglandins, has failed to stop the bleeding; or (ii) it is thought that the bleeding may be partly due to trauma.

Recombinant factor VIIa for the treatment of PPH should be limited to women with specific haematological indications.

Uterine massage to ensure the uterus is contracted and there is no bleeding is a component of active management of the third stage of labour for the prevention of PPH. Uterine massage should be started once PPH has been diagnosed.

Bimanual uterine compression may be offered as a temporizing measure in the treatment of PPH due to uterine atony after vaginal delivery.

Uterine packing is not recommended for the treatment of PPH due to uterine atony after vaginal delivery.

In women who have not responded to treatment with uterotonics, or if uterotonics are not available, **intrauterine balloon or condom tamponade** may be offered in the treatment of PPH due to uterine atony

External aortic compression for the treatment of PPH due to uterine atony after vaginal delivery may be offered as a temporizing measure until appropriate care is available.

There have been no RCTs on the **use of pneumatic or non pneumatic antishock garments** in the treatment of PPH. WHO has no recommendations on its use until more data is available

If other measures have failed and resources are available, **uterine artery embolization** may be offered as a treatment for PPH due to uterine atony

If bleeding does not stop in spite of treatment with uterotonics, other conservative interventions (e.g. uterine massage), and external or internal pressure on the uterus, **surgical interventions** should be initiated. Conservative approaches should be tried first, followed – if these do not work – by more invasive procedures. For example, compression sutures may be attempted first and, if that intervention fails, uterine, utero-ovarian and hypogastric vessel ligation may be tried.

If life-threatening bleeding continues even after ligation, subtotal (also called supracervical or total hysterectomy) should be performed. The level of skill of the health care providers will play a role in the selection and sequence of the surgical interventions

Hypertensive Disorders in Pregnancy-(Refer to ANC module)**PUERPERAL SEPSIS AND PUERPERAL INFECTION.**

Puerperal sepsis is defined as infection of genital tract occurring at any time between the onset of rupture of membranes or labour and 6 weeks postpartum, in which two or more of the following are present: pelvic pain, fever, foul smelling vaginal discharge and sub – involution of the uterus. The most common site of infection in puerperal sepsis is the placental bed. However infection may also occur in the cervix, vagina, perineum and the episiotomy site.

Puerperal Infection is a more general term than puerperal sepsis and includes all extra - genital infections and incidental infections. It encompasses infections specifically related to the birth process but not involving the genito-urinary systems e.g. breast abscess, incidental infections (malaria, respiratory tract infection) as well as urinary tract infections.

Puerperal sepsis is one of the major causes of maternal deaths contributing to about 15% of MMR in developing countries. Puerperal sepsis can also cause long-term complications such as pelvic inflammatory disease (PID) and infertility.

Predisposing factors of puerperal sepsis**Medical/ Obstetric**

- Anaemia
- Prolonged rupture of the membrane
- Prolonged labour
- Retained products of conception
- Caesarean section especially emergency C/S,
- Assisted delivery (vacuum, forceps)
- Post partum Haemorrhage
- Twin delivery especially with manipulation of the second twin
- Malnutrition
- Chronic diseases (Diabetes mellitus, HIV, TB)

Health Systems

- Poor infection prevention / control practices
- Delivery by unskilled birth attendants e.g. TBAs
- Poorly equipped and understaffed health facility

Social

- Poor personal hygiene
- Low status of women, which contributes to their poor general health and deprives them of adequate medical care and resources
- Delay in care seeking
- Lack of knowledge about signs and symptoms of puerperal sepsis

Causes of Puerperal sepsis

More than one type of bacteria may be involved when a woman develops puerperal sepsis.

Exogenous bacteria

These are bacteria, which are introduced into the vagina from the outside (streptococci, staphylococci, clostridium tetani, etc.). Exogenous bacteria can be introduced into the vagina by:

- Unclean hands and unsterile instruments
- Foreign substances that are inserted into the vagina e.g. Herbs, oil, cloth (Clostridium tetani)
- Vaginal sexual activity (Neisseria gonorrhoea, Chlamydia trachomatis).

Endogenous bacteria

These are bacteria, which normally live in the vagina and rectum without causing harm (e.g. some types of streptococci and staphylococci, E.coli, Clostridium welchii).

Endogenous bacteria may become harmful and cause infection if

- They are carried into the uterus, usually from the vagina by the examining finger during pelvic examination, during instrumental delivery, and during manual removal of placenta
- There is tissue damage, i.e. bruised, lacerated or dead tissue (e.g. after a traumatic delivery or following obstructed labour)
- There is prolonged rupture of membranes

Symptoms and signs of puerperal sepsis

The following symptoms and signs may occur in puerperal sepsis:

- Fever (temperature of 38°C or more)
- Chills and general malaise
- Lower abdominal pain
- Vomiting,
- Headache in severe cases
- Tender uterus
- Sub-involution of the uterus
- Purulent, foul-smelling lochia,
- Perineal pain,
- Infected perineal wound

Puerperal sepsis may also present with signs of shock which include; (Low blood pressure, tachycardia (over 90) and cold clammy skin)

Diagnosis of puerperal sepsis and infections

The following key steps should be observed to ensure accurate diagnosis of puerperal sepsis:

- Take full medical history including that of the peripartum period
- Carry out a complete physical examination to include at least
 - Vital signs of Temperature, Pulse, RR and BP
 - Examination for anaemia
 - Breast inspection and palpation
 - Inspect and Palpate abdomen for involution of the uterus, tenderness, state of C/S wound

- if present
 - Perform bimanual pelvic exam observing the status of any tears, lacerations, and lochia
- Laboratory investigation should include
 - Full blood count
 - High vaginal swab for microscopy culture and sensitivity
 - Urine microscopy, culture and sensitivity
 - Blood culture and sensitivity

Presentation of various causes of puerperal sepsis

Presenting signs and symptoms	Other symptoms/signs	Possible Diagnosis
Fever/chills Lower abdominal pain Purulent foul smelling lochia Tender uterus	Light vaginal bleeding Shock	Metritis
Lower abdominal pain and distension Persistent spiking fever/chills Tender uterus	Poor response to antibiotics Swelling in adnexa or Pouch of Douglas Pus obtained on culdocentesis	Pelvic abscess
Low-grade fever/chills Lower abdominal pain Absent bowel sounds	Rebound tenderness Abdominal distention Anorexia, Nausea/vomiting Shocks	Peritonitis
Breast pain and tenderness 3-5 days after delivery	Hard enlarged breast Both breast affected	Breast engorgement
Breast pain and tenderness Reddened wedge shaped areas on the breast 3-4 weeks after delivery	Inflammation preceded by engorgement Usually only one breast is affected	Mastitis
Firm very tender breast Overlying erythema	Fluctuant swelling in the breast Draining pus	Breast abscess
Un-usually tender wound with bloody or serous discharge	Slight erythema extending beyond the edge of incision	Wound abscess, wound serum or wound haematoma
Painful and tender wound Erythema and oedema beyond edge of incision	Hardened wound Purulent discharge Reddened area around the wound	Wound cellulitis
Dysuria Increased frequency of micturition	Retro-pubic /supra-pubic pain Abdominal pain	Cystitis

Differential diagnosis:

Fever in the puerperium may also be caused by:

- Urinary tract infection (e.g. acute pyelonephritis)
- Thrombo-embolic disorders, e.g. Thrombophlebitis or deep vein thrombosis
- Respiratory tract infections
- Other medical conditions, such as malaria and typhoid, hepatitis
- Human immune deficiency virus (HIV)-related infections.

Presentation of other causes of puerperal fever

Presenting Symptoms and Other Symptoms and Signs Typically Present	Symptoms and Signs Sometimes Present	Probable Diagnosis
Dysuria Spiking fever / chills Increased frequency and urgency of urination Abdominal pain	Retro-pubic/supra-pubic pain Loin pain/tenderness Tenderness in rib cage Anorexia Nausea/vomiting	Acute pyelonephritis
Spiking fever despite antibiotics	Calf muscle tenderness	Deep vein thrombosis
Fever Difficulty in breathing Cough with expectoration Chest pain	Consolidation Congested throat Rapid breathing Rhonchi/rales	Pneumonia / Tuberculosis
Fever Decreased breath sounds	Typically occurs postoperative	Atelectasis
Fever Chills/rigor Headache Muscle/joint pain	Enlarged spleen	Uncomplicated malaria
Symptoms and signs of uncomplicated malaria Coma Anaemia	Convulsions Jaundice	Severe/complicated malaria
Fever Malaise Anorexia Nausea Dark urine and pale stool Jaundice Enlarged liver	Muscle/joint pain Urticaria Enlarged spleen	Hepatitis

Management of puerperal sepsis and infections

Metritis

Metritis is infection of the uterus after delivery and is a major cause of maternal death.

Delayed or inadequate treatment of metritis may result in pelvic abscess, peritonitis, septic shock, deep venous thrombosis, pulmonary embolism, chronic pelvic infection with recurrent pelvic pain and dyspareunia, tubal blockage and infertility.

Metritis is managed as follows:

1. Give a combination of antibiotics until the woman is fever free for 48 hrs. This will comprise the following:
 - a. Pencillin G 2Mu IV every 6 hours
 - b. Gentamycin 5 mg/kg body weight IV every 24 hours
 - c. Metronidazole 500 mg IV every 8 hours
2. If fever is still present 72 hours after starting antibiotics re-evaluate the patient and revise the diagnosis. Note that oral antibiotics are not necessary after stopping IV antibiotics
3. If retained placental fragments are suspected, perform a digital exploration of the uterus to remove clots and large pieces.
4. If there is no improvement with the conservative measures and there are no signs of general peritonitis (fever, rebound tenderness, abdominal pain) perform laparotomy to drain any pus
5. If the uterus is necrotic and septic, perform subtotal hysterectomy
6. Transfuse as necessary using packed cells, if available

Pelvic Abscess

When a definitive diagnosis of pelvic abscess is made:

1. Give a combination of antibiotics **before** draining the abscess and continue until the woman is fever free for 48 hours. These will include:
 - a. Penicillin G 2 mu IV every 6 hours
 - b. Gentamycin 5 mg/ kg body weight IV every 24 hours
 - c. Metronidazole 500mg IV every eight hours
2. Change to oral medications when the patient is fever free for 48 hours.

Peritonitis

In case of generalised peritonitis:

1. Introduce a naso -gastric tube for suction
2. Commence IV fluids and maintain nil by mouth until bowel sounds are normal
3. Give a combination of antibiotics till woman is fever free for 48 hours
 - a. Penicillin G 2Mu IV every 6 hours
 - b. Gentamycin 5 mg/ kg body weight IV every 24 hours
 - c. Metronidazole 500 mg IV every eight hours
4. If necessary perform laparotomy for peritoneal wash out

Mastitis:**Definition:**

Mastitis refers to an inflammatory condition of the breast. It may or may not be accompanied by infection. It should not be confused with breast engorgement, which is an exaggeration of the lymphatic and venous engorgement that occurs before lactation. Mastitis is not the over distention of the breast with milk.

Predisposing factors:

Mastitis usually occurs in breastfeeding women.

There may have been breast engorgement and/or cracked nipples, which have allowed bacteria to enter through the broken skin.

It may follow difficulty in fixing the baby to the breast, leading to nipple damage or bruising of the breast tissues due to rough handling.

Causes of mastitis

The two principle causes of mastitis are *milk stasis* and *infection*.

Milk stasis is usually the primary cause, typically occurring 3–4 weeks after delivery. It may or may not be accompanied by infection. Mastitis can lead to breast abscess and in severe cases to septicaemia.

Symptoms and signs

The onset of mastitis is usually rapid. In most cases only one breast is affected.

It commonly presents with typical signs of Inflammation, namely:

- Breast is painful and swollen
- Red, wedge-shaped area visible on breast
- Breast tenderness

Management

1. It is important to start broad-spectrum antibiotics without delay. Do not wait for the laboratory results before initiating treatment! The antibiotic regimen will comprise
 - a. Amoxicillin/Clavulanic Acid 625mg three times a day for 10 days
OR
 - b. Cloxacillin 500mg every 6 hours for 10 days.
OR
 - c. Erythromycin 250 mg orally every 8 hours for 10 days.
2. In addition the patient may be given paracetamol 500mg by mouth four – six hourly as required.
3. Encourage the woman to continue breastfeeding
4. The health worker should teach the mother correct positioning and attachment for breast feeding (See breastfeeding section of the guidelines). This should be reassessed after two feeds and if not better the mother taught how to express enough breast milk to relieve discomfort before initiating the feed

5. Cold compresses may be applied to the breasts between feeding to reduce swelling and pain.
6. The breasts should be well supported with a binder or brassiere
7. Patients with mastitis should be followed up in three days to ensure adequate response.

Breast Abscess:

When a definitive diagnosis of breast abscess is made

1. The following antibiotics may be administered:
 - a. Cloxacillin 500mg every 6 hours for 10 days.
 - Or
 - b. Erythromycin 250 mg per oral every 8 hours for 10 days.
2. The woman can also be given paracetamol 500mg by mouth to relieve pain
3. Cold compresses may also be applied to the breasts to reduce swelling and pain
4. She should be encouraged to express the milk BUT she should NOT give it to the baby.
5. The abscess should be drained either under sedation or general anaesthesia in theatre.
6. The breasts should be supported with a binder or brassiere
7. Follow up in three days is recommended to ensure response.

INFECTION OF PERINEAL AND ABDOMINAL WOUNDS.

Management of infected perineal and abdominal wounds is as follows:

1. If there is pus or fluid, open and drain the wound.
2. Remove infected skin or subcutaneous tissues and debride the wound. Do not remove fascial sutures.
3. If there is an abscess without cellulitis, antibiotics are not required.
4. Place a damp dressing and have the woman return to change the dressing every 24 hours.
5. Advise on good personal / perineal hygiene.

SHOCK:**Introduction**

Shock is a life threatening condition that is characterised by failure of the circulatory system to maintain adequate perfusion of the vital organs. It requires immediate and intensive treatment.

The main causes of obstetric shock are severe haemorrhage and sepsis.

Recognising shock

Main signs and symptoms	Other signs and symptoms
Pulse weak and fast (>110 beats/minute)	Pallor
BP low (systolic <90 mmHg) – late sign	Sweatiness or cold and clammy skin
	Rapid breathing (rate of 30 breaths per minute or more)
	Anxious, confused or Unconscious
	Scanty urine output (less than 30 mls/Hr)

Immediate management

1. Call for help
2. Assess the woman Using **A V P U** mnemonic: (i.e. is the patient ALERT, responding to VOICE, only responding to PAIN or UNRESPONSIVE)
3. If she is unconscious turn her on to her side to minimise the risk of aspiration in case she vomits and to ensure that the airway is open.
4. Keep the woman warm but do not overheat her, as this will increase peripheral circulation and reduce blood supply to the vital centres
5. Elevate the legs to increase return of blood to the heart (if possible, raise the foot end of the bed)

For patients at primary level i.e. Health Centre/BEOC level, once initial management has been done and vital the signs are stable, refer her to a hospital/CEOC

Specific Management

1. Take vital signs (If Systolic BP <90 mmHg or pulse >110/Minute- this may be haemorrhagic or septic shock).
2. Continue to monitor the vital signs and blood loss every 15 minutes. Observe for shortness of breath or puffiness
3. Insert IV line using a large-bore cannula/needle (16 Gauge or largest available)
4. If a peripheral vein cannot be located, perform a venous cut-down (refer to cut-down procedure)
5. Collect blood for Haemoglobin, and cross matching and clotting time estimation
6. Give oxygen at 6-8 L per minute by mask or nasal canula if cyanosis present

Fluid replacement:

1. Once the IV canula is in place, Infuse fluids rapidly (**Normal saline or Ringer's lactate**) initially at a rate of 1 Litre in 15 – 20 minutes. After that, infuse 1 litre in 30 minutes at 30 ml/minute

2. Avoid using plasma Substitutes e.g. Dextran.
3. Give at least 2L of IV fluids in the first hour. This is over and above fluid replacement for ongoing losses (Note: A more rapid rate of infusion is required in the management of shock resulting from bleeding. Aim to replace two to three times the estimated fluid loss)
4. Do not give fluids by mouth to a woman in shock
5. Reduce the infusion rate to:
 - a. 3ml/minute (1 Litre in 6-8 hours) when pulse slows down to less than 100 beats/minute, systolic BP increases to 100 mmHg or higher
 - b. 0.5 ml/minute if breathing difficulty or puffiness develops
6. Give fluids at:
 - a. Moderate rate if severe abdominal pain, dangerous fever or dehydration: infuse 1 Litre in 2-3 hours
 - b. Slow rate if severe anaemia / severe pre-eclampsia or eclampsia: infuse 1 Litre in 6-8 hours
7. Catheterise the bladder and monitor urine output
8. Record time and amount of fluids given – always use a fluid balance sheet

There is no evidence that plasma substitutes are superior to normal saline in resuscitation of woman in shock.

Reassessment

Reassess the woman's response to IV fluids within 30 minutes for signs of improvement. These are:

- Stabilising pulse (90 beats/minute or less)
- Increasing systolic blood pressure (100 mmHg or more)
- Improving mental status (less confusion or anxiety)
- Increasing urine output (30ml/hour or more)

If the woman's condition improves adjust the rate of IV infusion to 1 Litre in 6 hours

Continue management of the underlying cause of shock

Collect blood for estimation of Haemoglobin, immediate cross-match and bedside clotting test just before infusion of fluids

If IV access is not possible:

- *Consider performing a venous cut-down to obtain IV access*
- *Give ORS by mouth if able to drink, or by NGT, 300-500ml in 1 hour*

DO NOT give ORS to a woman who is unconscious or has convulsions

Classification of circulating volume lost and associated symptoms and signs

(A pregnant woman has a circulation volume of about 100ml/kg, this is 6 litres for a woman of 60kg)

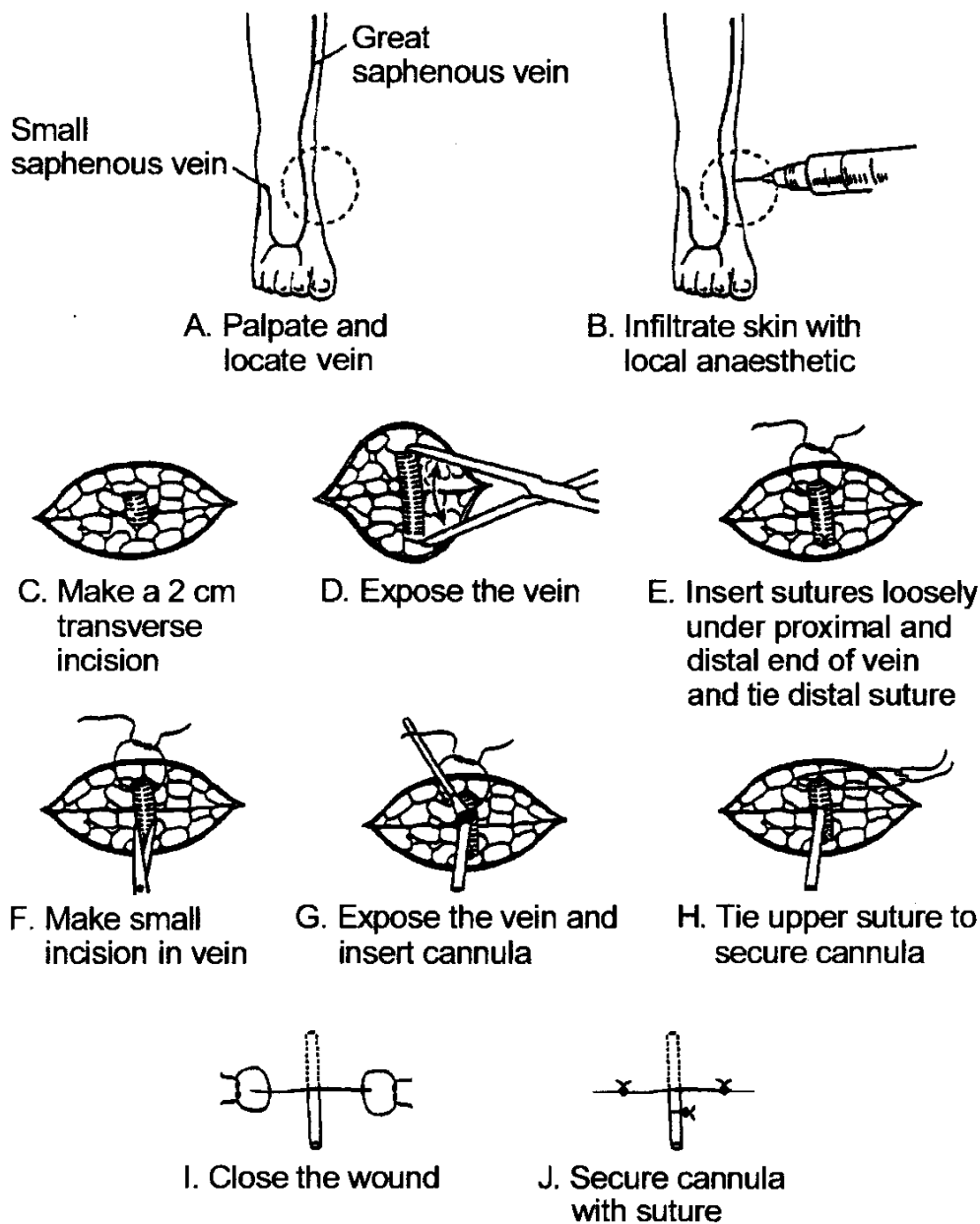
Class	Circulating volume lost	Signs
1	15% or less (not much more than 700ml)	You may notice only a mild rise in pulse rate. If the woman is otherwise healthy and if not anaemic, she will not require a blood transfusion
2	15-30% (over 1.5 Litres)	Symptoms will include rising pulse rate and rising breathing frequency. Use crystalloids to replace fluid loss.
3	30-40% (over 2 litres)	It is only at this stage that the blood pressure falls. Remember a drop in BP is a late sign of hypovolaemia. Patient will need a blood transfusion in addition to crystalloids.
4	>40%	This is immediately life threatening. Blood transfusion is required immediately.

IMPORTANT PROCEDURES IN MANAGEMENT OF SHOCK**2. Procedure for Bedside clotting test**

- Take 2 ml of venous blood into a small, dry, clean plain glass test tube (approximately 100mmx75mm)
- C)
- After four minutes, tip the tube slowly to see if a clot is forming.
- Tip it again every minute until the blood clots and the tube can be turned upside down
- Failure of a clot to form after seven minutes or a soft clot that breaks down easily suggests coagulopathy

3. Procedure for venous cut-down

The saphenous vein is about one finger anterior and superior to the medial malleolus (on inner side ankle)



MANAGEMENT OF THE UNCONSCIOUS PATIENT

To determine the level of consciousness, a rapid assessment is made using **AVPU** mnemonic. (Is the patient **A**LERT, responding to **V**OICE, or only responding to **P**AIN or **U**NRESPONSIVE)

A decrease in the level of consciousness is a marker of insult to the brain (lack of oxygen). The more

deeply the patient is (or becomes) unconscious, the more serious the insult. Lack of oxygen to the brain results from either reduced blood flow (such as hypovolaemia) or reduced oxygen (caused for example by reduced breathing, convulsions, sepsis or anaemia).

Steps in the management

1. Call for help
2. Position woman on her left side
3. Assess Airway and Breathing
 - If she is not breathing, provide assisted ventilation using ambu-bag and mask
4. Assess circulation and insert IV access
5. Re-assess A V P U
6. Determine the possible cause of reduced level of consciousness
 - Has there been a recent convulsion (eclampsia)?
 - Is she a known epileptic?
 - Is there any neck stiffness (meningitis)?
 - Does she have a fever (temperature > 38C)
 - Assess pupils (to check if a cerebral bleed has occurred)
 - Carry out observations of vital signs: pulse, breathing, blood pressure, temperature, foetal heart

Special considerations

Convulsions

Eclampsia is the most common cause of unconsciousness. Remember, eclampsia can occur before, during or after delivery. If the woman has had a convulsion or is convulsing: **give magnesium sulphate**

High BP

If diastolic BP greater than 110 mm Hg give antihypertensive drugs e.g. Hydrallazine

Fever

If temperature greater than 38 degrees C or history of fever, rule out Sepsis, Malaria, Meningitis, Pneumonia e.t.c. and treat accordingly

Determining and managing the cause of shock

Determine the cause of shock after the woman is stabilized

Always start specific therapy for the condition leading to shock as soon as possible!!

If heavy bleeding is suspected as the cause of shock:

- Take steps to stop the bleeding
- Transfuse as soon as possible to replace blood loss
- Determine cause of bleeding and manage accordingly
- Reassess the woman's condition for signs of improvement

If infection is suspected as the cause of shock:

- Collect appropriate samples
- Give the woman a combination of antibiotics to cover aerobic and anaerobic infections and continue until she is fever-free for 48 hours. These include: **Ampicillin 3 gm IV every 6 hours PLUS Gentamycin 160 mg I.V. every 8 hours PLUS Metronidazole 500 mg IV every 8 hours**
- Reassess the woman's condition for signs of improvement,
- If the patient is improving continue with parenteral antibiotics until abdominal distension subsides and bowel sound return. Thereafter continue with oral Metronidazole 400 mg every 8 hours for 10 days.
- If the patient is not better within 12 hours on intravenous antibiotics REFER her as appropriate

If trauma is suspected as the cause of shock, prepare for surgical intervention

Reassessment

Reassess the woman's response to fluids within 30 minutes to determine if her condition is improving. Signs of improvement include:

- ✓ Stabilizing pulse (rate of 90 per minute or less)
- ✓ Increasing blood pressure (systolic 100 mmHg or more)
- ✓ Improving mental status (less confusion or anxiety)
- ✓ Increasing urine output (30 ml per hour or more)

If the woman's condition improves:

- Adjust the rate of infusion of IV fluids to 1L in 6 hours
- Continue management for the underlying cause of shock

Further management

If the woman's condition fails to improve or stabilize:

- Continue to infuse IV fluids, adjusting the rate of infusion to 1 L in 6 hours and maintain oxygen at 6-8 L per minute
- Closely monitor the woman's condition
- Perform laboratory test including repeat haemoglobin determination, blood grouping and Rh typing. If facilities are available, check serum electrolytes, serum creatinine and blood pH.
- Manage as appropriate

UTERINE INVERSION

Definition

This occurs when there is prolapse of the fundus to or through the cervix so that the uterus is in effect turned inside out. It is said to happen when uterus turns inside out during delivery of the placenta. Uterine inversion is a potentially life threatening complication of childbirth requiring prompt diagnosis and definitive management. Almost all cases occur after delivery. It very rarely occurs in non-pregnant patients and is then usually associated with prolapsing **uterine fibroids**¹ although it can occur with other tumours. Incidence varies widely from as many as 1 per 1,584 deliveries to as few as 1 per 20,000 deliveries.

Uterine inversion may be classified as follows:

- First degree - the inverted fundus extends to, but not through the cervix.
- Second degree - the inverted fundus extends through the cervix but remains within the vagina.
- Third degree - the inverted fundus extends outside the vagina.
- Total inversion - the vagina and uterus are inverted.

Aetiology:

Identified aetiological factors include:

- Short umbilical cord
- Excessive traction on the umbilical cord
- Excessive fundal pressure
- Fundal implantation of the placenta
- Retained placenta and abnormal adherence of the placenta⁵
- Chronic endometritis
- Vaginal births after previous caesarean section
- Rapid or long labours
- Previous uterine inversion⁶
- Certain drugs such as magnesium sulphate (drugs promoting tocolysis)
- Unicornuate uterus⁷

Presentation

Uterine inversion may present:

- Acutely - within 24 hours of delivery
- Sub acutely - over 24 hours and up to the 30th postpartum day
- Chronic - more than 30 days after delivery

It presents most often with symptoms of a post-partum haemorrhage.

The classic presentation is of:

- Post-partum haemorrhage
- Sudden appearance of a vaginal mass
- Cardiovascular collapse (varying degrees)
- There may also be: Pain in the lower abdomen, a Sensation of vaginal fullness with a desire to bear down after delivery of the placenta

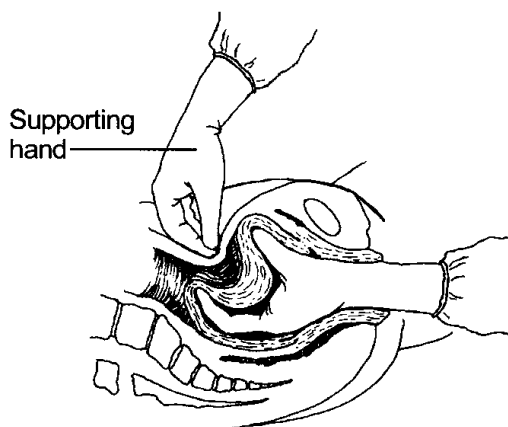
CORRECTING ACUTE UTERINE INVERSION

Procedure

- Get help. This should include the most experienced anaesthetic help available.
- Give pethidine 1 mg/kg body wt (not more than 100 mg) IM/IV slowly or morphine 0.1 mg/kg IM
- Secure further intravenous access with large bore canula and commence fluids. Resuscitation is usually started with crystalloids such as normal saline or Hartmann's solution
- Thoroughly cleanse the inverted area with antiseptic solution
- Insert a urinary catheter.
- Administer tocolytics to allow uterine relaxation. For example:
 - Nitroglycerin (0.25-0.5 mg) intravenously over 2 minutes **OR**
 - Terbutaline 0.1-0.25 mg slowly intravenously **OR**
 - Magnesium sulphate 4-6 g intravenously over 20 minutes
- Attempt prompt replacement of the uterus. This is best done manually and quickly as delay can render replacement progressively more difficult. **Grasp the uterine fundus and push it through the cervix in the direction of the umbilicus to its normal anatomic position while stabilising with the other hand.** (see diagram below) It is important that the part of the uterus that came out last (part closest to the cervix) goes in first.
- If this fails then a general anaesthetic is usually required.
- If manual correction fails proceed to hydrostatic correction
- DO not give any oxytocic drugs until inversion is corrected
- If bleeding continues, assess clotting status using bedside clotting test. Failure of a clot to form after 7 minutes or a soft clot that breaks down easily suggests coagulopathy
- Give a single dose of prophylactic antibiotics after correcting the inverted uterus
 - Ampicilin 2 g IV plus Metronidazole 500mg IV or
 - Cefazolin 1 g IV plus Metronidazole 500mg IV
- If there are signs of infection (fever, foul smelling vaginal discharge) give antibiotics as for metritis.
- If necrosis is suspected, perform vaginal hysterectomy

Techniques for repositioning the uterus

Manual repositioning of inverted Uterus



Hydrostatic repositioning

- Exclude uterine rupture first
- Place the patient in deep Trendelenburg position
- Infuse warm saline into the vaginal posterior fornix via a rubber tube (or ordinary IV administration set) held 1-2 metres above the patient while an assistant blocks the vaginal orifice
- It may be easier to do this by attaching the IV giving set to a silicone venous cup inserted into the vagina as this gives a better seal
- (The water distends the posterior fornix leading to increase in the circumference of the orifice which in turn relieves cervical constriction hence correcting the inversion)

If hydrostatic correction is not successful, try manual repositioning under general anaesthesia

Surgery

If above techniques do not work, it is necessary to use Surgery

- Perform laparotomy and reposition the uterus either by
 - Pulling from above using Allis' forceps placed in the dimple of the inverted uterus and gentle gradual upward traction (Huntington's procedure)
 - Or
 - Cut the cervical ring posteriorly using a longitudinal incision first (Haultain's technique)

After repositioning

- If placenta is still attached remove it manually **After** correction
- Maintain bimanual uterine compression and massage until the uterus is well contracted and bleeding has stopped
- Administer oxytocin 20 units in 500 mls IV fluids at 10 drops per minute to keep the uterus contracted. Increase to 60 drops per minute in case of haemorrhage.
- Give antibiotics to prevent infection(if not already commenced)
- Monitor closely after replacement to avoid re-inversion.

Differential diagnosis

- Prolapse of a uterine tumour
- Gestational trophoblastic disease
- Occult genital tract disease
- Marked uterine atony
- Undiagnosed second twin

Psychological/Mental Disorders in the postpartum period

Postpartum emotional distress is fairly common after pregnancy and ranges from mild postpartum blues (affecting about 80% of women) to postpartum depression (34%) or psychosis. Postpartum psychosis can pose a threat to the life of the mother or baby. The postpartum period should therefore be considered as a vulnerable time for the development of emotional and psychological disorders.

Types of postpartum psychological disorders

Postpartum blues

This is characterised by mild mood disturbances marked by emotional instability (crying spells apparently without cause, insomnia, exaggerated cheerfulness, anxiety, tension, headache, irritability, among others).

Usually the complaints develop within the first week postpartum, continue for several hours to a maximum of ten days and then disappear spontaneously.

Because of their frequency (30-70%), postpartum blues are sometimes considered a normal physiological event.

Post partum/postnatal depression

Postpartum Depression affects up to 34% of women and typically occurs in the early postpartum weeks or months although it may persist for a year or more.

Depression occurring later is more protracted and more serious than in the early postpartum period.

Depression has an important influence on maternal-infant interaction during the first year, because the infant experiences inadequate stimulation (Beck1995).

The woman typically presents with complaints of affective nature:

- She may be gloomy, depressed, irritable, and sad.
- Other complaints may include: insomnia, lack of appetite, disturbance of concentration, loss of libido, exhaustion, low energy and motivational levels, feelings of helplessness, and hopelessness, headache, backache, vaginal discharge and abdominal pain may be reported.
- She may also exhibit obsession thinking, fear of harming the baby or self, suicidal thoughts and depersonalisation.

Causes

The cause of postpartum depression remains unclear, with extensive research suggesting a multi-factorial aetiology.

Management

Treatment is not different from the treatment of depression in general and usually consists of psychotherapy and antidepressants.

There is no evidence that treatment with hormones (progesterone or its derivatives) is effective, although such treatment has often been advocated, based on uncontrolled studies.

The prognosis of postpartum depression is good. With early diagnosis and treatment more than two-thirds of women recover within a year.

Prevention of post partum depression:

- Studies have consistently demonstrated the importance of psychosocial and psychological variables and interventions in pregnancy and the early postpartum period to prevent postpartum depression (RHL no. 11 2008).
- Provision of a conducive labour environment e.g. (providing a companion during labour) has also been shown to reduce postpartum depression (Wolman et al 1993).
- Health care workers could promote self-care activities among new mothers to assist in alleviating depressive symptoms during the postpartum period
- Local support groups of women who have had similar experiences is also valuable
- Efforts should be made to educate family members in the early detection of the signs and symptoms of depression in a pregnant woman. (RHL no.11 2008) The husband and family members should be involved in caring for postpartum mothers experiencing depressive symptoms.
- Financial difficulty is a risk factor commonly associated with perinatal depression. Women in low resource setting need empowerment to ensure financial security during pregnancy and childbirth (RHL no.11 2008)

Postpartum/ Puerperal Psychosis

This is a much more serious disturbance, affecting less than 1% of postpartum women. The cause is unknown, although about half of the women experiencing psychosis also have a history of mental illness. Women who have bipolar disorder or schizoaffective disorder have a higher risk for developing postpartum psychosis. These symptoms usually start at the end of the first week postpartum

Postpartum psychosis may be characterized by:

- Abrupt onset of delusions or hallucinations,
- Insomnia, paranoia,
- Mania,
- Abnormal preoccupation with the baby,
- Severe depression, anxiety, despair
- Suicidal or infanticidal impulses
- Abnormal reaction towards her family members;

Management

Admission to a psychiatric department or clinic is necessary; preferably with her baby.

The psychotic disease as such is indistinguishable from other psychoses.

Nevertheless the woman has an increased chance of recurrence in subsequent pregnancies.

These women also have an increased risk of psychotic disorder in other stressful circumstances.

The task of the primary caregiver is to be watchful and to diagnose the disease in time (Basic maternal and newborn Care: a guide for Skilled Providers – JHPIEGO).

- A past history of psychotic illness should alert caregivers to potential problems.
- Mothers with symptoms **of postpartum psychosis should be promptly referred for hospital care.**
- Where there are clear signs of psychosis the patient should be accompanied to a hospital or clinic
- The patient should be provided with psychological support and practical help (with the baby as well as with home care)
- To avoid tragic outcomes, actively listen to the woman and provide necessary encouragement.
- Lessen stress and avoid dealing with emotional issues when the mother is still unstable.
- If antipsychotic drugs are used, be aware that medication can be passed through breast milk and that infant feeding options should be reassessed.

Prognosis for recovery is excellent although about 50% of women will suffer a relapse during subsequent deliveries.

Summary

Sign/symptom	Anatomic/ Physiologic basis	Prevention and relief measures – provide reassurance and:	Alert signs that may indicate a problem
Dreams (vivid) or Nightmares	Hormonal changes	Counsel the woman and advise her and/or companion as follows: - To avoid eating just before bedtime - To return for care if Signs/symptoms worse; or if Danger signs arise	
Fatigue/somnolence Commonly occurs during the first trimester and week 1 postpartum May persist if woman is not getting enough sleep	Emotional stress Normal reaction to the hard work of labour and birth Enormous amount of energy expended in labour and birth Emotional and physical stress of having to care for the baby in addition to her previous responsibilities Interrupted sleep to feed and care for the baby	Counsel the woman and advise her and/or companion as follows: - Eat a balanced diet. - Take micronutrient supplements as directed - Exercise daily - Try and get adequate rest and sleep (e.g. taking a nap when the baby sleeps) The woman should avoid: - Over-exertion - Smoking and alcohol The woman's partner/family should: - Ensure that the woman has time for rest and sleep - Avoid making unnecessary demands on her - Share some of the responsibilities of newborn care. - Ensure that the woman to return for care if Signs/symptoms worsen or Danger signs arise	Dizziness /fainting, Pallor, Breathlessness, Tachycardia, Oedema Insomnia, Symptoms suggestive of postpartum depression Symptoms suggestive of postpartum psychosis
Feelings of inadequacy, worry, or fear Most commonly occur during weeks 1 – 2 postpartum Especially common among adolescents and primipara	The woman is suddenly confronted with: The reality of a new and very dependent life in her care The challenge of learning about child care when she is feeling physically vulnerable	Provide support and reassurance through your words as well as your actions by: - Assuring her that she is of inestimable worth - Commending her for what she does right - Giving her clear and careful advice/counselling on newborn care and self-care. - Allowing her to ask questions and discuss her anxieties. Advise the woman and/or her companion as follows: - Eat a balanced diet and get daily exercise. - Take time for herself - Resume social contacts as soon as feasible. - Avoid unrealistic expectations for herself. - Take a nap when the baby sleeps / whenever possible.	Crying, feelings of sadness or of being overwhelmed, irritability between 3 and 6 days after birth (PP Blues) Insomnia, excessive or inappropriate sadness or guilt, feelings of worthlessness and/or anxiousness

		Suggest that the woman's partner/family to: • Ensure that the woman has time for rest and sleep. • Avoid making unreasonable demands on her. • Allow her time alone with her partner • Be sensitive to the woman's needs. • Care for the woman in an attentive and compassionate way. • Share some of the responsibilities of newborn care. • Ensure that the woman returns for care if Signs/symptoms worsen or Danger signs arise	lasting for more than 1 week (PP depression) Hallucinations, delusions, morbid or suicidal thoughts (puerperal psychosis)
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The Referral Link

Importance of Referral:

Referral is two way: from community to facility and vice versa. Appropriate referral enables the mother and baby to reach a health facility and access care especially during an emergency in an efficient and timely manner. The facility on the other hand may refer a client to the community level workers for observation

The Referral Link

Mothers who have delivered at a health facility by a skilled birth attendant should be discharged with a referral note to the community health worker to visit her on day 3 and day 7.

The Community health worker on the other hand needs to refer mothers to the facility for routine care as well as in emergency situations

For the referral system to be effective, facility and community level workers must work in collaboration. This is in order to:

- Foster partnerships and good working relationships between these two groups of workers hence strengthen the community facility interface
- Strengthening the continuum of care between the community and facility
- Establish a joint platform in the interest of reducing maternal and newborn morbidity and mortality; while ensuring regular performance review
- Strengthening coordination of care both at facility and community levels

COMMUNITY MATERNAL AND NEWBORN HEALTH

Content outline:

1. Introduction
 - a. Definition
 - b. Justification
 - c. Background information (situation analysis and challenges)
2. Overview of community strategy
3. The role of the Community Midwife
4. The role of the CHEW
5. The role of the CHW in Community MNH
6. The role of the community

Introduction

The aim of working at community level is to contribute to the empowerment of women, families and communities to improve and increase control over maternal and newborn health, as well as to increase access and utilization of quality health services, particularly those provided by skilled attendants. (WHO 2003 Working with Individuals, Families and Communities)

For successful implementation of MNH programmes resulting in improved maternal and newborn health, active involvement of individuals, families, and communities is critical for sustainability and ownership. Within the context of primary health care ownership implies a buy in of the community through participation and a willingness to contribute towards the sustainability of the service.

There is evidence that community mobilization is an effective method for promoting participation and empowering communities among a wide range of health and other non health benefits (Lancet September 2008). There is also increasing awareness among service providers that communities not only take the majority of preventive and promotive health actions, they also provide clinical care of the critically and chronically ill. Evidence from India has also shown the value of a home based newborn care package to reduce neonatal morbidity and mortality. (Bang et al 2003).

Definition:

A community is a group of people who have common interests, needs, goals, boundaries and social support systems. Communities are therefore at the foundation of affordable, equitable and effective health care, and are the core of the Kenya Essential Package for Health (KEPH) as proposed in the second National Health Sector Strategic Plan 2005 (NHSSP II).

Background information

Situation analysis

Despite having national health policies and strategies that are focused on improving health care delivery services and systems, maternal and newborn health has not shown any significant improvement at the household level. Some of the challenges are:

- Poverty
- Lack of information
- The HIV pandemic
- Escalating cost of health services
- Lack of engagement of communities
- Inequities in provision of and access to health services
- Socio- cultural and religious beliefs and practices that affect health seeking behaviours.
- Poor quality of health services and poor deployment practices
- Lack of government commitment to MNH

The majority of women continue to deliver at home without skilled attendance, and the first 2 delays are still a major contributor to maternal mortality in Kenya. It is well demonstrated that simple community based approaches could save up to 32% of neonatal deaths and most child deaths and as well as benefiting maternal health (Lancet Neonatal Survival 3). The recognition that Kenya would not attain the MDGs unless the communities were actively involved in improving their health care led to the inclusion of the community strategy as part of the NHSSP2. Under the NHSSP2, the community level is designated as level 1 of the health service structure.

The Community Strategy

The overall goal of the community strategy is to enhance community access to health care in order to improve individual productivity and thus reduce poverty, hunger, child and maternal deaths, as well as improve education performance across all the stages of the life cycle.

The intention of the community strategy is to strengthen the capacity of communities to analyse, plan, implement and manage health and health – related development initiatives so that they can contribute effectively to the country 's socio – economic development

Community participation is the active involvement of the community in all or some of the stages of a programme that is problem identification, prioritization, planning, monitoring, implementation and evaluation using locally available resources. The amount and quality of the participation depends on the level of community involvement in the action to be undertaken.

(See also the Community Strategy- NHSSP 2)

MNH Services provided at within the community (Level 1)

Level 1 MNH activities may include the following:

- *Disease prevention and control*
 - To reduce morbidity, disability and mortality due to HIV/AIDS, STI, TB, and malaria
 - First aid and emergency preparedness
 - IEC for community health promotion and disease prevention
- *Family health services to expand FP, maternal, newborn, child and youth services*
 - MNCH/FP, maternal care/obstetric care, immunization and C-IMCI
 - Adolescent reproductive health
- Non-communicable disease control:
 - Anaemia, nutritional deficiencies, mental health, kitchen gardens
- Community-based referral system, particularly in emergency situations
- Healthy home environment and environmental sanitation
- Organization of community health days

Formal cooperation between the Ministry of Public Health and Sanitation, the Ministry of Culture and Social Services, Ministry of Gender, and non-government organizations (NGOs)/ CBOs, FBOs and CSOs involved in MNH works well in achieving and sustaining results.

Health committees (at divisional, locational, sub-locational and village level) are expected to organize actions for health promotion at their different levels in order to contribute to the health and well being of the community.

Providers of Health Care at Level 1

According to the *Norms and Standards for Health Service Delivery*:

- One level one unit serves 5 000 people and requires 50 Community Health Workers (CHWs) and 2 Community Health Extension Workers (CHEWs)
- One CHEW (retrained Public Health Technician or Nurse) supervises and supports 25 CHWs
- One community health worker (CHW) serves 20 households or approximately 100 people
- Community midwives (where they exist) can provide skilled birth care in the community

Community Midwifery

The Community Midwifery (CM) model has been demonstrated to be feasible to implement and acceptable to communities, families and the Kenyan Ministry of Health (MOH). It has proved effective in increasing the proportion of women delivering with a skilled attendant, as well as increasing the proportion of new mothers accessing postnatal care and immunizations (Mwangi and Warren 2008).

The Community midwife is:

1. A health professional who has permanent residency within the community to be served
2. A trained and qualified and registered health professional with the evidence of any one of the following: KRM, KEM, KRHCN and KECHN, Registered Clinical Officer with RH or a medical practitioner
3. Evidence of retention on a professional register (Nursing Council of Kenya, Kenya Clinical Officers Council, Medical Practitioner's and Dentists Board)

Furthermore the Community midwife should be:

- Ready to be supervised and monitored by the DHMT, (usually the Deputy District Public Health Nurse)
- Willing to link with the health care system through the nearest health facility for support such as updates, transport for emergencies, supplies, equipment
- Willing to collect data and submit reports
- Willing to link with civil society and the provincial administration and work as a team in the advocacy of maternal and newborn care services
- Willing to work closely with/supervise CHWs, CHEWs, and VHWs recognizing the role of each in the provision of MNH in the community
- Willing to work closely with the community leaders and community groups to identify the most common health problems and work together for a solution.

(For further reading, please refer to the Community Midwifery guidelines)

Roles and responsibilities of the CHEW

These include the following:

- Facilitate the linkages between the health facility and the community
- Participate in the selection, training and support of the CHWs and Community Health Committees
- Provide technical and logistical support to caregivers at level 1
- Manage the Community Based Health Information systems and use it to continually improve the health status of the community unit
- Monitor the use of simple drugs, commodities and supplies
- Provide supportive supervision and coaching to CHWs
- Provide technical support during community based MDR
- Organise and facilitate periodic health dialogue and action days

Roles and responsibilities for CHWs

- Advocate for community leadership support for safe pregnancy and delivery of a healthy newborn
- Provide IEC on current KAP on safe pregnancy and delivery of a healthy newborn
- Assist the mother and family to formulate an Individualised Birth Plan, including emergency preparedness and complication readiness
- Promote skilled birth attendance by disseminating key messages to support safe pregnancy & delivery of a healthy new born and timely referral
- Promote at least 4 focused ANC visits beginning early and skilled birth attendance
- Promote PMTCT- Along the continuum of pregnancy, delivery and postnatal period
- Promote postnatal care including the use of postpartum FP
- Provide community based Essential Newborn Care
- Provide IEC with key messages to promote early childhood care including exclusive breastfeeding
- Distribute preventive materials and supplies (ITNs, nutritious foods)
- Community Based Distribution of Contraceptives (level 1:- pills, condoms)
- Keep accurate records including Mapping of pregnant women in their area.

(For further reading, please refer to the community MNH guidelines)

The Key Role of Households and Communities as Partners in LEVEL ONE SERVICES***Health promotion***

- Promoting gender equity
- Demanding quality MNH services
- Ensuring a healthy diet in order to meet nutritional needs for mothers and children.
- Ensuring pregnant mothers have individualized birth and complication readiness plans
- Ensuring pregnant mothers have adequate rest
- Monitoring health status to promote early detection of problems for timely action.
- Utilize various community forums to disseminate positive health messages
- Increase community awareness on available MNH services for special groups
- Encourage male involvement in health related matters especially MNH
- Address cultural norms and practices that negatively impact on maternal and newborn health
- Supporting exclusive breastfeeding

Disease prevention:

- Practicing good personal hygiene e.g. washing hands, oral hygiene, using latrines and waste disposal
- Using safe drinking water.
- Ensuring adequate shelter, and protection against vectors of disease eg ensuring use of ITNs especially for all pregnant women and children less than 5 years.

- Preventing accidents, abuse, and taking appropriate action when they occur.
- Ensuring appropriate sexual behaviour to prevent transmission of HIV /AIDS and sexually transmitted diseases.

Health Care seeking and compliance with treatment and advice:

- Ensure that every pregnant woman receives antenatal care, skilled attendance at birth, and postnatal care services
- Ensure that all births and deaths (including still births) are registered especially for mothers and newborn
- Community should ensure that all babies are weighed as soon as possible after delivery
- Ensure that infants complete a full course of immunizations.
- Recognizing and acting on the need for referral or seeking care outside the home.
- Follow recommendations given by health workers in relation to treatment, follow-up and referral.
- Promote utilization of FP services for the health and wellbeing of the mother, baby, family and community

Governance and management of health services

- Establishment / strengthen and actively participate in community health committees
- Promote establishment of community health financing mechanisms
- Ensure effective community referral and linkages
- Establish and participate in community maternal death reviews (verbal autopsy)
- Ensure that health providers in the community are accountable for effective maternal and newborn health service delivery, resource use and above all functioning in line with the Citizen's Health charter
- Provide enabling environment for delivery of health services
- Ensure that Financial and administrative resources are allocated to support sustainable engagement of women families and communities

Male involvement

Reproductive health programmes have gained increased awareness of the role of men in maternal and newborn health as partners, fathers and community members. This role is defined by an interplay of cultural, social, gender and economic factors, which do not in general prepare men to participate in the crucial aspects of pregnancy, childbirth and postnatal care. Also, there is an increased acknowledgement of men's reproductive rights and their own reproductive health needs, including active and informed involvement in maternity, childbirth and childcare.

Men are key decision-makers in maternal and newborn care-seeking behavior. They need to understand the needs, risks and danger signs of pregnancy, childbirth and postpartum periods to support women.

Promotion of the role of men as partners and fathers is essential for their involvement and support.

Health care workers need to be prepared to work with men as well as with women, to support them in their roles. Health services can consider convenient hours for men so that, when feasible, women can be encouraged to invite their partners to accompany them for care or fathers can be allowed to attend deliveries for support. Providers also need the interpersonal skills to work with men to support them in their roles and to support women in developing capacities for decision-making. Birth and emergency preparedness will also reinforce the need for couple communication and decision-making.

Themes for the role of men in maternal and newborn health

- ✓ Maternal and newborn health needs
- ✓ Couple communication and shared decision-making for birth planning
- ✓ Participation in antenatal care, childbirth, postnatal care of the mother and newborn
- ✓ Emergency signs and appropriate care for the woman and newborn
- ✓ Prevention of STIs/HIV/AIDS
- ✓ Birth spacing and postpartum family planning
- ✓ Support for breastfeeding
- ✓ Participation of men in raising and educating their children
- ✓ Responsible paternity and adulthood (for youth)

Traditional Birth Attendants (TBAs)

In Kenya, the TBAs are not considered as skilled birth attendants due to the negative experiences encountered even with the 'trained TBAs. It has been noted that TBAs are unable to address any of the 5 major causes of maternal mortality in Kenya. However their roles have been redefined and may include the following:

- ✓ Advocate for maternal and newborn health needs
- ✓ Encourage (even accompany) women to attend essential antenatal and postnatal care and have skilled care during birth
- ✓ Support women and newborns in self-care and care compliance (nutrition, treatment, supplementation, immunization, scheduled appointments, family planning, infant feeding).
- ✓ Disseminate health information in the community and within families
- ✓ Provide social support during and after birth, either as a birth companion, or provide support to the household while the woman is away at birth
- ✓ Serve as a link between women, families and communities and local authorities and formal health services

(Source and for further reading: - Working with Individuals, Families and Communities to Improve Maternal and Newborn Health –WHO 2010)

INFECTION PREVENTION IN MNH

Outline

- Definition Infection Prevention
- The disease transmission cycle
- Purpose of infection prevention
- Principles of infection prevention
- Hand washing technique
- Procedure of handling sharps
- Procedures used to process instruments
- Procedures for waste disposal

Definition

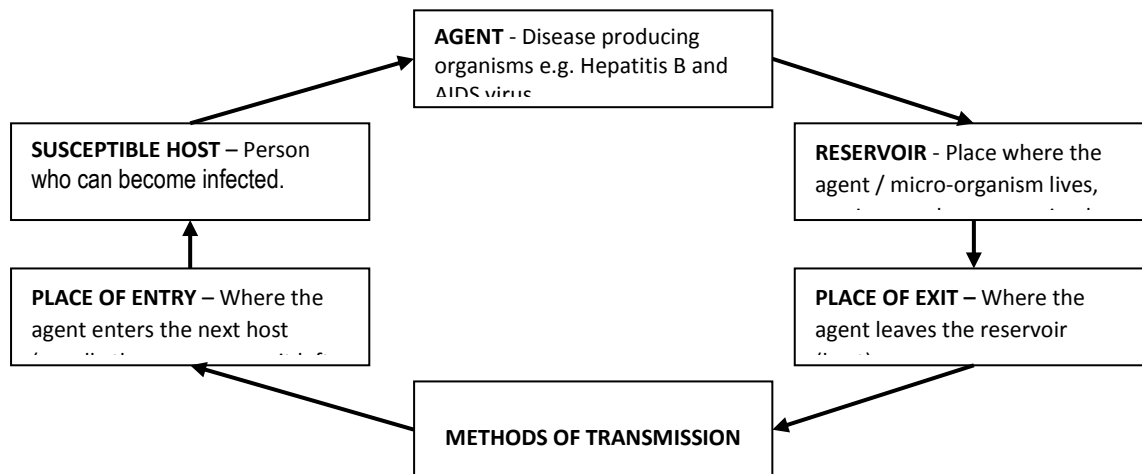
Infection prevention is a collective effort made by healthcare providers and clients to prevent or minimize the risks of transmitting infections such as Hepatitis B and HIV/AIDS to other clients or to other healthcare providers. It also aims to make instruments free from infective organisms and safe for use.

Rationale

Evidence has shown that inpatients and health care providers acquire infections from the hospital environment - for example in England about 9 % of inpatients acquire hospital infections at any one time. This is equivalent to at least 100,000 infections a year (National Audit Office, 2000). According to the Centre for Disease Control and Prevention, 5 percent of all patients in U.S. hospitals develop infections; at least one third of these infections are preventable. The rates are believed to be much higher in the developing world, where resources for health care are limited.

Infection prevention measures are important in all health care situations. Therefore health care providers should take precautions when performing maternal and neonatal health procedures to minimize personal risks resulting from exposure to blood and other body fluids. Even when a sterile technique is used for delivery, infections can still occur from patient's endogenous bacteria if they are brought into the uterus by examining fingers or by the instruments during pelvic examination or other vaginal procedures, or by foreign bodies that are inserted into vagina, e.g. pessaries, herbs, oil, cloth, or by sexual intercourse.

DISEASE TRANSMISSION CYCLE: This is as outlined below. Infection prevention seeks to minimise transmission at the different levels.



(Adapted from WPRO/WHO)

The purpose of Infection Prevention

The primary purpose of infection prevention in health care facilities is two-fold:

- To minimize infections due to micro organisms causing serious wound infections, abdominal abscesses, pelvic inflammatory disease, gangrene and tetanus.
- To prevent the transmission of serious, life threatening diseases such as hepatitis B and HIV/AIDS.

Principles of Infection Prevention

The recommended infection prevention practices are based on certain important principles, which are outlined below.

- Every person (patient or staff) should be considered potentially infectious;
- Hand washing is the most practical procedure for preventing cross-contamination;
- Wear gloves before touching anything wet – broken skin, mucous membranes, blood or other body fluids (secretions or excretions);
- Use barriers (protective goggles, face masks or aprons) if splashes and spills of any body fluids (secretions or excretions) are anticipated;
- Use safe work practices, such as not recapping or bending needles, proper instrument processing and proper disposal of medical waste

Universal Precautions

Universal precautions are a simple set of effective practices designed to protect health workers and patients from infection with a range of pathogens including blood borne viruses. They help to break the disease transmission cycle and these practices are used when caring for all patients regardless of diagnosis. They include the following:

- Hand washing.
- Wearing of gloves, eye protection or face shields and gowns.
- Correct handling, transporting, and processing of instruments, used/soiled linens and client care equipment
- Safe use and disposal of needles and sharps (avoid re-capping)
- Promptly cleaning up blood and body fluid spills
- Using safe disposal systems for waste collection and disposal
- Practice of environmental cleanliness.

The Steps of Infection Prevention include the following

1. Hand washing
2. Decontamination
3. Cleaning
4. High-Level Disinfection (HLD)
5. Sterilization
6. Storage
7. Waste disposal
8. House keeping

Hand washing is the single most important procedure in preventing infection

Hand washing

Hand washing causes a significant reduction in potential pathogens carried on the hands. Ninety nine percent (99%) of the transient organisms/bacteria are removed with simple hand washing using plain soap, water and friction. There is consistent evidence that hand washing is linked to a reduction in infection rates. Hand washing should be done before: examining (direct contact with) a patient and before Putting on surgical gloves

Hand washing should be done after:

- Any situation in which hands may become contaminated, such as:
- Handling soiled instruments and other items;
- Touching mucous membranes, blood or other body fluids (secretions or excretions);
- Having prolonged and intense contact with a patient; and
- Removing gloves

Hand washing should also be done in between examining patients.

Hands should be washed with soap and clean water (or an antiseptic Hand rub can be used) even after removing gloves because the gloves may have tiny holes or tears, and bacteria can rapidly

multiply on gloved hands due to the moist, warm environment within the glove (CDC 1989; Korniewicz et al 1990). To encourage hand washing, program managers should make every effort to provide soap and a continuous supply of clean running water, either from the tap or a bucket, and single-use towels.

If paper towels are not available, dry hands with a clean towel or air-dry. (Shared towels quickly become contaminated and should not be used. Carrying one's own small towel or handkerchief can help to avoid using dirty towels. If you use your own towel, it should be washed every day.)

Avoid dipping hands into basins containing standing water. Even with the addition of an antiseptic agent, such as Dettol⁷ or Savlon⁷, micro organisms can survive and multiply in these solutions (Rutala 1996).

Do not add soap to a partially empty liquid soap dispenser. This practice of topping "topping off" dispensers may lead to bacterial contamination of the soap.

When no running water is available, use a bucket with a tap that can be turned off to lather hands and turned on again for rinsing, or use a bucket and pitcher

Used water should be collected in a basin and discarded in a latrine if a drain is not available.

Hand Antisepsis

The goal of antisepsis is to remove soil and debris from the hands. Antisepsis also serves to reduce both transient and resident flora.

The technique for hand antisepsis is similar to that for plain hand washing. It consists of washing hands with water and soap or detergent (bar or liquid) containing an antiseptic agent (often chlorhexidine, iodophors or triclosan) instead of plain soap.

Hand antisepsis should be done before examining or caring for highly susceptible patients (e.g., premature infants, elderly patients or those with advanced AIDS) and before performing an invasive procedure such as placement of an intravascular device etc.

While practicing hand antisepsis, the provider should always be aware of patients on Contact Precautions (e.g., hepatitis A or E) or those who have drug resistant infections (e.g., methicillin-resistant *S aureus*).

Hand washing with medicated soaps or detergents is more irritating to the skin than using antiseptic hand rubs (see next section); therefore, if available, antiseptic hand rubs should be used instead (Larson et al 1990 and Larson *et al* 2001).

Antiseptic Hand rub

Use of an antiseptic hand rub is more effective in killing transient and resident flora than hand washing with antimicrobial agents or plain soap and water. It is quick and convenient to perform, and gives a greater initial reduction in hand flora (Girou et al 2002). Antiseptic hand rubs also

contain a small amount of an emollient such as glycerine, propylene glycol or sorbitol that protect and soften the skin.

Since antiseptic hand rubs do not remove soil or organic matter, if hands are visibly soiled or contaminated with blood or body fluids, hand washing with soap and water should be done first.

In addition, to reduce the “build up” of emollients on hands after repeated use of antiseptic hand rubs, washing hands with soap and water after every 5–10 applications is recommended.

Finally, hand rubs containing only alcohol as the active ingredient have limited residual effect (i.e., ability to prevent growth of bacteria after being applied) compared to those containing alcohol plus an antiseptic such as chlorhexidine.

Hand washing with plain soap and water followed by use of an antiseptic hand rub containing chlorhexidine has been shown to yield significantly greater reductions in microbial counts on hands, improve skin health and reduce time and resources (Larson et al 2001).

Antiseptics versus disinfectants

Antiseptics	Disinfectants
Used for: Surgical hand scrub Skin, cervical, vaginal preparation before a clinical procedure Hand washing in high-risk situations	Used for: High-level disinfectants – processing instruments and other items Low-level disinfectants – cleaning surfaces
Use on skin and mucous membranes to kill micro organisms	Use to kill micro organisms on inanimate objects
Not for use on inanimate objects	Not for use on skin or mucous membranes

Surgical Hand scrub

The purpose of the surgical hand scrub is to mechanically remove soil, debris and transient organisms and to reduce resident flora for the duration of surgery. The goal is to prevent wound contamination by microorganisms from the hands and arms of the surgeon and assistants.

For many years, preoperative hand scrubbing protocols required at least a 6–10 minute vigorous scrub with a brush or sponge, using soap containing an antiseptic agent (chlorhexidine or an iodophor). This practice, however, has been shown to damage the skin and can result in increased shedding of bacteria from the hands (Dineen 1966; Kikuchi-Numagami et al 1999).

Several studies suggest that neither a brush nor sponge is necessary to reduce bacterial counts on the hands of surgical staff to acceptable levels.

USE OF GLOVES

There are different types of gloves that may be used in MNH. They include the following: Surgical gloves, Single use examination gloves for non sterile procedures, and Utility or heavy duty household gloves for cleaning.

Before gloving, it is important to remove rings or other finger /hand jewellery. The service provider should wear the correct size of gloves and to use separate pair of gloves for each patient. 'Clean' areas should always be examined first before 'dirty' areas for instance perform a vaginal examination before a rectal examination.

USE AND DISPOSAL OF NEEDLES AND SHARPS

Hypodermic Needles and Syringes

Use each needle and syringe only once

Do not disassemble needle and syringe after use

Pass sharps using 'hands free' techniques

Do not recap, bend or break needles before disposal

Dispose the needle and syringes in puncture-proof container.

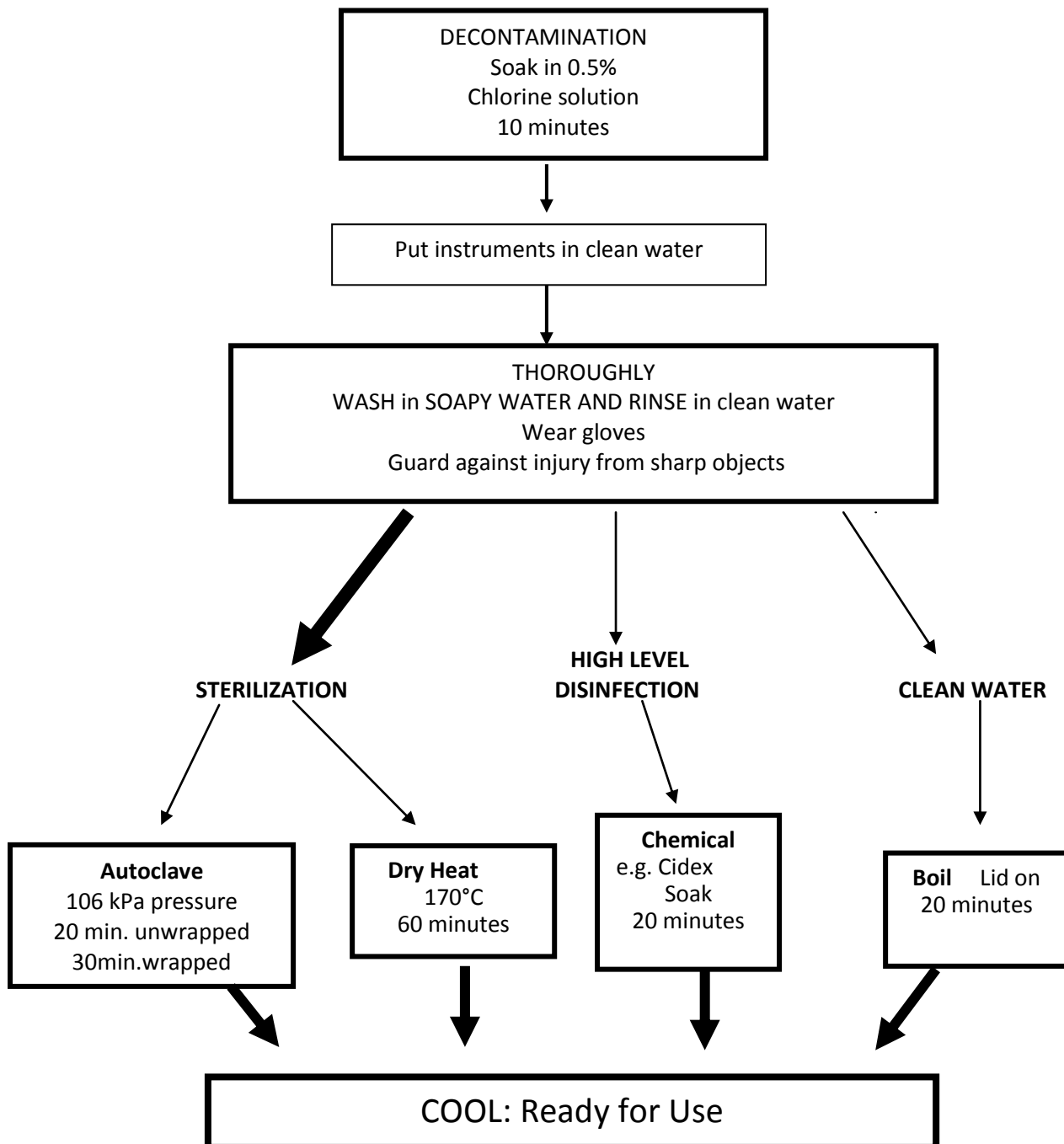
Note: In some special circumstances where a recapping is necessary, use the "one-hand" recap method:

Note: Never use a syringe for more than one injection.

Studies have shown that changing only the needle, not the syringe, between clients can result in the transmission of hepatitis B virus, and presumably HIV/AIDS. Never leave a needle inserted in the rubber stopper of a multiple dose bottle. This practice is dangerous as it provides a direct route for bacteria to enter the drug.

Causes of injuries with sharps

1. Recapping hypodermic needles
2. Manipulating sharps before disposal
3. Accidentally pricking another staff member
4. Leaving sharps in areas where they are unexpected
5. Surgical procedures with limited visibility or in confined spaces
6. Improper handling or disposing waste
7. Unexpected client motion during injections

PROCEDURES FOR PROCESSING INSTRUMENTS

Wrapped sterile packs can be stored for up to one week.

Unwrapped items should be stored in a sterile or HLD container with a tight fitting lid or used immediately

Decontamination

This is the first step in processing items

It makes items safer to handle and easier to clean

To prepare the solution, add 1 part bleach to 6 parts water to make a 0.5% chlorine solution

Soak items in a 0.5% chlorine solution for 10 minutes immediately after use. Do not soak longer

Replace solution daily or when it becomes heavily contaminated

NB: Neither Sterilization nor High Level Disinfections procedures are effective without prior cleaning using detergent water and brushes.

Cleaning instruments and other items

Cleaning is the process of physically removing all organic material, such as blood, tissue, sputum, faeces and urine. Neither sterilization nor high-level disinfections is effective without prior cleaning with clean water and soap. Cleaning: removes blood, body fluids, tissue and dirt; reduces the number of micro organisms (including endospores).

Health care providers are advised to have 3 plastic buckets with lids and coded colours for decontamination and cleaning process of contaminated instruments.



High –level disinfection and storage (HLD)

High-level disinfection (HLD) refers to the destruction of all microorganisms with the exception of bacterial spores (Rutala, 1996). When the high-level disinfectant / sterilant (a chemical germicide) is used for a shorter exposure time it destroys all viruses, vegetative bacteria, fungi, mycobacterium and some, but not all, bacterial spores. HLD is used for items that will come in contact with broken skin or intact mucous membranes

Types of HLD include Boiling and Use of chemicals

Tips for HLD by boiling

1. Open or disassemble items
2. Articles must be completely immersed in water
3. Start timing when the water begins to boil
4. Do not add anything else to the pot after boiling begins
5. Boil for 20 minutes in a cooking pot with a lid
6. Store all items dry and use within one week

Chemicals for HLD

The chemicals that can be used for HLD include Chlorine and Glutaraldehyde

The following chemicals should not be used for HLD: Alcohol, Benzalkonium chloride (Zephiran) Carbolic acid (Lysol, Phenol), Chlorhexidine gluconate (Hibitane, Hibiscrub), Chlorhexidine gluconate with cetrimide (Savlon, Cetavlon), Formaldehyde, Hydrogen Peroxide, Iodophors, Mercury-containing compounds, PCMX (chloroxylenol, Dettol), and Sporicidin.

Use of Chlorine versus Glutaraldehyde

Chlorine	Glutaraldehyde
Cheapest effective disinfectant	More expensive
Effective against many micro organisms	Effective against many micro organisms
Can be corrosive; do not use on laparoscopes	Not corrosive when used as directed
Can be irritating to users	Irritating to users
Prepare a new solution daily	Use prepared solution for up to two weeks

STERILISATION AND STORAGE

Sterilization is the process in which all microorganisms including endospores are destroyed.

Sterilization

Eliminate all micro organisms, including endospores

Recommended when items will come in contact with the bloodstream or tissue under the skin

METHODS OF STERILISATION

Dry heat sterilization	Steam sterilization (autoclave)	Chemical sterilization
C for 2 hours It is not necessary to open or disassemble items Start timing when the oven reaches the desired temperature	C Pressure: 106 kPa Time: 20 minutes if unwrapped, 30 minutes if wrapped Wrapped packs can be stored up to 1 week Unwrapped items should be stored in a sterile or HLD container with a tight fitting lid	Gluteraldehyde 2-4%: soak for 10 hrs minimum OR Formaldehyde 8%: soak for 24 hrs minimum Rinse with boiled water and air dry Store in HLD container with a tight lid

WASTE DISPOSAL

Types of Waste may be classified as follows:

- General waste – This is non hazardous and poses no risk of injury or infection
- Medical waste – This is generated during diagnosis, treatment, delivery and/or immunization,
- Hazardous chemical waste – Includes chemicals that are potentially toxic or poisonous

Importance of proper waste disposal

1. It minimizes the spread of infection to health workers, patients and the local community
2. It reduces the risk of accidental injury to those who handle the waste
3. It reduces the likelihood of contamination of soil, ground water, etc
4. It reduces attraction of insects and rodents
5. It reduced odours

Guidelines for disposal of medical waste

- Wear utility gloves and shoes
- Use washable, leak-proof containers
- Keep containers in convenient and safe places
- Transport solid contaminated waste for disposal in covered containers
- Carefully pour liquid waste down a utility drain.
- Empty containers daily or when three-quarters full
- In case of sharps burn or bury the container
- Burn or bury contaminated solid waste
- Never put hands into containers
- Ensure that you wash the gloves and your hands afterwards
- To ensure safe disposal of waste, colour coding of the different types of waste is recommended

Colour coding for waste segregation

Category	Example	Colour of bin
Non-infectious	Papers, food, cartons	Black 
Infectious	Gloves, dressings, body fluids	Yellow 
Highly infectious	Anatomical waste	Red 

HOUSE KEEPING

General cleaning and maintenance of cleanliness reduces the number of micro organisms and thus the risk of infections. It also provides an appealing environment

Room arrangement

- Put everything in the right place
- Make sure that all the equipment and supplies needed are accessible
- Arrange the room so that you can move around easily and safely

General guidelines for housekeeping

- Schedules should be posted and followed
- Utility gloves and shoes should be worn when cleaning client-care areas
- Minimize scattering of dust and dirt
- When cleaning wash from top to bottom
- Change cleaning solutions when they are dirty

DISPOSAL OF THE PLACENTA

Placenta is classified as solid Medical waste. Disposal should therefore be as per recommended IPC guidelines. Generally speaking

Solid medical waste should be disposed of on the premises; this allows staff who understand the risks involved to supervise the disposal process. There are three options for the disposal of solid medical waste: burning, burying, and transport.

Burning/ incinerating. Burning is the best option, since the high temperature destroys microorganisms and reduces the amount of waste. Burning in an incinerator or oil drum is recommended. Open burning is not recommended because it causes scattering of waste, is dangerous, and is unattractive. However, if open burning must be done, carry the waste to the site just before burning, and burn it in a small, designated area. Remain with the fire until it is completely out.

Burying. On-site burial is the next best option. To use burial, you must have space for a pit big enough for all the waste generated at the site. The pit should be surrounded by a fence or wall to limit access to it and to prevent scavenging of waste.

Transporting. If neither burning nor burial on site is possible, the waste must be transported for off-site disposal. If waste will be handled during transport by non-facility staff (such as municipal trash removers), they must be educated about the cautions and risks regarding medical waste.

Transport to a community dump is the least desirable alternative. Open dumps increase the community's risk of exposure to infectious microorganisms because: 1) they facilitate the spread of infections by flies, rodents, and other animals that come in contact with medical waste; and 2) they encourage scavenging.

Always wear heavy utility gloves and shoes when handling medical waste.

Note:

There is also a growing trend of using the placenta to facilitate the woman's postpartum recovery through ingestion of the placenta, known as **placentophagy**. The placenta is incredibly nutritious and contains many of the vitamins, minerals and hormones that a mother's body needs to adequately recover from the pregnancy and birth. Women who take part in this practice feel that they have a faster recovery from the pregnancy and birth, have more energy and increased milk production, and often do not experience any postnatal mood instability such as the "baby blues," or postpartum depression.

If a woman wants to use the placenta for her postpartum recovery, special consideration must be given to its care after the birth. From the time it's born the placenta must be handled as though it were food, because that is what it will soon become.

MATERNAL AND PERINATAL DEATH REVIEW

Outline

- Introduction
- Definition of Maternal and Perinatal Death
- Purpose of Maternal and Perinatal Death Review
- Different approaches of maternal health audits to improve quality of care
- Guiding principles for Maternal and Perinatal Death reviews
- Model for National Maternal Death Notification and Review in Kenya
- Process of MDR at different levels

Introduction

Maternal and perinatal death reviews have resulted into improved quality of maternal and perinatal services as reflected by a reduction in maternal mortality, notably in South Africa where maternal death review processes were introduced in 1998. It was introduced in Kenya in 2004 and it is encouraged to review all maternal and perinatal deaths that occur at facility and community level.

Definition of Maternal Death

The definition of a maternal death is:

“The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes”

Definition of Perinatal Death

The definition of a perinatal death is:

“The definition of a foetus weighing at least 500 grams (or 22 weeks gestation), plus the number of early neonatal deaths (up to 7 days)

Purpose of Maternal and Perinatal Death Review

1. To raise awareness among health professionals, administrators, programme managers, policy makers and community members about those factors in the facilities and the communities which, if they had been managed, the death may not have occurred. These are called the avoidable factors.
2. To stimulate action to address these avoidable factors and so prevent further maternal and perinatal deaths

APPROACHES OF MATERNAL HEALTH AUDIT

There are several approaches that can be used to study maternal deaths and clinical practice. They all have the objective of reducing maternal and neonatal mortality and morbidity by improving the

quality of care provided. These approaches can be used at the different levels of implementation and review with different outcomes.

The Levels of Maternal Death Review in Kenya are as follows:

Level	Type of Maternal Death Review	Review of Near Miss	Clinical Review. Practice
Community	Verbal Autopsy (community based death reviews)	No	No
Facility	Facility based death reviews	Case review of near-misses	Local clinical audit
National	Confidential enquiry into maternal deaths	Confidential enquiry into near-misses	National clinical audit

The main approaches being used in Kenya are:

Community-based maternal death reviews (verbal autopsy)

Community-based maternal death review is a method of finding out the medical causes of death and ascertaining the personal, family or community factors that may have contributed to the deaths in women who died outside of a health facility.

Facility-based maternal death reviews

A facility-based MDR is a qualitative in-depth investigation of the causes of, and circumstances surrounding, maternal deaths occurring at health facilities. It is particularly concerned with tracing the path of women who died, through the health care system and within the facility, to identify any avoidable remediable factors, which could be addressed to improve maternal care in the future. Deaths are initially identified at the facility level but such reviews are also concerned with identifying the combination of factors at the facility and in the community that contributed to the death.

It is important to note that

No facility-based maternal death review is complete unless it is linked with an attempt to respond to the findings with appropriate action

Confidential enquiries into maternal deaths

Confidential enquiry into maternal deaths is a systematic multi-disciplinary anonymous investigation of all or a representative sample of maternal deaths occurring at a facility, district, regional or national level. It identifies the numbers, causes and avoidable or remediable factors associated with them.

Guiding principles for Maternal and Perinatal Death reviews

- ❖ The focus of the maternal death reviews should be the health facility systems and not the individual.
- ❖ It should be built on existing tools and processes.

- ❖ Review of documentation of patient case notes is the main source of information for the MDR process
- ❖ All contributions are welcomed and valued
- ❖ MDR meeting is primarily an educational experience for all participants
- ❖ MDR meeting is a team building experience and not a disciplinary hearing and therefore no witch hunting should take place
- ❖ MDR should be incorporated into the pre service curricula of training institutions

PROCESS OF MDR AT DIFFERENT LEVELS

Maternal Death Review at the community (level 1)

1. The Community Health Worker informs the Community Health Committee and the CHEW
2. The CHEW completes the Maternal Death Notification (MDN) form within 24 hours (see page 13 for the form)
3. The MDR Notification form is sent to the national MDR committee with copies to the District and Provincial MDR Committee, while a copy remains at the Health Facility
4. The Level 1 MDR Committee reviews the Maternal Death within 7 days using the **Verbal Autopsy Tool**

The Level 1 MDR Committee ideally comprises of:

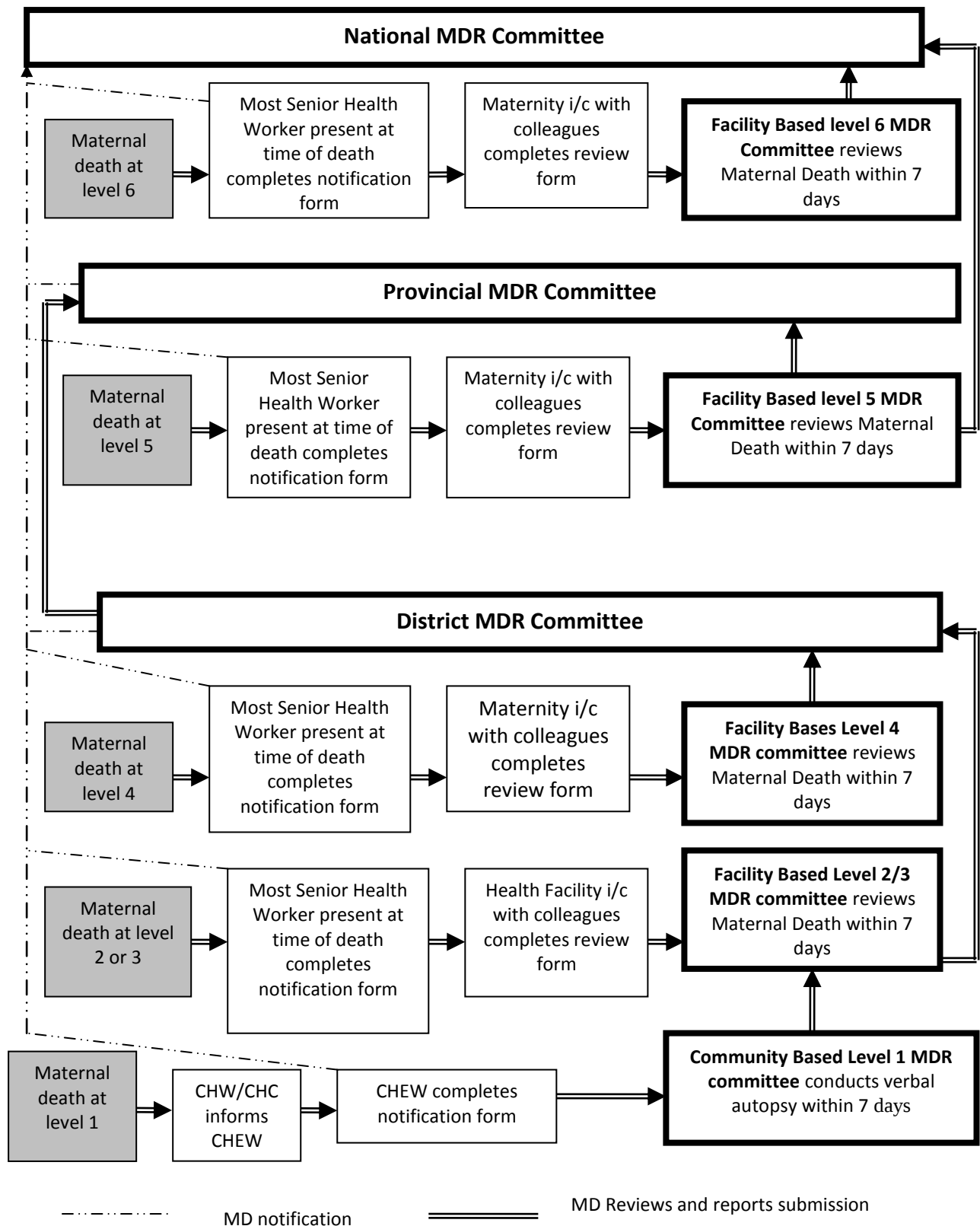
- a) Community Health Extension Worker (CHEW)
- b) Member of the Community Health Committee (CHC)
- c) Community Health Worker (CHW) of the area where death occurred
- d) Community Midwife if active within the community
- e) Assistant Chief or Village Elder
- f) Member of the community capable of mobilising the village

Co-opted members could include:

- a) Chief
- b) Divisional Public Health Technician

In the absence of a functional community structure:

- ❖ The Health Facility in Charge should constitute a MDR Committee with community representatives
- ❖ The completed Verbal Autopsy Tool is submitted to the Level 2/3 MDR Committee for further discussion and forwarding to the District MDR committee
- ❖ The Level 1 MDR Committee provides feedback on their findings to the community through dialogue days or Chief's Baraza and coordinates action to prevent future deaths.



Maternal death at the Dispensary or Health Centre (level 2/3)

- ❖ The Most Senior Health Worker present at the time of death completes the Maternal Death Notification (MDN) form within 24 hours
- ❖ The MDN form is sent to the national MDR committee with copies to the District and Provincial MDR Committees, while a copy remains at the Health Facility
- ❖ The Health Facility in Charge together with colleagues completes the Maternal Death Review (MDR) form using medical records and interviewing staff members involved in the direct care of the deceased within 7 days
- ❖ The completed MDR form is submitted to the Level 2/3 MDR Committee for further discussion and forwarding to the District MDR Committee

It is a requirement for each Health Facility to constitute a Facility Based Level 2/3 MDR Committee

The exact composition of the Level 2/3 MDR Committee is left to the discretion of each facility and should be able to meet at short notice without external financial support. The committee should have at least a minimum of 3 and a maximum of 6 members, among them:

- a) A Member of Health Facility Management Committee
- b) A Professional Health Worker with midwifery expertise

Maternal death at the Hospital (level 4/5/6)

- ❖ The Most Senior Health Worker present at the time of death completes the Maternal Death Notification (MDN) form within 24 hours
- ❖ The MDN form is sent to the national MDR committee with copies to the District and Provincial MDR Committee, while a copy remains at the Health Facility
- ❖ The Maternity in Charge together with colleagues completes the Maternal Death Review (MDR) form using medical records and interviewing staff members involved in the direct care of the deceased within 7 days.
- ❖ The completed MDR form is submitted to the Level 4/5/6 MDR Committee for further discussion and forwarding to respective District, Provincial and National MDR Committees

The hospitals have the discretion to institutionalise the Level 4/5/6 MDR Committees in line with their local set up. The membership should at least comprise of:

- a) Gynaecologist/Obstetrician or Senior Medical Officer
- b) Senior Nursing Officer
- c) Hospital Administrative Officer
- d) Laboratory Technician
- e) Anaesthetist

Co-opted members could include:

- a) Other health professionals (Nurse, Midwife, Clinical Officer)
- b) Radiographer
- c) Support staff (security, drivers, etc)
- d) A member of the Health Management Board

Reference documents

The '***National guidelines for maternal and perinatal death review***', **March 2009**, contains the following additional information:

- Terms of Reference for MDR committees at facility levels and MD committees at district, provincial and national level
- Checklists for Maternal Death Review
- Notification form for Maternal Death
- Review form for facility based Maternal Deaths
- Verbal autopsy tool for community based Maternal Deaths
- Review form for facility based Perinatal Deaths
- Data aggregation forms for districts and provincial level

RESEARCH IN MNH

Outline

- Definition of research
- Purpose of research
- Research opportunities in Maternal and Newborn Health

Definition

Research is an attempt to increase the sum of what is known, usually referred to as a “body of knowledge” by the discovery of new facts or relationships through a process of systematic scientific inquiry, the research process (Macleod Clark & Hockey, 1989)

Research is about generating new knowledge

Evidence-based practice is clinical practice informed by the best knowledge available.

Purpose of research

Research in Maternal and newborn health has a key role to play within a continuous improvement process. It serves to broaden the scope of understanding, identify gaps in knowledge, and investigate ways to fill in the gaps by testing effectiveness and efficiency of interventions, discovering new treatments and new techniques of clinical management and informing policy decisions.

Research opportunities in Maternal and Newborn Health

Research in Maternal and Neonatal Health is very broad and can range from measuring quality of care in a labour ward to describing socio-cultural MNH practices at community level.

Some of the areas relevant for further research include:

- Assessing maternal mortality and its main causes
- Social, cultural and/or financial barriers to accessing Essential Obstetric Care
- Best practices in Maternal and Newborn Health
- Innovative ways of enhancing Birth (and emergency) preparedness at community level
- Strengthening responsiveness of the referral system to emergencies
- Integration of HIV information and services into MNH service delivery

(For further reading- Refer to RH Research Agenda; and National RH research guidelines)

MONITORING, EVALUATION AND SUPERVISION

Monitoring

Every health facility providing MNH services should be involved in monitoring and evaluation of the program.

The aim of monitoring and evaluation is to ensure that the health providers remain focused on the goals, objectives and set targets.

Purpose of Monitoring

1. Provide data on how program activities are progressing towards meeting set program objectives
2. Monitoring allows the early revision of a project, programme or research objectives and activities or a complete overhaul depending on the monitoring feedback
3. It uses assessment techniques to measure the performance of the organization, person or specific intervention
4. Ensures improvements or changes by identifying those aspects that are working according to the plan and those that are in need of midcourse corrections.
5. The day to day monitoring of performance and quality should be a supervisor's main concern.
6. It can help prioritise resource mobilisation, allocation and staff motivation

Monitoring and evaluation of maternal and newborn health

M &E remains a key challenge of MNH programmes. It aims at generating information that is necessary for evidence-based decision-making and the planning process. M &E for the MNH uses the six UN Emergency Obstetric Care process indicators, which include the following:

UN process indicators

EOC process indicator	Recommended level
Amount and density of facilities providing EOC services	Optimum: there are at least 5 EmOC facilities (including at least one comprehensive EOC facility) per 500,000 people
Geographical distribution of EOC facilities	Optimum: 100% of sub national areas have at least 5 EmOC facilities (including at least one comprehensive EOC facility per 500,000 population)
Proportion of all births in EOC facilities	At least 15% of all births in the population take place EmOC facilities (update for Kenya)
Met need for EOC services	Optimum: 100%estimated to have major direct obstetric complications are treated in EmOC facilities
Caesarean sections as a percentage of all births	Estimated proportion of births by CS is Minimum: 5% and Maximum: 15%
Obstetric case fatality rate	Case fatality rate among women with direct obstetric complications in EmOC facilities is less than 1%

The following indicators relevant to the MNH are outlined in the National MNH road Map. These indicators are based on the WHO global monitoring of reproductive health as well as the MDG indicators.

They are normally monitored as part of the National Population Census (every 10 years); the Kenya Demographic and Health Survey (KDHS) every 5 years, the Kenya Service Provision Assessment (KSPA) every 4 years; the National Health Sector Strategic Plan and annually as part of the AOP review process.

No.	Indicators	Baseline	Target 2012	Target 2015	Source of data
1	Maternal Mortality Ratio/ 100 000 live births	488	280	147	KDHS 2008/9
2	Neonatal Mortality Rate/ 1 000 live births	31	21	11	KDHS 2008/9
3	Proportion of facilities providing BEONC	3%	50%	100%	KSPA 2010
4a	Availability of CEmOC / 500 000 population	1.3	1.3	1	KSPA 2004
4b	Availability of BEmOC / 500 000 population	0.4	2.2	4	KSPA 2004
5	Proportion of (expected) deliveries in the population conducted by a skilled attendant	43.8%	67%	90%	HMIS KDHS 2008
6	Proportion of pregnant women having at least one antenatal visits during this pregnancy	91.5	96%	100%	KDHS 2008
7	Proportion of pregnant women having at least four antenatal visits during this pregnancy	56%	71%	90%	HMIS KDHS 2008/9
8	Proportion of antenatal women receiving IPT2	15%	47.5%	80%	KDHS 2008
9	Percentage of women attending post-natal care check up at least once within 48hrs	42%	60%	80%	HMIS KDHS 2008
10	Proportion of pregnant women attending ANC tested for HIV	57%	68.5%	80%	KAIS 2007
11	Unmet need for contraception	26%	15%	5%	KDHS 2008/9

Methods of monitoring program activities

Supervisory assessment: The supervisor formulates a tool on what to be observed and questions to be asked during the visit. Rating is done to score.

Self-assessment: The provider formulates a checklist and ticks as he/she performs or at the end of activity.

Peer assessment: The provider requests a colleague to assess using an already formulated checklist

Client feedback: It gets the client's comments on the services sought/consumed. It uses a structured questionnaire, which is in line with the set objectives

Observation

Poll community perceptions: The community within the catchments area gives their views on services offered in the facility. A sample of the community is obtained.

Review records and reports: Auditing to evaluate services already offered

Benchmark: (Review of set benchmarks) measuring performance against set standards

Provider and client interviews

PROCESS INDICATORS:

The main registers for recording the MNH activities in Kenya are:

- Antenatal Clinic register
- Maternity Register (labour and delivery)
- Postnatal care Register

- Family Planning register
- Permanent register (for immunisation)

The following are in the process of development:

- Post Abortion Care register
- Referral register

The major process indicators for MNH in Kenya and the tools for monitoring their implementation are listed below

1. Guidelines and Standards:

- Approved guidelines and standards disseminated to service providers and managers (Dissemination Reports)
- Service providers and managers trained in the use of the approved guidelines and standards (Training Reports)
- Service Providers and managers actually using the approved guidelines and standards appropriately (supervisor audit reports and self audit reports)
- Approved guidelines and Standards available at service delivery points (Supervisory visit reports, Distribution list)

2. Antenatal care

- Complete ANC profile (Mother child booklet, ANC Register, laboratory register)
- Number and content of health education talks given by service providers (Health education book)
- Evidence of appropriate immunisations given e.g. TT (Mother child booklet, ANC register, Immunisation Register)
- Mothers counselled and tested for HIV (ANC register, Mother child booklet)
- Haematinic, deworming and IPT appropriately dispensed (Mother child booklet, ANC register, pharmacy register)
- Counselling and individualised birth plan discussed (mother child booklet, ANC register)

3. Intrapartum care

- Evidence of admission into the maternity unit, diagnosis, complications, drugs used, test done, time mode of delivery, apgar score, details of the baby, birth registration etc (maternity register, cardex, patients notes, mother child booklet, birth notification, death notification)
- Evidence of appropriate monitoring of process and progress of labour (Partograph, patients notes, midwives notes- cardex)
- Maternal death (MDR notification form, MDR review form, patient notes, Cardex, maternity register, MDR register)

4. Postnatal Period

- Evidence of targeted postnatal care – Health education and counselling, diagnosis and management, recognition and management of complications, HIV counselling and testing, care of the newborn, immunisations, drugs (Postnatal care register, mother child booklet, patients notes)
- Family planning – FP counselling, new or revisit, type, dosage, date given, complications, etc (FP register)

5. Summary tools for MNH

The main summary tools for MNH data in Kenya are the S-711. It is compiled monthly by the facilities and the districts. Information from this tool is what is fed into the district and National HMIS File Transfer Protocol database system

6. Community MNH

- a. Community maternal death review (verbal autopsy tool)
- b. Community MNH activities – number of pregnant women, deliveries, ANC attendance, individualized birth plan, births, etc (CHWs log book, CM register, facility registers), condition sex of baby
- c. HIS data system is being expanded to include community

EVALUATION

Definition

This involves the assessment of how well program activities are being performed in relation to the set objectives, inputs and expected outcomes.

Why evaluate

1. Account for what has been accomplished through project funding
2. Promote learning in what works and what does not work
3. Provide feedback to stakeholders for decision making
4. Assess cost-effectiveness of the program
5. Enhance effectiveness of project and program management
6. Contribute to policy development

Key Evaluation Questions

1. **What?** Did we do what we said we would do?
2. **Why?** What did we learn about what worked and
3. **What** didn't work?
4. **So what?** What difference did it make after doing this work?
5. **Now what?** What could we do differently?
6. **Then what?** How do we use the evaluation findings for future program planning?

Cost-Effectiveness Analysis

This helps managers and planners make decisions about the use of their budgets and funding. It entails combining results of monitoring data and cost data. Decision-makers can make choices about allocation of their funds and decide whether or not the funds are being spent appropriately.

Types of evaluation

Are 5 types of evaluation

1. Process evaluation- measures the quality of program implementation, assesses coverage, extend of service utilization by intended population.
2. Baseline evaluation- done at the start of the project / intervention
3. Mid - term evaluation – done at the middle of the project / intervention
4. End - term / terminal evaluation – done at the end of the project
5. Impact – evaluation – done several years after the end of the project

Evaluation tools

- Quarterly reports
- Annual reports
- Checklists
- Card Systems
- Data review methods
- Audits for standards indicators
- Questionnaires
- Record cards

Application of evaluation

Evaluation is useful in assessing overall impact of interventions at facility level, in research, surveillance, monitoring and service provision and in documenting the proper use of human and other resources.

Constraints and challenges in monitoring and evaluation

- Inadequate knowledge and skills in M&E
- Inadequate Financial resources for M & E
- Poor record keeping and quality of data
- Staff resistance to monitoring and evaluation process
- Lack of feedback
- Competing tasks
- Inadequate manpower

SUPERVISION**Definition**

Supervision is the overall range of measures to ensure that the actors involved carry out their activities effectively and efficiently and become better and more competent to carry out assigned roles. It entails enabling people to do their work in a better way.

Super- means from a higher vantage point.

Vision- means ability to see something.

Reasons for Supervision

Supervision is necessary to promote continuing improvement in performance of actors involved in MNH programme implementation.

Styles of Supervision

1. Traditional (Autocratic).
2. Facilitative (Supportive)

Facilitative Supervision (FS)

FS is a system of management whereby supervisors at all levels in an institution focus on the needs of the staff they oversee. The Supervisors consider their staff as their customers. The most

important role of a facilitative supervisor is to enable staff to: manage the QI process, meet the needs of clients and implement institutional goals.

Differences from traditional supervision

- Focuses on helping staff solve problems through the use of quality-improvement tools.
- Focuses on processes rather than individuals.
- Assists staff in planning for future quality-improvement goals.
- Is continuous and builds on past gains while setting higher quality-improvement goals.

Benefits of FS

- Fewer problems to solve by yourself
- Less need to provide technical assistance
- Gain of good reputation
- Being more welcome at sites
- Satisfaction of success
- More fulfilling job

What is not included in Facilitative Supervision

- Hiring staff
- Developing job descriptions
- Conducting performance evaluations
- Reprimanding staff
- Firing staff

Facilitative supervision includes: effective communication skills, problem identification and solving, good leadership skills,

Facilitative supervision for MNH in Kenya

FS is conducted in the following levels: national, provincial, district, institutional (facility) and site level (community)

At the national level, the DRH managers and officers conduct FS visits quarterly. The national team with members from the provincial team (RH Training and supervision teams) visit facilities in sampled districts.

In the facilities the managers and the training and supervision team members conduct on site FS and coaching / mentoring.

KENYA MNH ESSENTIAL DRUG LIST

1. Uterotonics
 - a. Oxytocin
 - b. Ergometrine
2. Anticonvulsants
 - a. Magnesium sulphate
 - b. Diazepam
3. Antihypertensives
 - a. Hydrallazine
 - b. Alpha methyl Dopa (aldomet)
 - c. Nifedipine
4. Antibiotics
 - a. Ampicillin
 - b. Gentamycin
 - c. Metronidazole
 - d. Benzathine Penicillin
 - e. Cloxacillin
 - f. Amoxycillin
 - g. Ceftriaxone
 - h. Erythromycin
 - i. Doxycycline (tetracycline)
 - j. Norfloxacin /Ciprofloxacin
 - k. Trimethoprim Sulphamethoxazole
 - l. Clotrimazole pessaries and cream
 - m. Eye antimicrobial (1% tetracycline eye ointment)
5. Antimalarials
 - a. Artemether
 - b. Quinine
 - c. Sulphadoxine pyrimethamine
6. Supplements
 - a. Iron/ folate
 - b. Zinc
 - c. Vitamin A
7. Local anaesthetic
 - a. Lignocaine
8. Intravenous fluids
 - a. Ringers Lactate
 - b. Normal saline
 - c. 5% dextrose
 - d. Water for injection
9. Analgesics / antispasmodics
 - a. Paracetamol
 - b. Hyoscine butyl bromide
 - c. Pethidine
 - d. Ibuprofen
10. ARVs
11. Deworming
 - a. Mebendazole
12. Vaccines
 - a. Tetanus toxoid
 - b. BCG

- c. Polio
- 13. Steroids
 - a. Betamethasone
 - b. Hydrocortisone
- 14. Other Resuscitation drugs
 - a. Adrenaline
 - b. Calcium gluconate
 - c. 50% dextrose
 - d. Aminophylline
 - e. Sodium bicarbonate
 - f. Heparin
 - g. Insulin
 - h. Lasix
 - i. Naloxone
- 15. Contraceptives
 - a. COC
 - b. POP
 - c. Implants
 - d. DMPA
 - e. IUCD
 - f. Condoms- male and female
- 16. Tocolytic
 - a. Salbutamol
- 17. Antiemetics
 - a. Metoclopramide
 - b. Promethazine
- 18. Anaesthetic drugs
- 19. Laboratory Kits
 - a. RPR/ VDRL testing kit
 - b. Uristicks
 - c. HIV testing
 - d. Haemoglobin testing kit
 - e. Blood group and rhesus testing kit

Equipment:

- Thermometer
- Blood pressure machine and stethoscope
- Pinard stethoscope (Fetoscope)
- Baby scale
- MVA equipment
- Vaginal examination pack
- Delivery pack
- Suture pack
- Oxygen cylinder
- drip stand
- Suction machine
- Incubator
- Autoclave /Sterilizer

- IP Buckets
- Sharps disposal Safety Box
- Waste Receptacle /bin (contaminated, non contaminated)
- Wall clock
- Torch
- Baby blanket/ towels
- Examination couch
- Delivery bed
- Screen
- Resuscitaire/ resuscitation table
- Room heater
- Light source
- Room thermometer
- Clean linen

Supplies

- Needles G 21 & 23,
- IV cannula, tourniquet ,
- IV infusion sets,
- Blood transfusion set,
- Specimen bottles,
- Urinary catheter
- Syringes,
- Cotton swabs
- Gauze roll
- Gloves (utility; sterile, long sterile for manual removal of placenta)
- LLITN
- Suture materials (polyglyconate)
- Vaginal speculums preferably Cuscos
- Sanitary pads/ dressings etc
- Protective clothing, gloves mackintosh, boots and goggles
- Soap
- Disposable paper towel

Records

- Partographs
- Patient charts
- Registers
- Mother Child booklet

Disinfectants & cleaning materials

- Bleach as in Jik or presept tablets

- Povidine
- Hibitane
- Cidex
- Steranios
- Soap (powder, liquid, tablet)

Specialized Kits

- MVA kit
- Delivery kit
- Suture pack
- Caesarean section kit
- Newborn resuscitation kit
- Minilap set
- IUCD insertion and removal kit
- Implant insertion and removal kits
- Resuscitation tray

Equipment for Comprehensive Obstetric Care

As in Basic Emergency Obstetric Care Facilities in addition to:

Surgical sets - Caesarean section set, General surgical set, D+C set

Laboratory Equipment - for specialized tests

Anaesthetic equipment and supplies-

Essential drugs, supplies and equipment required for emergency preparedness in Comprehensive EOC Hospitals under the direction of experienced personnel.

Millennium Development goals, targets and indicators

Millennium Development Goals	Targets	Indicators
Goal 1 Eradicate Extreme Poverty and Hunger	Target 1 Halve between 1990 and 2015 the proportion of people whose income is less than 1 US dollar a day	Proportion of people living on less than 1 US dollar a day
	Target 2 Halve between 1990 and 2015 the proportion of people who suffer from hunger	- Prevalence of underweight in children under 5 years - Proportion of population below minimum level of dietary energy consumption
Goal 2 Achieve Universal Primary education	Target 3 Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling	- Net enrolment ratio in primary education - Proportion of pupils starting grade 1 who reach grade 5 - Literacy rate of 15-24-year-olds
Goal 3 Promote gender equity and empower women	Target 4 Eliminate gender disparity in primary and secondary education preferably by 2005 and in all levels of education no later than 2015	- Ratio of girls to boys in primary, secondary and tertiary education. - Ratio of literate females to males among 15 to 24 year olds. - Share of women in wage employment in the non-agricultural sector - Proportion of seats held by women in national parliament
Goal 4 Reduce child mortality	Target 5 Reduce by two-thirds, between 1990 and 2015 the under 5 mortality rate	- Under 5 mortality rate - Infant mortality rate - Proportion of 1 year old children immunized against measles
Goal 5 Improve Maternal Health	Target 6 5A: Reduce by three quarters, between 1990 and 2015, the maternal mortality ratio 5B: Achieve by 2015, universal access to reproductive health	Maternal mortality ratio Proportion of births attended by skilled health personnel Contraceptive prevalence rate Adolescent birth rate Antenatal coverage Unmet need for family planning
Goal 6 Combat HIV/AIDS, Malaria and other disease	Target 7 Have halted by 2015 and begun to reverse the spread of HIV/AIDS	- HIV prevalence among 15-24 years old pregnant women - Contraceptive Prevalence rate - Number of children orphaned by HIV/AIDS
	Target 8 Have halted by 2015, and begun to reverse the incidence of malaria and other major diseases	
Goal 7 Ensure environmental sustainability Water and sanitation Improving the lives of slum dwellers	Target 9 Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources	- Proportion of land area covered resources - Land areas protected to maintain biological diversity - CDP per unit of energy use (as proxy for energy efficiency)
	Target 10 Halve, by 2015, the proportion of people without sustainable access to safe drinking water	Proportion of population with sustainable access to improved water source
	Target 11 Have achieved by 2020, significant improvement in the lives of at least 100 Million slum dwellers	- Proportion of people with access to improved sanitation - Proportion of people with access to secure tenure
Goal 8 Develop Global Partnership for development	Target 12 Deal comprehensively with the debt problems of developing countries through national and international measures in order to make debt sustainable in the long term	- Proportional of official bilateral HIPC debt cancelled - Debt service as a percentage of exports of goods and services - Proportion of ODA provided as debt relief - No of countries reaching HIPC decision points and number that have reached their HIPC completion points

Provider in charge _____ Clinic/Hospital name _____

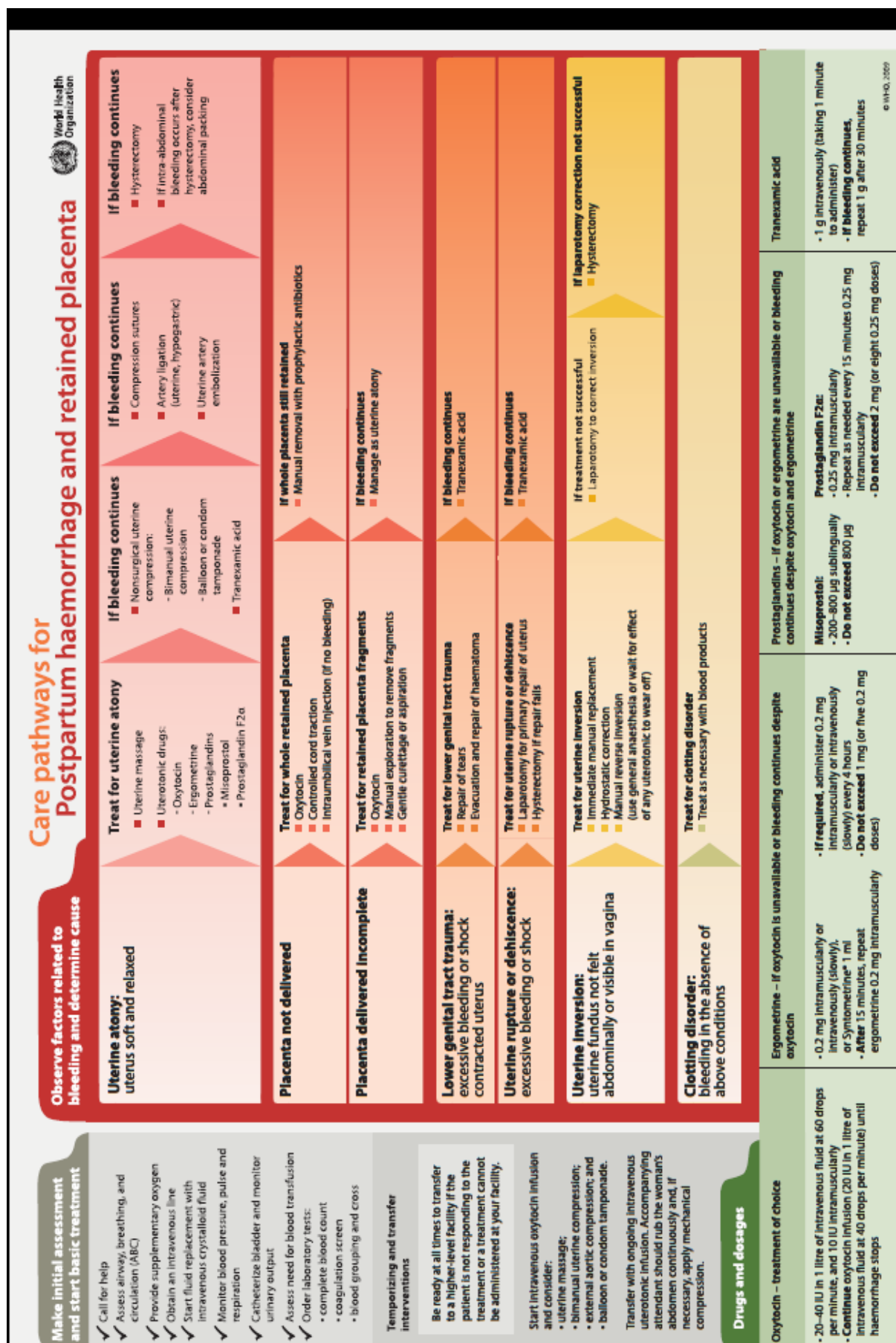
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KEY ELEMENTS AND TIMING OF Postnatal Care for the Mother and Baby

	WITHIN 24 TO 48 HOURS*	WITHIN 1 TO 2 WEEKS	4 TO 6 WEEKS	4 TO 6 MONTHS
MOTHER 	CHECK/PERFORM: • Mental status assessment • Physical assessment: Pulse, Temperature, Blood Pressure, Urinary Incontinence • Inspection of the CS wound (if present) for bleeding • Assess lochia and blood loss • Breast examination for establishment of lactation. • Call antenatal • Record in PNC register and mother Child booklet PROVIDE: • Pain management • Screening for TB and treat as appropriate • Vitamin A (200,000 IU) • Iron/folic acid supplements • LUTN • Treat or refer if any complications are detected • Appropriate P method • If HIV positive give ARV for prophylaxis or treatment COUNSEL MOTHER ON: • HIV Counseling and testing (in-clinic) • PF Counseling (weekly until a spacing of pregnancy) ADVICE ON: • Danger signs for mother • Personal hygiene and hand washing • Breast care • Contraception • Care of the perineum • Harmful practices • Maternal nutrition • Use of Iodized Salted Niles. • Return date	CHECK/PERFORM: • Mental status • Pulse/BP/temperature, pulse rate • Lochia (color, amount, smell) • Assess for self tenderness • Inspect if at from CS site or perineal wound • Breast condition • Urinary incontinence • Observe a breast feed • Record in PNC register and Mother Child booklet PROVIDE: • Vitamin A supplementation (if not yet given) • Haemolysis • LUTN (if not yet given) • Treatment for any complications detected • Refer as appropriate COUNSEL MOTHER ON: • Danger signs for mother • CT for HIV • Family Planning (HTP) • Maternal Nutrition • Personal hygiene and hand washing for caregiver • Breast care and Exclusive breast feeding • Harmful practices • Cervical cancer screening • Return date	CHECK/PERFORM: • General condition of mother • BP/Weight/temperature • Lochia (amount, color, smell) • Observe a breast feed • Record in PNC register and Mother Child booklet PROVIDE: • PF method of choice • CT for HIV • Information on need for cervical cancer screening after 3 months • Clinical breast examination • Screening for STI/RTI • Screen for TB • Treatment for any complications detected • Refer as appropriate COUNSEL MOTHER ON: • Danger signs for the mother • Exclusive breast feeding and Breast care • Healthy Timing and Spacing of Pregnancy (HTSP) • Maternal nutrition • Personal hygiene and hand washing for the caregiver • Return date	CHECK/PERFORM: • General health of mother • BP/Weight/temperature • Lochia (amount, color, smell) • Observe a breast feed • Record in PNC register and Mother Child booklet PROVIDE: • PF method of choice • CT for HIV • Information on need for cervical cancer screening after 3 months • Clinical breast examination • Screening for STI/RTI • Screen for TB • Treatment for any complications detected • Refer as appropriate COUNSEL MOTHER ON: • Danger signs for the mother • Exclusive breast feeding and Breast care • Healthy Timing and Spacing of Pregnancy (HTSP) • Maternal nutrition • Personal hygiene and hand washing for the caregiver • Return date
BABY 	CHECK/PERFORM: • Apgar scoring • Body temperature • Tone and record birth weight • Head to toe examination • Observe the baby for danger signs • Observe a breast feed • Record in PNC register and mother Child booklet PROVIDE: • Ensure warmth and keep the baby's head warm • Clean baby's face bath for the first 24 hours • If pre term encourage skin-to-skin care • Encourage early initiation of and exclusive breastfeeding • Weigh baby's weight in 1st • Immunization (BCG & birth Polio) • Refer prophylaxis for HIV as indicated • Treat or refer the infant if any complications are detected • Encourage and facilitate birth registration COUNSEL MOTHER ON: • Cord care • Hand washing for caregiver • Return date	CHECK/PERFORM: • Growth monitoring chart weight • Head to toe examination • Assess for danger signs for baby • Immunization status • Record in PNC register and Mother Child booklet PROVIDE: • Immunizations as per schedule • IMH prophylaxis as appropriate • Treatment of any complications detected • Refer as appropriate • Birth registration if not yet done • Management of HIV positive infant • Birth registration if not yet done COUNSEL MOTHER ON: • Danger signs for baby • Exclusive breast feeding • Hand washing for caregiver • Hygiene • Return date	CHECK/PERFORM: • Growth monitoring chart weight • Head to toe examination • Assess for danger signs for baby • Immunization status • Record in PNC register and Mother Child booklet PROVIDE: • Immunizations as per schedule • IMH prophylaxis as appropriate • Treatment of any complications detected • Refer as appropriate • Birth registration if not yet done • Management of HIV positive infant • Birth registration if not yet done COUNSEL MOTHER ON: • Danger signs for baby • Exclusive breast feeding • Hand washing for caregiver • Hygiene • Return date	CHECK/PERFORM: • Growth monitoring chart weight • Head to toe examination • Assess for danger signs for baby • Immunization status • Record in PNC register and Mother Child booklet PROVIDE: • Immunizations as per schedule • IMH prophylaxis as appropriate • Treatment of any complications detected • Refer as appropriate • Birth registration if not yet done • Management of HIV positive infant • Birth registration if not yet done COUNSEL MOTHER ON: • Danger signs for baby • Exclusive breast feeding • Hand washing for caregiver • Hygiene • Return date

*The first assessment should be carried out soon as possible after delivery (health facility) with the mother and baby should be checked at 1 hr, 3 hrs and again before discharge. If home delivery refer to health facility as soon as possible within 24 (6) hours.





Annex: Minimum package of MNH services at different levels

Level 1	Level 2	Level 3	Level 4, 5 and 6
Promotion of healthy behaviours including: • Male involvement • Early antenatal attendance • Individual Birth Plan • Skilled Birth Attendance • Nutritional care • Early postpartum and newborn care • Immunisation • Early initiation and exclusive breastfeeding • Malaria prevention • PMTCT • FP services • Hygiene • Birth and death notification • Mother & Child Health Booklet Recognition of danger signs for mother and baby that require referral Establishment of community-based referral system for emergencies Establishment of community based FP distribution network Level 2 services by trained and recognized community midwives Establishment of maternal and newborn death reviews Establishment of Community-based Health Information System	<i>All level 1 services plus</i> Focused Antenatal Care (FANC) • BP, weight, physical exam, urinalysis • Counsel on danger signs and emergency preparedness • Individual Birth Plan • TT immunization • MIP (IPT, ITN) • Iron/folic supplement • De-worming • Syphilis screening • PMTCT • TB screening (clinical) • Identification of complications and management and/or appropriate referral Normal labour and delivery • Use of partograph • SVD • AMTSL • Identification of complications and management and/or appropriate referral • PMTCT Essential Newborn Care (ENC) • Keeping the baby warm including Kangaroo Mother Care • Early initiation of breastfeeding • Newborn resuscitation • Counsel mother and family on danger signs of the newborn • Immunisation • Identification of danger signs and management and/or appropriate referral • PMTCT Targeted Postpartum Care (PPC) • Provide 3 PPC services (within 24 – 48 hrs, 1 - 2 wks, 4 - 6 wks) • Vitamin A supplement • Advice on danger signs, emergency preparedness and follow up • Identification of complications in mother and newborn, and management and/or appropriate referral • PMTCT Family Planning (FP) • Lactation Amenorrhea Method (LAM) • Injectables • Hormonal Pills • Condoms (male and female) • Natural methods • Emergency Contraception (EC) Record keeping (HMIS) • Antenatal register, Delivery register • Postnatal register, FP register, ASRH /youth centre register • Immunisation register	<i>All level 2 services plus</i> Focused Antenatal Care (FANC) • Full antenatal profile • Sputum for AAFB Basic Essential Obstetric Care (BEOC) • Parenteral oxytocics to augment labour or management of PPH • Parenteral antibiotics to treat puerperal and newborn infections • Parenteral anticonvulsants (MgSO₄) to manage (pre) eclampsia • Manual removal of placenta • Manual Vacuum Aspiration for incomplete abortion • Assisted vaginal delivery (vacuum extraction) • Newborn resuscitation Essential Newborn Care (ENC) • Oxygen therapy Family Planning • Implants • IUCD Record keeping • Admission register • MVA register	<i>All level 3 services plus</i> Focused Antenatal Care (FANC) • CD4 count • Rhesus incompatibility • Ultrasound Comprehensive Essential Obstetric Care (CEOC) • 6 BEOC signal functions • Blood transfusion • Surgical procedures (e.g. C/section, Laparotomy for Ectopic pregnancy or ruptured uterus, destructive vaginal operation, D&C) Essential Newborn Care (ENC) • Management of severely ill newborns • Management of low birth weights / prematurity • Management of congenital anomalies • Phototherapy and exchange transfusion Family Planning • Sterilization (BTL and vasectomy) Record keeping • Theatre register

Criteria for classifying women for the basic component of the new antenatal care model

Name of patient: _____	Clinic record number:	
Address: _____	Telephone: _____	

INSTRUCTIONS: Answer all of the following questions by placing a cross mark in the corresponding box.

	No	Yes
OBSTETRIC HISTORY		
1. Previous stillbirth or neonatal loss?	☐	☒
2. History of 3 or more consecutive spontaneous abortions?	☐	☒
3. Birthweight of last baby < 2500g?	☐	☒
4. Birthweight of last baby > 4500g?	☐	☒
5. Last pregnancy: hospital admission for hypertension or pre-eclampsia/eclampsia?	☐	☒
6. Previous surgery on reproductive tract? (Myomectomy, removal of septum, cone biopsy, classical CS, cervical cerclage)	☐	☒
CURRENT PREGNANCY		
7. Diagnosed or suspected multiple pregnancy?	☐	☒
8. Age less than 16 years?	☐	☒
9. Age more than 40 years?	☐	☒
10. Isoimmunization Rh (-) in current or in previous pregnancy?	☐	☒
11. Vaginal bleeding?	☐	☒
12. Pelvic mass?	☐	☒
13. Diastolic blood pressure 90mm Hg or more at booking?	☐	☒
GENERAL MEDICAL		
14. Insulin-dependent diabetes mellitus?	☐	☒
15. Renal disease?	☐	☒
16. Cardiac disease?	☐	☒
17. Known 'substance' abuse (including heavy alcohol drinking)?	☐	☒
18. Any other severe medical disease or condition?	☐	☒
Please specify _____		

A "Yes" to any ONE of the above questions (i.e. ONE shaded box marked with a cross) means that the woman is not eligible for the basic component of the new antenatal care model.		
Is the woman eligible?	(circle)	NO YES
If NO, she is referred to _____		
Date _____	Name _____	Signature _____
(staff responsible for ANC)		

NATIONAL GUIDELINES FOR MATERNAL AND NEWBORN HEALTH

SECTION 2

ESSENTIAL NEWBORN CARE

NEONATAL CARE GUIDELINES

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F1: CARE OF THE NORMAL NEWBORN

Definition

A normal newborn is a baby born at 37 completed weeks or thereafter, has birth weight of 2500gm or more and has no complications.

All health care levels including the community should be able to look after a normal neonate.

Principles of Newborn Care:

To ensure newborn survival and reduce neonatal morbidity, the following principles of newborn care need to be observed:

- Clean atraumatic delivery (Refer to section on Management of Labour and Delivery)
- Prevention of infection (See Standards for Infection Prevention and Control)
- Provision of warmth
- Cord care
- Infant Feeding
 - Early initiation of feeds
 - Exclusive breastfeeding unless otherwise indicated
 - Alternative Feeding Methods
- Comprehensive first and subsequent examination
- Immunization
- Continuing health education and promotion for the caregiver

1.1 Clean atraumatic delivery (Refer to Chapter on Management of labor)

1.2 Provision of warmth

Purpose: To prevent hypothermia.

At birth and within the first hour(s)

- **Warm the delivery room:** for the birth of the baby the room temperature should be 25-28°C, There should be no draught
- **Dry baby:** immediately after birth, place the baby on the mother's abdomen or on a warm, clean and dry surface. Dry the whole body and hair thoroughly, with a dry cloth.
- **Skin-to-skin contact:** Leave the baby on the mother's abdomen (before cord cut) or chest (after cord cut) after birth for at least 2 hours. Cover mother and baby with warm cloth and put a hat on the baby's head
- If the mother cannot keep the baby skin-to-skin because of complications, wrap the baby in a clean, dry, warm cloth and place in a cot. Cover with a blanket. Use a radiant warmer if room not warm or baby small

Subsequently (first day)

- Explain to the mother that keeping baby warm is important for the baby to remain healthy
- Dress the baby or wrap in soft dry clean cloth or blanket. Cover the head with a cap
- Ensure the baby is dressed or wrapped and covered with a blanket
- Encourage the mother to sleep in same bed with the baby (**bedding in**)
- If bedding-in is not possible, keep the baby within easy reach of the mother (**rooming-in**)
- If the mother and baby must be separated, ensure baby is dressed or wrapped and covered with a blanket
- Monitor warmth every 4 hours by touching the baby's feet: if feet are cold use skin-to-skin contact, add extra blanket and reassess. (see section on re-warming of the newborn)
- Keep the room for the mother and baby warm. If the room is not warm enough, always cover the baby with a blanket and/or use skin-to-skin contact

At home

- Explain to the mother that babies need one more layer of clothes than other children or adults
- Keep the room or part of the room warm, especially in a cold climate
- At night, let the baby sleep with the mother or within easy reach to facilitate breastfeeding

Do not put the baby on any cold or wet surface

Do not bath the baby at birth. Wait at least 24 hours before bathing

Do not swaddle (wrap too tightly). Swaddling makes them cold

Do not leave the baby in direct sun light

Re-warming the baby skin-to-skin

- Before re-warming, remove the baby's cold clothing
- Place the newborn skin-to-skin on the mother's chest dressed in a pre-warmed shirt open at the front, a nappy (diaper), hat and socks
- Cover the infant on the mother's chest with his / her clothes and an additional (pre-warmed) blanket
- Check the temperature every hour until normal
- Keep the baby with the mother until the baby's body temperature is in the normal range
- If the baby is small, encourage the mother to keep the baby in skin-to-skin contact for as long as possible, day and night
- Be sure the temperature of the room where the re-warming takes place is at least 25°C
- If the baby's temperature is not 36.5°C or more after 2 hours of re-warming, reassess the baby
- If referral is needed, keep the baby in skin-to-skin position / contact with the mother or other person accompanying the baby

1.3 Cord care:

- Wash hands before and after cord care
- Put nothing on the stump
- Fold nappy (diaper) below stump
- Keep cord stump loosely covered with clean clothes
- DO NOT bandage the stump or abdomen
- If stump is soiled, wash it with clean water and soap. Dry it thoroughly with clean cloth
- Avoid touching the stump unnecessarily
- Explain the above to the mother and that she should seek medical care if the umbilicus is red or draining pus or blood

1.4 Infant Feeding

Early initiation of feeds

- All neonates should have feeds initiated as early as possible within the first hour of birth
- (Refer to section on Breastfeeding)
- If mother cannot breastfeed at all, use home-made or commercial formula

Exclusive Breastfeeding

- (See section on exclusive breastfeeding)

Alternative feeding methods

- If mother cannot breastfeed at all, use commercial infant formula and where not available home-made

Quantity to feed by cup

- Start with 60 ml/kg body weight per day for day 1. Increase total volume by 10-20 ml/kg per day, until baby takes 150 ml/kg/day
- Divide total into 8 feeds
- Check the baby's 24 hour intake. Amount of individual feeds may vary
- Continue until baby takes the required quantity
- Wash the cup with water and soap after each feed

For quantity to feed by cup (in ml) from birth (by weight) – (Refer to section on Fluid Management)

The following are ***signs that baby is receiving an adequate amount of milk***

- Baby is satisfied with the feed
- Weight loss is less than 10% in the first week of life
- Baby gains at least 160g in the following weeks or a minimum of 300g in the first month
- Baby wets every day as frequently as baby is feeding
- Baby's stool is changing from dark to light brown or yellow by day 3

How to Teach the mother replacement feeding:

- Ask the mother what kind of replacement feeding she prefers
- For the first few feeds after delivery, prepare the formula for the mother, and then teach her how to prepare the formula herself and feed the baby by cup.
- Steps in preparing and feeding using formula:
 - Wash hands with water and soap
 - Boil water for few minutes
 - Clean the cup thoroughly with water and soap and rinse with clean water (use hot water if possible). Leave to dry in a clean place
 - Decide how much milk the baby needs
 - Measure the milk and water and mix them
 - Teach the mother how to feed the baby by cup. Nb. Baby is cup feeding well if required amount of milk is swallowed, spilling little, and weight gain is maintained
 - Let the mother feed the baby 8 times a day (in the first month). Teach her to be flexible and respond to the baby's demands
 - If the baby does not finish the feed within 1 hour of preparation, give it to an older child or use for other purpose. **DO NOT** give the remaining milk to the baby for the next feed
 - Wash the utensils with water and soap soon after feeding the baby
 - Make a new feed every time
- Give her written instructions on safe preparation of formula
- Explain the risks of replacement feeding and how to avoid them
- Advise on when to seek care
- Advise about the follow-up visit

Risks of replacement feeding

These should be explained to the mother or caregiver and include the following:

- Her baby may get diarrhea if:
 - Hands, water, or utensils are not clean
 - The milk stands out too long (more than an hour)
- Her baby may not grow well if:
 - She/he receives too little formula each feed or too few feeds
 - The milk is too watery
 - If she/he has diarrhea

Follow-up for replacement feeding

- Follow up 2 weeks after birth then monthly for growth monitoring
- Ensure the support to provide safe replacement feeding is available
- Advise the mother to return if:
 - the baby is feeding less than 6 times per day, or is taking smaller quantities
 - the baby has diarrhoea
 - there are other danger signs

1.5 First and Subsequent Examination of the New born

- Examine the baby from head to toe at birth, before discharge and when necessary
- Examine the baby in a warm environment
- Allow the mother to be present during the examination
- If the baby has not been weighed yet, weigh the baby, take length and record the weight and length
- While talking to the mother and before undressing the baby, observe the baby for:
 - color
 - respiratory rate
 - posture
 - movement
 - reaction to stimuli
 - obvious abnormalities
- As you proceed with the examination, explain the findings to the mother in simple terms and point out abnormalities
- Wait until the entire examination is complete before beginning specific management of the baby's problems, treating the problems designated as priorities first

Table F1: Examination of the newborn baby

Look at	Look for
Respiration	<i>(The normal respiratory rate is 30-60 breaths per min)</i> • Respiratory rate • Grunting on expiration • Chest in drawing • Apnoea
Colour	<i>(Nb. Normal colour of the baby is pink)</i> • Pallor • Jaundice (yellow) • Central cyanosis (blue tongue and lips)
Heart rate	Heart rate (Normal, 100 - 160 beats per minute)
Body Temperature	Temperature (Normal, 36.5 °C - 37.5 °C)
Posture and Movements (observed or history of)	<i>(The normal resting posture of a term newborn baby comprises loosely clenched fists and flexed arms, hips, and knees. The limbs may be extended in small babies (less than 2.5 kg at birth or born before 37 weeks gestation. Babies who were in a breech position may have fully flexed hips and knees, and the feet may be near the mouth; alternatively, the legs and feet may be to the side of the body)</i> • Opisthotonos (extreme hyperextension of the body, with the head and heels bent backward and the body arched forward). During the examination, look closely for signs of other problems that could cause opisthotonos e.g. tetanus, meningitis, bilirubin encephalopathy [kernicterus] • Irregular, jerky movements of the body, limbs, or face (convulsion or spasm) • Jitteriness (rapid and repetitive movements that are caused by sudden handling of the baby or loud noises and can be stopped by cuddling, feeding, or flexing a limb)

Muscle tone and level of alertness	<i>The normal newborn baby ranges from quiet to alert and is consolable when upset. The baby is arousable when quiet or asleep.</i> • Lethargy (decreased level of consciousness from which the baby can be roused only with difficulty) • Floppiness (weak muscle tone; limbs fall loosely when picked up and released) • Irritability (abnormally sensitive to stimuli; cries frequently and excessively with little observable cause) • Drowsiness (sluggish) • Reduced activity • Unconscious (profound sleep; unresponsive to stimuli; no reaction to painful procedures)
Limbs	• Abnormal position and movement of limbs • Baby's arms or legs move asymmetrically • Baby cries when a leg, arm, or shoulder is touched or moved • Bone is displaced from its normal position • Club foot (foot is twisted out of shape or position; e.g. heel is turned inward or outward from the midline of the leg) • Extra finger(s) or toe(s), polydactily or syndactily
Skin	<i>(N.b It is not abnormal for the baby's skin on the trunk, abdomen, and back to peel after the first day).</i> Look for; • Redness or swelling of skin or soft tissues • Pustules or blisters • Blistering skin rash on palms and soles • Cut or abrasion • Bruise (bluish discoloration without a break in the skin, usually seen on the presenting part, e.g. buttocks in breech presentation) • Birth mark or skin tag (abnormal spot, mark, or raised area of the skin) • Loss of elasticity • Thrush (bright red patches on skin in napkin area on buttocks, often scaly in appearance or with small white centres)
Umbilicus	<i>(N.b. The normal umbilicus is bluish-white in colour on day 1. It then begins to dry and shrink and falls off after 7 to 10 days).</i> • Umbilicus is red, swollen, draining pus, or foul smelling • Skin around umbilicus is red and hardened • Bleeding from umbilicus • Umbilical hernia
Eyes	• Pus draining from eye • Red or swollen eyelids • Subconjunctival bleeding (bright red spot under the conjunctiva of one or both eyes)

Head and Face	(N.b <i>The normal newborn baby's head may be moulded from a vertex birth; this will resolve spontaneously over a period of three to four weeks</i>) • Hydrocephalus (large head with bulging fontanel and widened sutures) • Bulging anterior fontanelle • Sunken fontanelle • Swelling on scalp that is not restricted to the area over the fontanel • Unable to wrinkle forehead or close eye on one side; angle of mouth pulled to one side (facial paralysis) • Unable to breastfeed without dribbling milk
Mouth and Nose	• Cleft lip (split in lip) • Tongue tie • Cleft palate (hole in upper palate connecting mouth and nasal passages) • Thrush (thick white patches on tongue or inside mouth) • Central cyanosis (blue tongue and lips) • Profuse nasal discharge ("snuffles")
Abdomen and Back	• Abdominal distension • Gastroschisis / omphalocele (defect of abdominal wall or umbilicus through which bowel or other abdominal organs may protrude) • Spina bifida / myelomeningocele (defect in back through which the meninges and/or spinal cord may protrude)
Weight	(N.b <i>The normal birth weight is between 2.5kg – 4.0kg</i>) • Birth weight less than 2.5 kg • Birth weight more than 4.0 kg • Not gaining weight (proven or suspected)
Urine and Stool	(N.b <i>It is normal for a baby to have six to eight watery stools per day. A breastfed baby can stay for a number of days before passing stool and this should not cause any worry so long as the baby is happy and comfortable</i>). • Has not passed urine within 24hours after birth • Passes urine less than six times per day after day 2 • Diarrhoea (increased frequency of loose stools as observed or reported by the mother; stool is watery or green, or contains mucus or blood) • Has not passed meconium within 24hours after birth
Genitalia and Anus	(N.b <i>Vaginal bleeding and discharge in the female newborn baby may occur for a few days during the first week of life and is not a sign of a problem</i>). • Check for imperforate anus • Check for indeterminate sex • Check for undescended testis and penile abnormalities

Feeding	• Baby fed well at birth but is now feeding poorly or has stopped feeding • Baby has not fed well since birth • Baby is not gaining weight (proven or suspected) • Mother has not been able to breastfeed successfully • Baby is having difficulty feeding • Baby is vomiting forcefully, regardless of the method of feeding after every feeding, or is vomiting bile or blood
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1.6 Immunization

- Give BCG 0.05ml and oral polio 2 drops at birth or before discharge
- Immunize all babies irrespective of their weight or gestational age
- Immunize at the usual age (*chronological age and not corrected age*), and do not reduce vaccine dose
- Immunize even if:-
 - Has been hospitalized for a prolonged period of time. If the baby is still in the hospital at 60 days of age, complete a first course of immunization
 - Has a clinically stable neurologic condition (e.g. brain injury)
 - Was born to a mother who is HIV positive
 - Is receiving treatment with antibiotics
 - Has jaundice
- Ensure all babies delivered at home are taken to the health facility for BCG and OPV zero
- Give vitamin A 200,000 units to all mothers
- All mothers who deliver at home to get Vitamin A 200,000 during the first clinic visit
- For babies on replacement feeding give vitamin A 50,000 units at birth
- On discharge the mother to get a birth notification

1.7 Continuing health education and promotion for the caregiver

Counsel the caregiver on continuing care of the baby:

- **Optimum infant feeding**
 - Exclusive breastfeeding for the first 6 months (or replacement feeding where indicated)
 - Show the mother how to position the baby for proper attachment to the breast
- **How to keep the baby warm**
 - Clothe the baby in warm clothes paying particular attention to the head and feet
 - Ensure baby's clothes are always dry
- **Prevention of infection**
 - Instruct the mother and family members to wash their hands with water and soap before handling the baby, before breastfeeding, after visiting the toilet, after handling the baby's faeces
 - Care of the cord
 - Wash the buttocks when soiled. Dry thoroughly
 - Use cloth on baby's bottom to collect stool. Dispose of the stool in the latrine/toilet

- When to go for next **immunization** and Growth monitoring
- Give the mother **Birth Notification**
- Advise the mother to collect the **birth certification** after one month from the registrar of births and deaths (DC's office)

- **How to recognize a sick child**
 - Stops breastfeeding
 - Has difficult or fast breathing
 - Feels hot or unusually cold
 - Becomes less active
 - Baby's body starts turning yellow

- **Sleeping**
 - Preferably Mother should sleep with the baby
 - Use the bed net day and night for a sleeping baby
 - Let the baby sleep on her/his back or on the side
 - Keep the baby away from smoke or people smoking
 - Keep the baby, especially a small baby, away from sick children or adults

- **Bath when necessary:**
 - DO NOT bathe the baby before 24hours of age or if the baby is cold
 - During a bath, ensure the room is warm, no draught
 - Use warm water for bathing
 - Thoroughly dry the baby, dress and cover after the bath

Table F2: Community Based Priority Practices in Neonatal Care

CARE	PRIORITY PRACTICES
Warmth	Dry and put baby on mother's chest and cover them both (skin to skin) immediately after delivery
Feeding	• Initiate breastfeeding within one hour after delivery • Encourage exclusive breastfeeding for at least 6 months • Wash hands before and after feeding • Start complementary feeding after 6 months
Prevention of infection	• Wash hands before and after delivery • Wipe baby's eyes when the baby is born • Instill tetracycline eye ointment in baby's eyes soon after delivery Cord Care: • Tie the cord three times using sterile cord clamps • Cut the cord using sterile blades or scissors • Keep the cord dry all the time • If stump is soiled, wash it with clean water and soap.

	Dry it thoroughly with a clean cloth • Don't apply anything to the cord e.g. saliva, powder, cow dung, salt etc
Immunization	• All babies delivered at home should be taken to the health facility within 1 week of delivery for: ✓ Initial examination of newborn ✓ Weighing ✓ Notification of birth ✓ Vitamin A supplementation ✓ Immunization • Immunize the baby with BCG, OPV birth doses during the first visit, or before the mother leaves the facility, and encourage completion of immunization according to national immunization schedule

1:8 Organizing a Young Child clinic

Counsel and provide:

1. Growth monitoring and promotion:

- Monthly weighing and height/length measurement for the first 2 years then at least quarterly up to 5 years
- Educate mother on appropriate child growth

2. Feeding:

- Ensure adequate nutrition by promoting breastfeeding and appropriate complementary feeding
- Follow the national infant policy guidelines according to mother's choice

3. Emphasize prevention of common childhood diseases such as diarrhoea, pneumonia, malnutrition and malaria

4. Encourage mothers to seek help when child is sick

5. For the sick child use IMCI guidelines

6. Immunization:

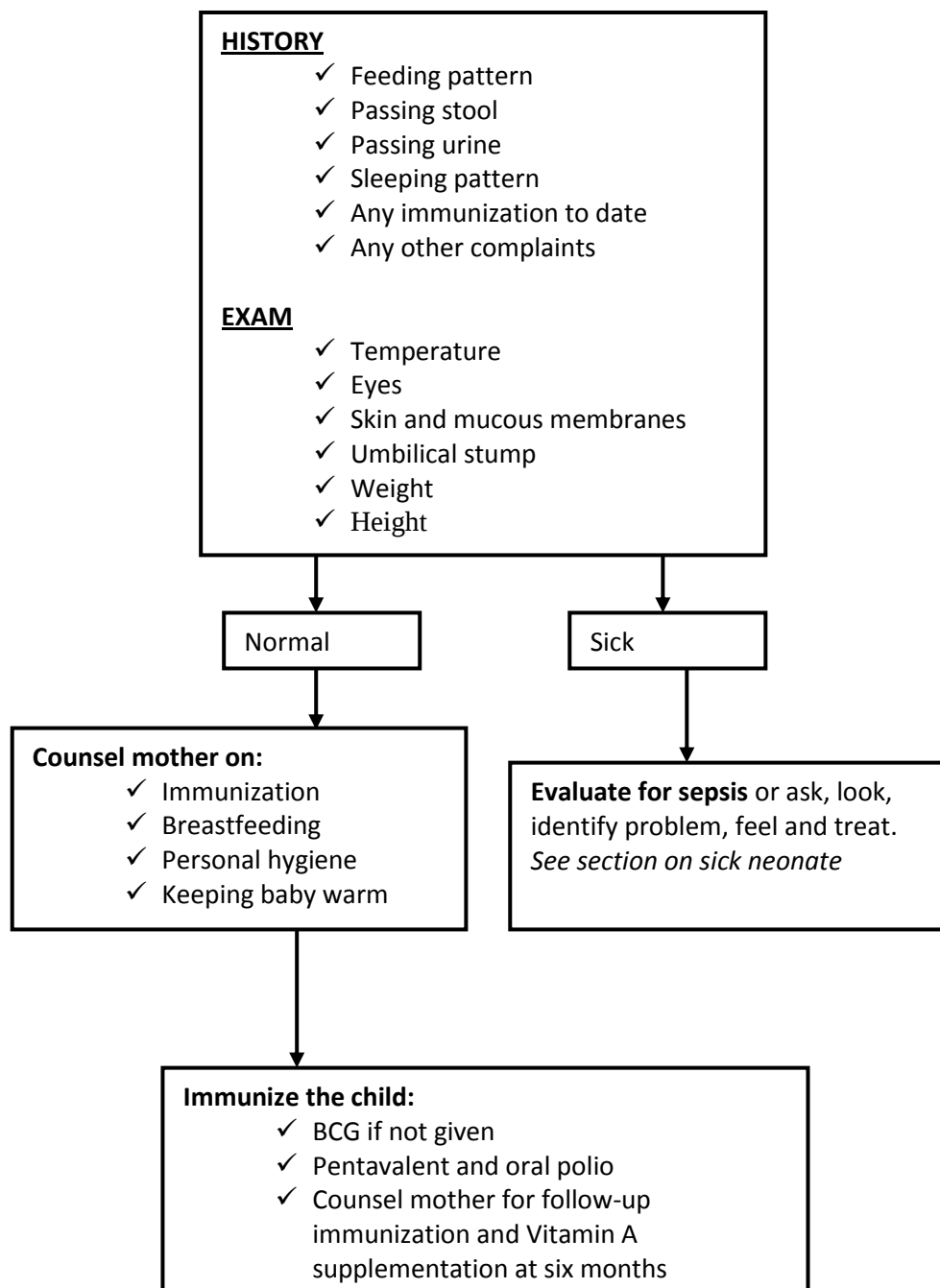
- Ensure completion of immunization of the child
- If mother did not get tetanus toxoid in pregnancy immunize her as you immunize the baby. Remember a mother is supposed to get a minimum of 5 doses in her reproductive years

7. Vitamin A supplementation:

- Give Vitamin A at six months and every 6 months up to five years

8. Teach mother how to recognize a sick child

Figure F1: Infant Care during Follow-up Visit of Post Partum Mother at 48hrs, 2 Weeks and 6 Weeks



F2. BREASTFEEDING AND LACTATION MANAGEMENT

FOCUSED ANTENATAL CARE (FANC)

What should happen during each FANC visit?

1st visit • Advice on individual birth plan • Take history • Do physical examination • Look for anaemia • Screen for syphilis • Give TT, iron folate • Give SP if more than 16 weeks pregnant • Tell her about danger signs • Discuss advantages of breastfeeding	2nd visit • Check on individual birth plan • Give first SP, iron and folate • Listen for foetal heart sound • Counsel and educate • Counsel on early initiation of breastfeeding, positioning and attachment
3rd Visit • Check on individual birth plan • Give second SP, iron and folate • Give TT (if 4 weeks from 1st dose) • Listen to foetal heart sound • Counsel and educate • Counsel on advantages and how to manage exclusive breastfeeding	4th Visit • Update on individual birth plan • Look for anaemia • Check foetal presentation • Do vaginal exam • Give iron and folate • Counsel and educate • Review all breastfeeding messages

NB: For late booking/attendance for ANC (28 weeks +) give all the breastfeeding messages above.

2.1 Breast Examination

All mothers should have their breasts examined and they should also be counselled on appropriate breastfeeding:

Step 1: Prepare Client:

- Explain procedure
- Psychological preparation
- Expose breasts

Step 2: Inspect breast in a sitting position

- For striae
- Any abnormalities

Step 3: Palpate breasts with client lying down

- For abnormal lumps
- Breast milk secretion

Step 4: Inspect nipples for problems that may hinder breastfeeding e.g. inverted nipples.
Check nipples for protractility

Step 5: Show mother how to position and attach baby to prevent nipple problems as shown in Figure F2

Step 6: Refer the client as necessary

Note: Teach self-breast examination to mother. This will facilitate early detection of breast cancers and other problems

2.2 Care of the Breast

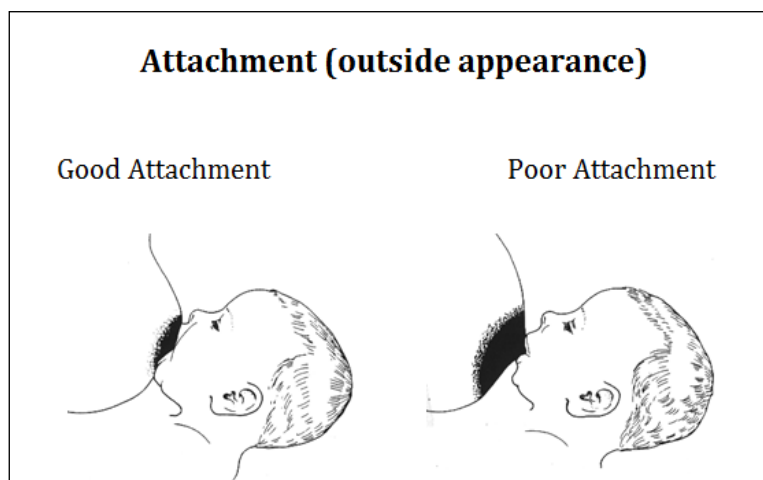
- As long as the nipples are clean breast milk is always free from germs
- ***There is no need to clean breast every time the baby feeds.*** A daily bath is enough

2.3 Breastfeeding the Newborn

Ensure mother is in a comfortable position then;

- Show her how to help her baby to attach. She should:
 - Touch her baby's lips with her nipple
 - Wait until her baby's mouth is opened wide
 - Move her baby onto her breast, aiming the infant's lower lip well below the nipple
- Look for signs of good attachment:
 - More of areola visible above the baby's mouth
 - Mouth wide open
 - Lower lip turned outwards
 - Baby's chin touching breast
- Look for signs of effective suckling (that is, slow, deep sucks, sometimes pausing)
- If the attachment or suckling is not good, try again, then reassess
- In case of breast engorgement, express a small amount of breast milk before you start breastfeeding to soften the areola area so that it is easier for the baby to attach

Figure F2



The following information should be discussed with the mother:

- The importance of exclusive breastfeeding for the first 6 months unless medically contraindicated e.g. a mother who is HIV positive who chooses not to breastfeed
- The need to avoid giving baby water or any other food or fluid in the first 6 months
- The importance of breastfeeding in the delivery room. For Caesarean Section mothers, they should be assisted to put baby to breast as soon as they are awake
- Informed feeding choices for the HIV infected mother
- How to maintain lactation if separated from their babies. Mothers who have to be away from baby for long stretches of time should be shown how to express breast milk and keep it

in clean covered cups. Let the baby feed by cup. Expressed breast milk can remain for 8 hours at room temperature

The Delivery Room:

- Initiate breastfeeding as soon as possible, within one hour of delivery
- Give baby to mother to hold even if not breastfeeding
- After birth, let the baby rest comfortably on the mother's chest in skin-to-skin contact.
- Tell the mother to put the baby to her breast when the baby seems to be ready, usually within the first hour. **Signs of readiness to breastfeed** are:
 - Baby looking around/moving
 - Mouth open
 - Searching
- Show the mother **how to hold her baby**. She should:
 - Make sure the baby's head and body are in a straight line
 - Make sure the baby is facing the breast; the baby's nose is opposite her nipple
 - Hold the baby's body close to her body
 - Support the baby's whole body, not just the neck and shoulders
- Check that the position and attachment are correct at the first feed. Offer to help the mother at any time
- Let the baby release the breast by her/himself; then offer the second breast
- If the baby does not feed in 1 hour, examine the baby. If healthy, leave the baby with the mother to try later

The Postnatal Ward:

If baby did not breastfeed in delivery room, Assess breastfeeding

- Encourage rooming-in/bed sharing with baby
- Ensure proper positioning and attachment
- Baby should empty one side completely before being put on the opposite side
- Alternate the side that the mother starts on
- Encourage feeding on demand at least 10 to 12 times per day including day and night
- Assist mothers with feeding problems
- For mothers who have had caesarean section put baby on breast as soon as possible when she is awake
- If the mother is ill and unable to breastfeed, help her to express breast milk and feed the baby by cup;
- If mother cannot breastfeed at all, consider alternative feed or refer
- Do not give glucose or water
- If properly managed, there should be no breast discomfort

2.4 Management of Breast problems:

2.4.1 Prevention

- Proper attachment and positioning of the baby during breastfeeding
- Frequent emptying of the breasts
- Not giving pre-lacteal feeds e.g. glucose, water or other types of milk
- Educate women on how to breastfeed during antenatal clinic, and how to manage simple breast problems

2.4.2 Sore or cracked nipples

Diagnosis

- Mother reports pain on breastfeeding
- Cracks may be seen on nipples

Management

- Counsel on personal hygiene and how to keep the nipples clean
- Express the milk from the affected breast to prevent engorgement
- Show mother how to position and attach baby
- Apply milk on the cracks and encourage exposure to air or sunshine if possible
- Continue breastfeeding both breasts
- Check for oral thrush in baby

2.4.3 Breast Engorgement

Definition

Breast engorgement occurs when there is congestion as well as over accumulation of milk

Diagnosis

The breasts feel hard with distended vessels. They are also warm and tender. The areola may look oedematous

Management

1. Mother is breastfeeding:

- If the baby is not able to suckle encourage the woman to express the milk
- Encourage the woman to breastfeed more frequently, using both breasts at each feeding
- Show the woman how to hold and attach baby to breast
- Relief measures before breastfeeding may include:
 - Applying warm/ cold compresses to the breasts just before breastfeeding, or encourage the woman to take warm shower
 - Massage the woman's neck and back
 - Have the woman express some milk manually prior to breastfeeding and wet the nipple area with breast milk to help the baby latch properly and easily
- Relief measures after feeding may include:

- Good support to the breast with a binder or brassier but avoid tight ones
- Apply cold/ warm compresses to the breast between feeding to reduce swelling and pain
- Give analgesics e.g. *Paracetamol* 500mg orally as needed
- Follow up 3 days after initiating management to ensure response

2. Mother is not breastfeeding:

- Support breasts with binder or brassiere to reduce swelling and pain
- Apply cold/warm compresses to the breasts to reduce swelling and pain
- Express enough milk to relieve pain but avoid complete emptying as this will reduce milk production. Let her gradually reduce volume expressed
- Give analgesic e.g. *paracetamol* 500mg orally when needed
- Review /Follow up 3 days after initiating treatment to ensure response
- Advise to seek care if breasts become painful, swollen and red, or if she feels ill or her temperature is $> 38^{\circ}\text{C}$

2.4.4 Mastitis

Definition

Mastitis is defined as inflammation of the breast.

Management:

- Treat with antibiotics e.g. Cloxacillin 500mg every six hours for 5-10 days Or Erythromycin 500mg every six hours for 5 – 10 days
- Analgesics e.g. Paracetamol 500mg orally as needed
- Encourage the woman to:
 - Continue breastfeeding on the unaffected side
 - Support breast with brassiere
 - Apply cold/ warm compresses to the breast between feeds to reduce swelling and pain
 - Express the milk from affected side several times a day and discard
- Follow up three days later to ensure response.

2.4.5 Breast Abscess

Definition

A breast abscess is a localized collection of pus in the breast.

Management

- Treat with antibiotics as in mastitis
- Drain the abscess
 - General anaesthesia e.g. Ketamine is usually required; you may also use Local anaesthetic spray

- Make the incision radially extending from near the alveolar margin towards the periphery of the breast to avoid injury to the milk ducts
- Wearing sterile gloves and use a finger or tissue forceps to break up the pockets of pus
- After draining the pus loosely pack the cavity with gauze
- Remove the gauze pack after 24 hours and replace it with a small gauze pack
- If there is still pus in the cavity place a small gauze pack in the cavity and bring the edge out through the wound as a wick to facilitate drainage of any remaining pus
- Encourage the woman to:
 - Continue breastfeeding even when there is a collection of pus
 - Support breast with a binder or brassiere
 - Apply cold/ warm compresses to the breast between feeds to reduce swelling and pain
 - Give analgesics e.g. Paracetamol 500mg orally 8hrly for 7 days
 - Follow up 3 days after initiating management to ensure response
 - Educate the mothers on the importance of emptying the breasts

F3. RESUSCITATION OF THE NEWBORN

Definition of neonatal resuscitation:

This is to establish the heart and lung function following cardio-respiratory arrest.

Birth Asphyxia

This is defined as Failure to initiate and sustain breathing at birth.

However, for many babies, the need for resuscitation cannot be anticipated before delivery. Therefore be prepared for resuscitation at every delivery.

Prevention of asphyxia

- All pregnant women should be encouraged to attend ante-natal care
- Educate people at all levels on the importance of delivering under the care of skilled birth attendants
- Equip all skilled birth attendants with adequate neonatal resuscitation skills
- Promote identification of women, with danger signs during pregnancy, labour and delivery

Predisposing factors

- Prolonged labour/difficult/instrument delivery
- Pre-eclampsia/eclampsia
- Ante-partum haemorrhage
- Malaria/fever
- Pre-term deliveries
- Previous foetal or neonatal death
- Meconium stained liquor (due to foetal distress)
- Maternal sedation (anaesthesia, analgesic)
- Cord-prolapse
- Prolonged rupture of membranes

- Breech or other abnormal presentation
- Multiple births

Preparation

- Check and arrange equipment/supplies at all times (use equipment checklist) as follows:
 - A firm stable surface
 - Source of heat e.g. heater, heater lamp or resuscitaire
 - Adequate lighting
 - Source of oxygen, flow meter, tubing and key
 - Suction equipment i.e. suction machine, suction catheters sizes F6, 8, 10
 - Ambu bag (500mls)
 - Face masks sizes 0 and 1, preferably round
 - Wall clock
 - At least two pieces of warm dry linen
 - Syringes and needles/swabs, (preferably 1ml, 2ml and 10mls)
 - Stethoscope
 - Airways sizes: 000,00,0
 - Nasal prongs
 - Nasogastric tube size F4, F6 and F8 can be used as umbilical catheter
 - Scissors and tape
- Extras:
 - Laryngoscope with extra batteries and bulb
 - Laryngoscope blades sizes 0 and 1, preferably straight blade
 - Endotracheal tube size 2.0, 2.5, 3.0, 3.5, and 4.0
- Drugs:
 - Adrenaline (Epinephrine)
 - 10% dextrose
 - Normal saline

Neonatal resuscitation procedure

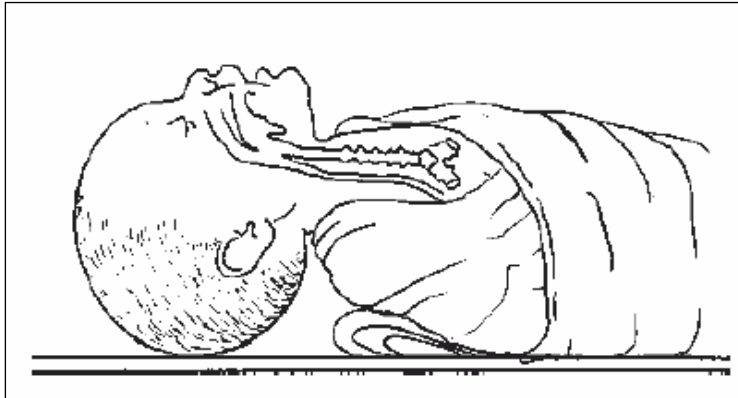
Resuscitation is a life saving procedure!

Temperature:

- Dry the baby, remove wet clothing and wrap baby in dry warm clothes. At the same time observe the baby's breathing, colour and activity
- Place the baby on a firm warm surface or under a radiant heat warmer

Airway:

- Position baby's head in a neutral position (slightly extended position) to open airway. (see Figure F3)
- Open airway
- Suction –If there is meconium stained fluid and baby is not crying and moving limbs (Do not suck for more than 3 seconds)
 - Suck only what you can see
 - Suck the mouth and then the nose
 - Suck only while withdrawing the catheter

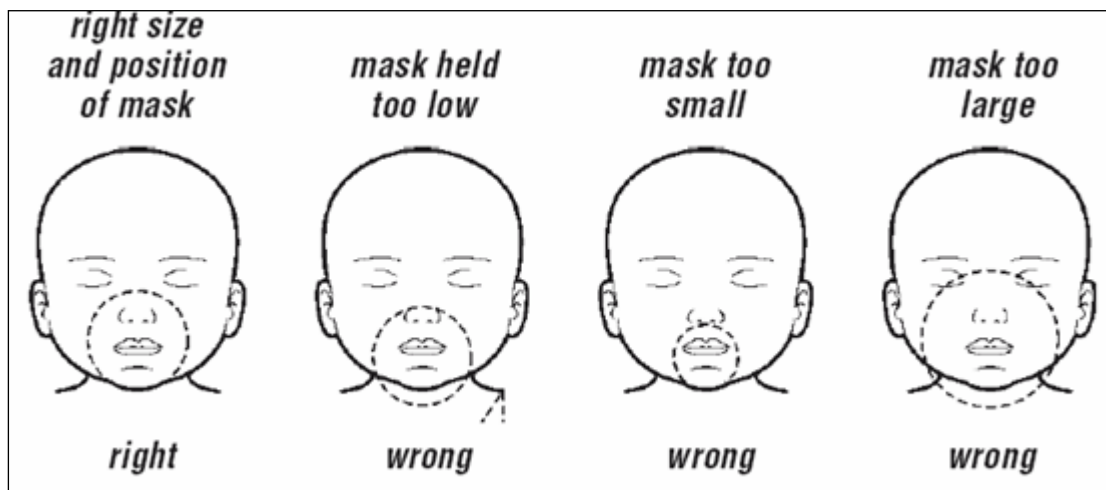
Figure F3: correct position of the head for ventilation**Assess breathing**

It is imperative to recognize which of the three scenarios below is occurring to the baby

- No breathing.
- Gaspings.
- Normal breathing.

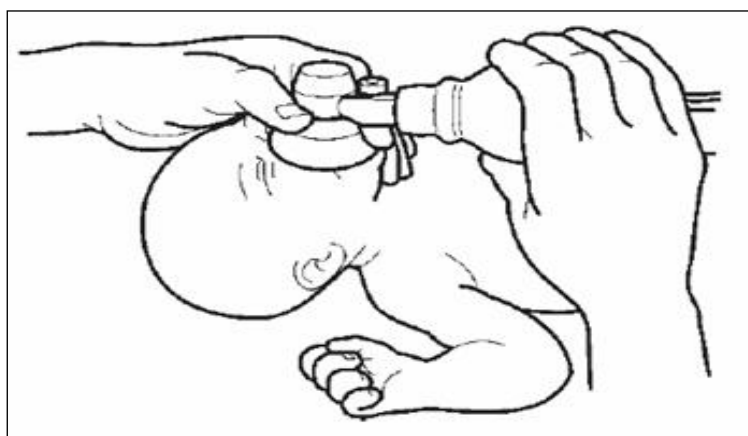
Ventilating the Newborn

- If gasping or no breathing, recheck the newborn's position. The neck should be slightly extended (Figure F3)
- Place the mask on the newborn's face. It should cover the chin, mouth and nose;

Figure F4: Fitting the face mask:

Ventilating with bag and mask

- Place mask to cover chin, mouth and nose
- Form a seal
- Squeeze bag attached to the mask with two fingers or whole hand about 30 to 50 times per minute
- Watch chest for movement, do not over inflate, allow baby to breathe out. If chest is not rising:
 - Reposition the head
 - Check mask seal
 - Squeeze bag harder
- Start ventilation immediately using room air (bag and mask). If the baby does not improve then use oxygen

Figure F5: Ventilation with bag and mask

Pull the jaw forward towards the mask with the third finger of the hand holding the mask. Do not hyperextend the neck.

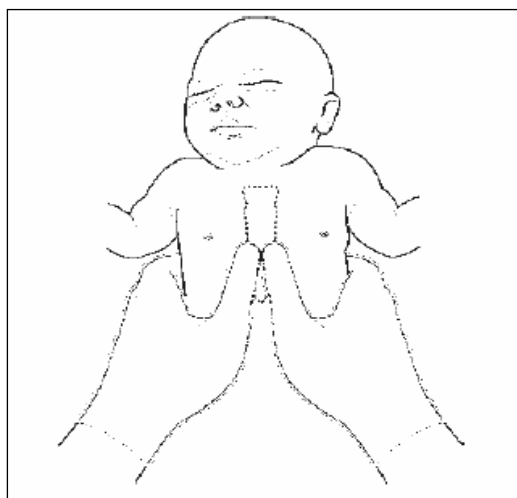
Circulation

- Assess and count heart rate, act according to the flow chart below.

Chest compression

Using two fingers method, or thumb method compress the chest (1cm below the line connecting the nipples and the sternum) pushing down 1.5cm.

Give 90 compressions coordinated with 30 breaths per minute (3 compressions for every breath).

Figure F6: Chest compression using the thumb method**The “DO NOTS” of neonatal resuscitation**

- Do not hold the baby upside down
- Do not slap the baby
- Do not perform routine suction of the upper airway
- Do not perform routine gastric aspiration
- Do not use sodium bicarbonate routinely
- Do not use Aminophylline

Correct position of hand for cardiac massage in a neonate. The thumbs are used for compression over the sternum.

Drugs

- Adrenaline 1:1000, dilute to make 1:10,000, by taking 1 ml of 1:1000 adding 9mls of water for injection to make 10mls
- Dosage: Using the diluted strength, give 0.1ml/kg intravenously
- Repeat dose up to 3 times at intervals of 5 minutes

Table F3: Endotracheal tube selection

	Weight of baby	Int-diam (mm)	Length of ET tube at lip
Endotracheal tube (ET)	<1000gm	2.5 uncuffed	7cm
	1000-2000gm	3.0 uncuffed	8 cm
	2000-4000gm	3.5 uncuffed	9 cm
	>4000gm	4.0 uncuffed	10 cm
Laryngoscope blades	<2000gm	0 (straight)	
	>2000 gm	1 (straight)	

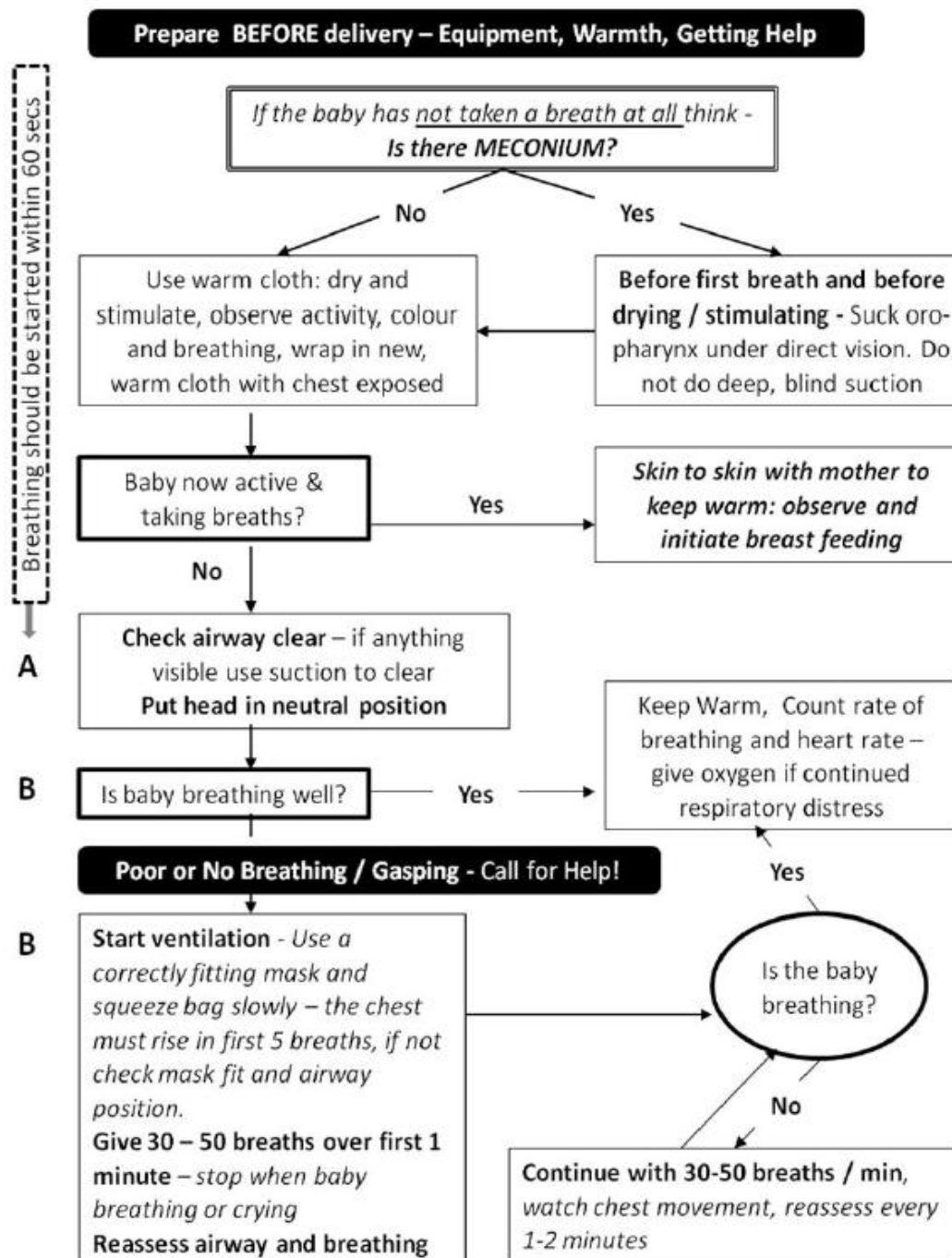
When to stop resuscitating:

If after 20 minutes of resuscitation the baby is not breathing and pulse is absent

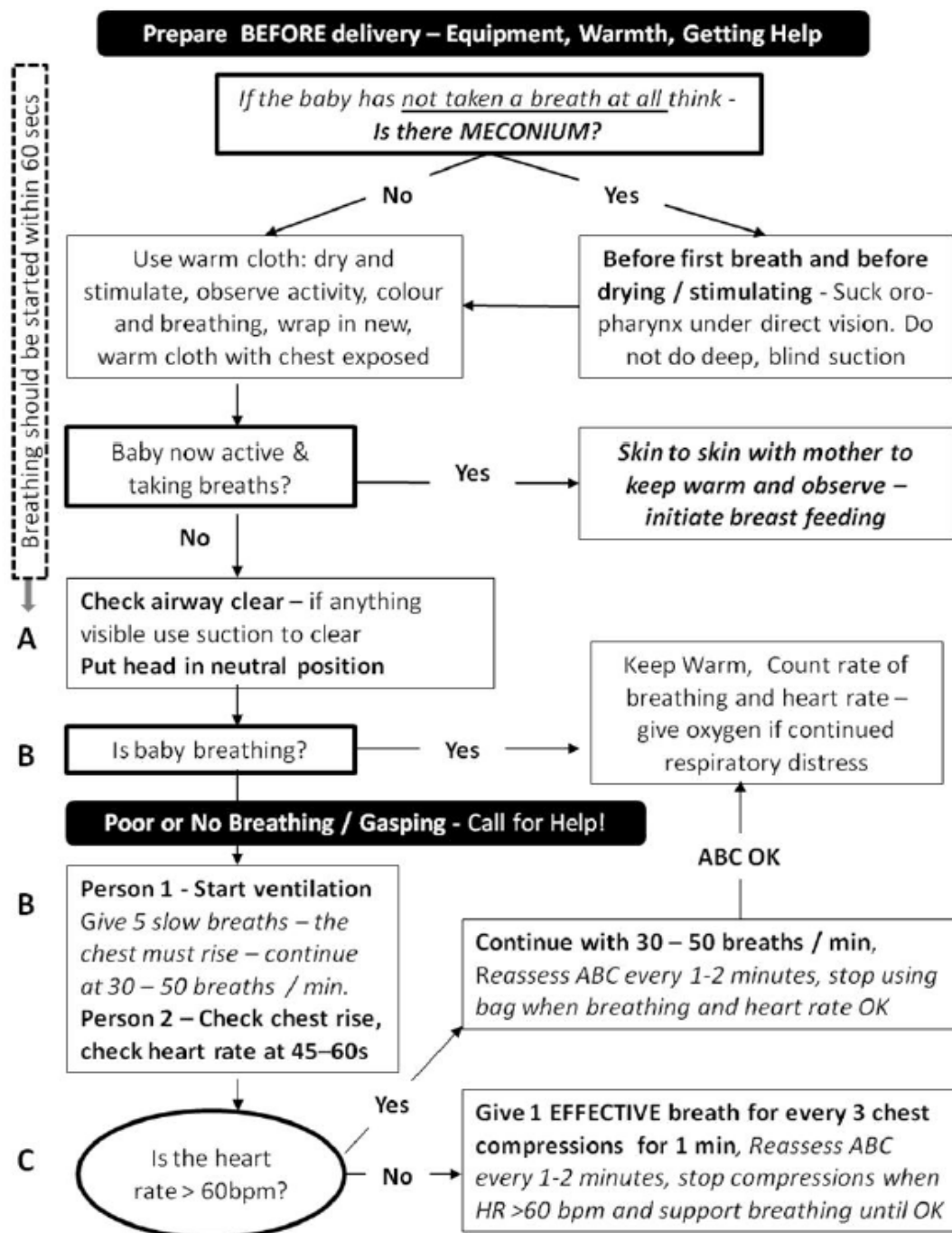
- *Explain to the mother that the baby has died, enquire if she would like to hold and give to her to if she wishes*

Figure F7: Neonatal Resuscitation

Newborn Resuscitation – for SINGLE Health Worker – Be Prepared!



Newborn Resuscitation – for TWO trained Health Workers – Be Prepared!



F4. BIRTH INJURIES

Definition:

This refers to an injury sustained by the baby during the birth process and includes injuries to:

- Skin and superficial tissues
- Muscle trauma
- Nerve trauma
- Fractures

Prevention

- i. Good ANC care
- ii. Anticipation of problem and early management or referral
- iii. Early recognition of injury and management

Skin and superficial tissues

Can be caused by vacuum extractor cups, forceps blades, and scalpel

Caput succedaneum

This is an edematous swelling under the scalp and above the periosteum which forms on the presenting part. It does not need treatment as it resolves spontaneously.

Cephalohaematomas

This is an effusion of blood below the periosteum that covers the skull bones. It usually resolves after 2-3 weeks. No treatment is necessary but the baby should be observed for jaundice and the mother reassured.

Figure F8: Unilateral cephalohaematoma



Subconjunctival hemorrhages

These are hemorrhages seen below the conjunctiva and above the sclera. There is no need for treatment except to reassure the mother.

Abrasions and swellings on presenting parts: (e.g. on face, genitalia etc).

Abrasions and lacerations should be kept clean and dry. If infected, antibiotics may be needed. Deep lacerations may require suturing.

Muscle

The most commonly damaged is a neck muscle called ***sternomastoid***. It results in twisting of the neck to the affected side referred to as *torticollis*. It is managed by laying baby on the unaffected side and physiotherapy. It usually resolves after several weeks

Nerve trauma

Facial nerve palsy;

This results from damage to the facial nerve. The eyelid on the affected side remains open and the mouth is drawn to the normal side. This might cause some feeding difficulties.

Figure F 9: Facial palsy



Management

Due to the feeding difficulty, help mother to attach well; and if this fails; give expressed breast milk

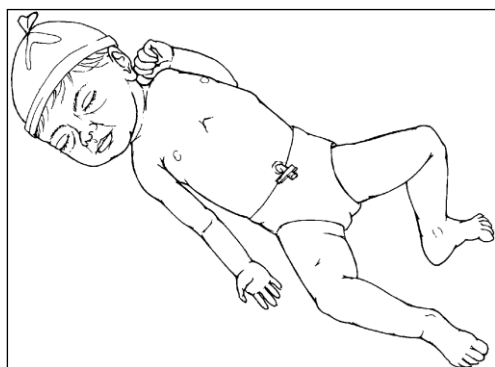
Damage to the brachial plexus leading to Erb's Palsy and Klumpke's palsy

This is usually caused by a difficult birth e.g.

- Breech delivery
- Large baby (more than 4 kg at birth)

Features include:

- No spontaneous arm movement on one side
- Arm and hand lying limply by baby's side

Figure F10: Erbs Palsy (arm paralysis)**Management**

Handle the baby's shoulder (e.g. during dressing or when mother is breastfeeding) gently to prevent further injury, and teach the mother how to do so. If at rural health facility, refer to hospital. For the first week, reduce pain by strapping the arm in place as described for a fractured humerus.

Fractures

Fractures are rare and are usually caused by difficult birth. The most commonly affected bones are the clavicle, humerus, femur and those of the skull.

Features

- *Displacement of bone from its normal position*
- Pain (crying) when a limb or shoulder is moved
- Lack of movement or asymmetrical movement of a limb
- Swelling over bone
- Crepitus

General management for fractures

- Confirm the diagnosis with X-ray
- Handle the baby gently when moving or turning, and teach the mother how to do so.
- Avoid movement of the affected limb as much as possible
- Immobilize the limb to reduce pain when the baby is handled (see below for how to immobilize specific fractures)
- If the mother is able to care for the baby and there are no other problems requiring hospitalization, discharge the baby

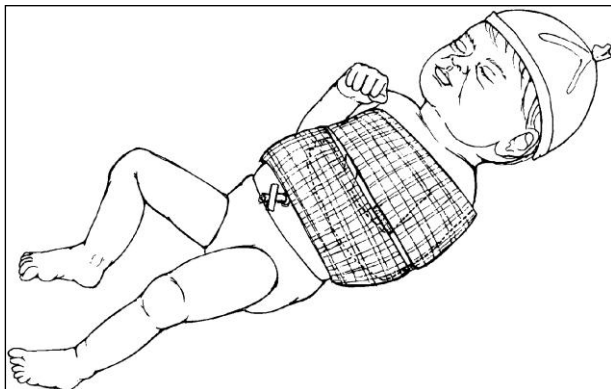
Fractured humerus

- Place a layer of cotton batting or gauze padding between the affected arm and the chest, from the axilla to the elbow
- Strap the upper arm to the chest using a gauze bandage
- Flex the elbow of the affected arm to 90 degrees, and use a separate bandage to strap the forearm across the abdomen in this position. Ensure that the umbilicus is not covered by the bandage

- Check the fingers twice daily for three days (the baby does not have to be admitted to the hospital if the mother is able to bring the baby back to the hospital each time):
 - If the **fingers become blue or swollen**, remove the bandage and rewrap it more loosely;
 - If the **bandage is rewrapped**, observe the fingers for blueness or swelling for an additional three days

Have the mother return with the baby in 10 days to remove the gauze bandages.

Figure F11: Splinting a fractured humerus



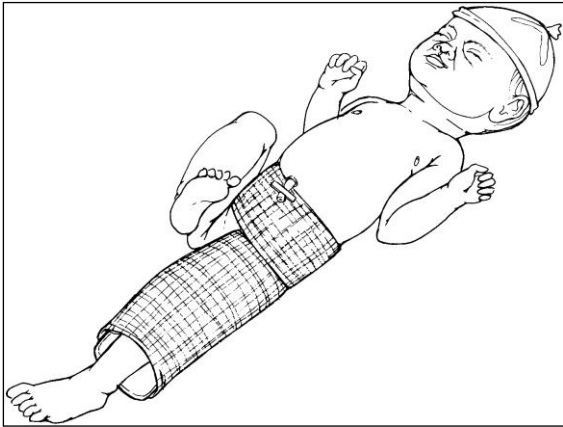
Fractured clavicle

- If moving the arm causes the baby to cry, strap the arm in place as described for a fractured humerus
- Have the mother return with the baby in five days to remove the gauze bandages

Fractured femur

- Place the baby on her/his back and place a padded splint under the baby from the waist to below the knee of the affected leg
- Strap the splint to the baby by wrapping an elastic bandage around the waist and from the thigh to below the knee of the affected leg. Ensure that the umbilicus is not covered by the bandage
- Check the toes twice daily for three days (the baby does not have to be admitted to the hospital if the mother is able to bring the baby back to the hospital each time):
 - If the toes become blue or swollen, remove the bandage and rewrap it more loosely
 - If the bandage is rewrapped, observe the toes for blueness or swelling for an additional three days
- Have the mother return with the baby in 14 days to remove the splint

Figure F12: Splinting a fractured femur



Head Injury

This involves injury to bones of the skull and intracranial tissues. It is rare, but can occur during difficult deliveries

Features include:

- No sign of overlying cephalohaematoma
- Intracranial haemorrhage
- Raised intracranial pressure
- CSF leakage
- Seizures

Diagnosis is by: X-ray and Ultrasound of the head

Management

- Linear fractures usually need no treatment
- Depressed fractures may require surgery
- Antibiotic cover for those with CSF leakage
- Treat associated problems like haemorrhage

5. MANAGEMENT OF THE HIGH RISK NEWBORN (NEONATE)

5.1 INFECTION CONTROL IN A NEWBORN UNIT

Methods to prevent infection

- Have a separate room specifically for newborn babies in a low traffic area with restricted access
- Avoid overcrowding and understaffing
- Do not place two or more babies in the same cot or incubator or under the same radiant warmer or phototherapy unit

People as sources of infection

- Do not allow personnel with skin infections or lesions to come into direct contact with babies
- Individuals handling the baby should wash their hands with soap and water

Hand washing

- Wash hands with soap and water, but if hands are visibly clean, disinfect them using an alcohol-based hand rub;
 - before and after caring for a baby and before any procedure
 - after removing gloves
 - after handling soiled instruments or other items
- Instruct the mother and family members to wash their hands before and after handling the baby
- To wash hands:
 - Thoroughly wet hands
 - Wash hands for 10 to 15 seconds with plain soap and running or poured water
 - Allow hands to air-dry or dry them with a clean paper towel
- An alcohol-based hand rub, made from adding 2 ml of glycerin (or other emollient) to 100 ml of 60% to 90% ethyl or isopropyl alcohol, is more effective in cleaning hands than hand washing unless the hands are visibly soiled. To clean hands using an alcohol-based hand rub:
 - Apply enough hand rub to cover the entire surface of hands and fingers
 - Rub the solution into hands until they are dry

Protective clothing

- It is not necessary to wear gowns or masks when providing routine care for newborn babies

Housekeeping and waste disposal

- Regular and thorough cleaning will decrease microorganisms on surfaces and help prevent infection
- Every newborn special care unit should have a housekeeping schedule:
 - Post the cleaning schedule in a visible area
 - Educate staff regarding cleaning, and delegate responsibility

Table F4: Cleaning schedule for the newborn special care unit

Frequency	Cleaning Guidelines
Daily	- Wet-mop floors with a disinfectant and detergent solution. - Do not sweep floors or use cleaning methods that increase dust - Wipe incubators and radiant warmers with a disinfectant solution
Between Babies	- Wipe equipment, bassinets (cots), examination tables, etc., with a cloth dampened with disinfectant solution - Clean incubators and radiant warmers between each use, including the mattress, with a disinfectant solution - Allow the incubator to dry completely before placing a baby inside
As Needed	- Clean windows, walls, lamps, chairs, to prevent accumulation of dust - Remove and destroy or clean contaminated waste containers - Remove and destroy the sharps-disposal container and replace with another suitable container - Clean spills of blood or body fluid with a disinfectant solution

Table F5: Guidelines for processing instruments and equipment

Instrument	Processing Guidelines (after each use)
Thermometers and stethoscopes	Wipe with a disinfectant solution between each use, and particularly between use with different babies.
Resuscitation bag and mask	- Wipe exposed surfaces with gauze pad soaked in disinfectant solution - Wash the face mask with soap and water
Incubator or radiant warmer	- Wipe with a disinfectant solution daily - Wash radiant warmer with soap and water before using for a new baby - Wash incubator weekly, if the same baby is still in the incubator, and before using for a new baby
Incubator apparatus and catheter, gastric tube, nasal prongs, nasal catheter, syringes	- Soak in disinfectant solution for 10 minutes - Wash with soap and water - High-level disinfect or sterilize
Oxygen head box	Wash with soap and water

5.2 LOW BIRTH WEIGHT INFANT

Definitions:

Low birth weight infant

Any baby whose birth weight is below 2500gms at birth.

Very low birth weight infant

Any baby whose birth weight is below 1500gms at birth.

Pre-term Baby

Any baby born before 37 completed weeks of gestation.

Small for Gestational Age Baby

Any baby whose birth weight falls below the 10th percentile for that gestational age.

Diagnosis of pre-term baby

Diagnosis is made through:

- History taking to determine maturity by dates
- Neonatal assessment to determine gestational age clinically

Diagnosis of Small for Gestational Age Baby / Intra uterine growth retardation (IUGR)

- The baby has dry wrinkled skin
- Looks wasted
- The weight is below the 10th percentile for that age

Prevention

- Encourage mothers to seek health care services as soon as possible
- Adequate antenatal care, with early diagnosis and proper treatment of complications e.g. infections, anemia and pregnancy related complications
- Adequate maternal nutrition

Management

- If a mother who is in early labour comes where there are no neonatal facilities transfer her immediately to a centre with a newborn unit
- All babies weighing 2000gms and below at birth should be admitted in the newborn unit or referred
- Small for gestational age babies do not need admission unless they are less than 34 weeks or weigh below 1900gms

General principles for care of the low birth weight baby

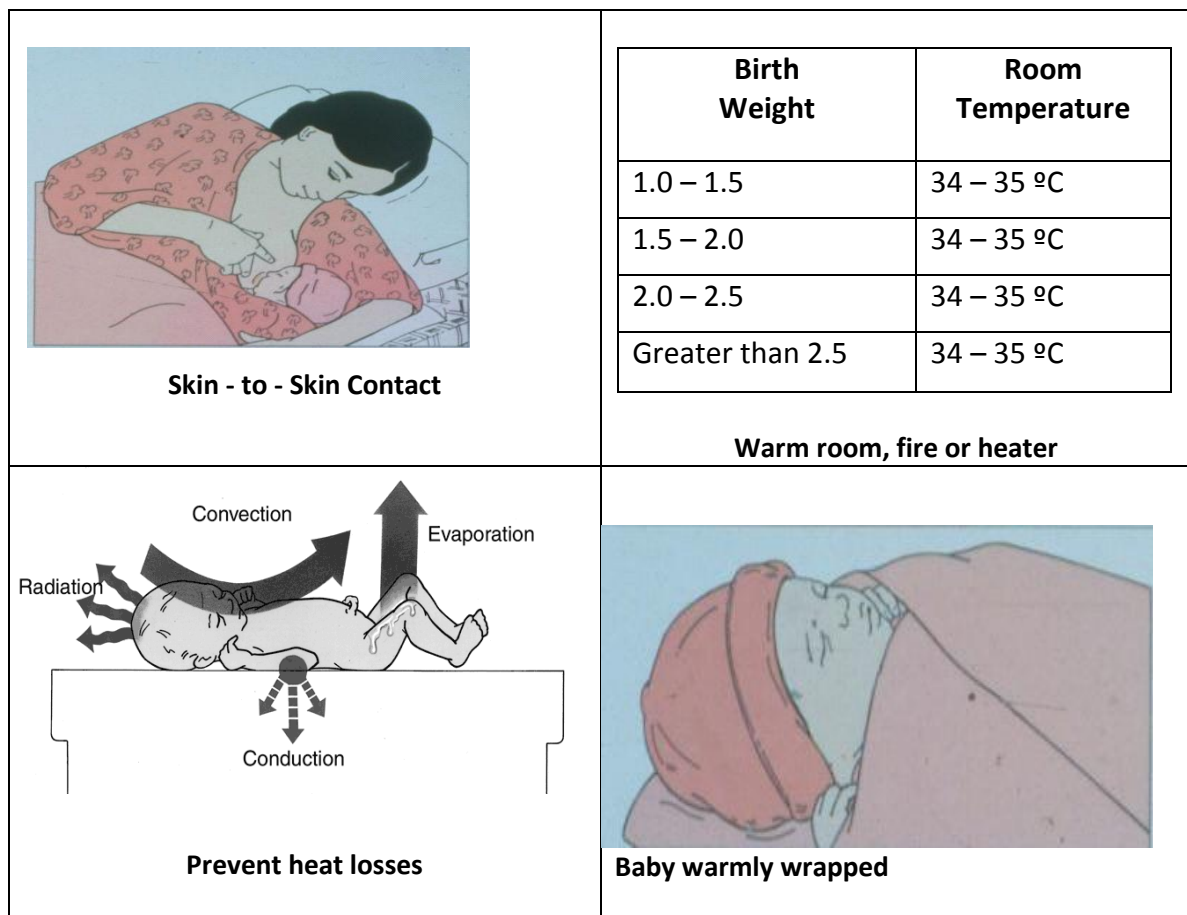
- *Provide adequate warmth*
- *Adequate feeding*
- *Prevent infections*

5:2:1 Means of keeping baby warm (thermal control)

If the baby is born at home, or in a place without facilities for care, the following should be instituted:

- Immediate drying and wrapping in warm clothing
- Keep baby skin to skin with the mother (“**Kangaroo method**”); he/she should be transferred using skin to skin method
- In the newborn unit use heated rooms or nurse in incubators if available preferably dressed

Figure F13: Keeping Preterm, Low Birth Weight and sick babies warm



CARE PRACTICES TO PREVENT OVER COOLING (WARM CHAIN):**Figure F14: The 'warm chain'**

1. Warm delivery room
2. Immediate drying
3. Skin-to-skin contact
4. Breastfeeding
5. Bathing and weighing postponed
6. Appropriate clothing and bedding
7. Mother and baby together
8. Warm transportation (skin-to-skin)
9. Warm resuscitation
10. Training and awareness

- ❖ Warm delivery room:
 - Keep birthplace warm (at least 25 °C) and avoid drafts.
 - Warm the room before the baby is born
- ❖ Immediate drying: Immediately after birth, dry the baby with a warm towel. Most cooling happens in the first two minutes after birth.
- ❖ Mother and baby together:
 - Put the baby in skin-to-skin contact with the mother for at least 2 hours after birth. Cover both with a warm cloth. It is important that an infant stays warm throughout the newborn period. Keep the mother and baby together in a warm room
- ❖ Breastfeeding: initiate breastfeeding as soon as possible, within one hour of birth. Then continue to feed on demand
- ❖ Bathing postponed: Wait for at least 3 days before bathing the baby.
- ❖ Postpone weighing until mother and baby are ready to be moved out of the delivery room
- ❖ Appropriate clothing and bedding:
 - Dress the baby in light, loose, warm clothing, a baby needs at least 1-2 more layers than an adult in the same climate
 - The number of layers depends on room warmth
 - About 25% of the baby's heat loss can come from the head, so cover the baby's head with a hat or cloth
 - Cover the baby with a light, warm cover or blanket
- ❖ Warm transportation (skin-to-skin):
 - Keep the baby warm during transportation, if referred
 - Put the baby skin-to-skin with the mother or another adult (kangaroo) and cover both warmly
 - The baby's temperature should be checked during the referral, if possible
- ❖ Training and awareness:
 - Teach both health workers and families about the risks of low temperature/hypothermia and how to prevent it

Kangaroo Mother Care

Rationale

Kangaroo Mother Care (KMC) is the care of a small baby who is continuously kept in skin-to-skin contact with the mother. It **provides the newborn low birth weight or preterm baby with the benefits of incubator care and is cheaper**. It is the best way to keep a small baby warm and it also helps establish breastfeeding. KMC can be started in the hospital as soon as the baby's condition permits i.e. the baby does not require special treatment, such as oxygen or IV fluids. KMC, however, requires that the mother stays with the baby or spends most of the day at the hospital until baby is feeding and gaining weight well. Thereafter it can be continued at home with regular outpatient monitoring.

Advantages of Kangaroo Mother Care to the baby

- Keeps the baby warm
- The baby feeds more easily
- Episodes of apnoea are less frequent
- Infections are prevented
- Baby grows very well

Important points:

All mothers irrespective of age, number of children, education, cultural or religious background, and socio-economic status can do it. However, the mother:

- Must be willing to do it
- Must be available all the time to provide the care needed
- Be of good general health
- Needs a supportive family and community

Indications for Kangaroo mother care

- Any low birth weight (LBW) baby who is stable: not requiring special treatment (e.g. oxygen or IV fluid)

When to start kangaroo-mother care -the baby

- The baby must be able to breathe on his or her own
- The baby must be free of life threatening disease or malformations
- The ability to breastfeed is not essential, other methods of feeding can be used until the baby can breastfeed

How to place the baby on the mother's chest: see figures below

Figure F15:



Placement and securing of baby in KMC;

- Arrange with the mother a time that is convenient for her. Ask her to wear light, loose clothing that can accommodate the baby, opens in the front and is comfortable in the ambient temperature
- If room temperature is below 22°C the baby should wear a sleeveless shirt open at the front, a napkin, a hat, and socks. Otherwise only a napkin is needed
- Place the baby in an upright position directly against the mother's skin
- Ensure that the baby's hips and elbows are flexed into a frog-like position and the baby's head and chest are on the mother's chest, with the head in a slightly extended position
- Use a soft piece of fabric (about 1 square metre), folded diagonally in two and secured with a knot. Make sure it is tied firmly enough to prevent the baby from sliding out if the mother stands, but not so tightly that it obstructs the baby's breathing or movement
- The baby should be encouraged to breastfeed at 2-3 hourly intervals. If unable to do so breast milk should be given using alternative feeding methods like NG tube or cup feeding as described under LBW feeding
- Mother should sleep on her back in a semi-reclined position

Figure F16: Positions during KMC**Length and duration**

At first, KMC should be for a few hours per day then gradually increased until almost 24 hours. If the mother needs a break, the baby is placed in warm cot and covered. At home other adult members of the family like the father can relieve the mother. Babies can be cared for using KMC until they are about 2.5kg or 40 weeks post-menstrual age or when baby starts fighting the KMC.

When to discharge home: Allow the baby home when:

- Baby in good health
- Exclusively breastfeeding
- Gaining weight (at least 15g/kg/day)
- Baby's temperature is stable
- When the mother is comfortable and confident

Follow up

- Twice weekly until 37 weeks post-menstrual age
- Weekly thereafter until baby is 2.5kg
- Then as for the normal baby

5.2.2 FEEDING

The best food for the baby is breast milk. ***No baby is too sick or too small to receive breast milk.*** It is important to show the mother HOW to express breast milk!

Fig F17: How to express breast milk:

In order to express breast milk, tell the mother to:

Wash her hands thoroughly

- Make herself comfortable
- Hold a container/ cup under her nipple and areola
- Place her thumb and first finger on the areola
- Compress and release the breast between her finger and thumb
- Compress and release all the way around the breast, keeping her fingers the same distance from the nipple
- Express one breast until it feels empty then repeat the process on the other side
- Have a clean dry container/cup for the expressed breast milk.
- Stop expressing when the milk no longer flows

Calculation of Feeds - Day 1

Feeds are calculated as follows:

- 1500gms and below - 80mls/kg/day
- 1501gms and above - 60mls/kg/day

Increase feeds by 20mls/kg daily up to 200mls/kg/ day.

Up to 1500gms

Starting volume is 3mls and increase by the same amount until the calculated amount for the day is reached. The rest of the fluid is given IV and is decreased gradually.

1501 -1800gms

Starting volume is 6mls and increase by the same amount until the calculated amount for the day is reached. The rest of the fluid is given IV and is decreased gradually.

Methods of feeding

- 1500gms and below feed by tube
- Between 1500gms – 1650gms feed by cup and, also encourage breastfeeding
- Above 1650gms and above, breastfeeding is recommended

NOTE: If one method is insufficient, a combination of two can be used.

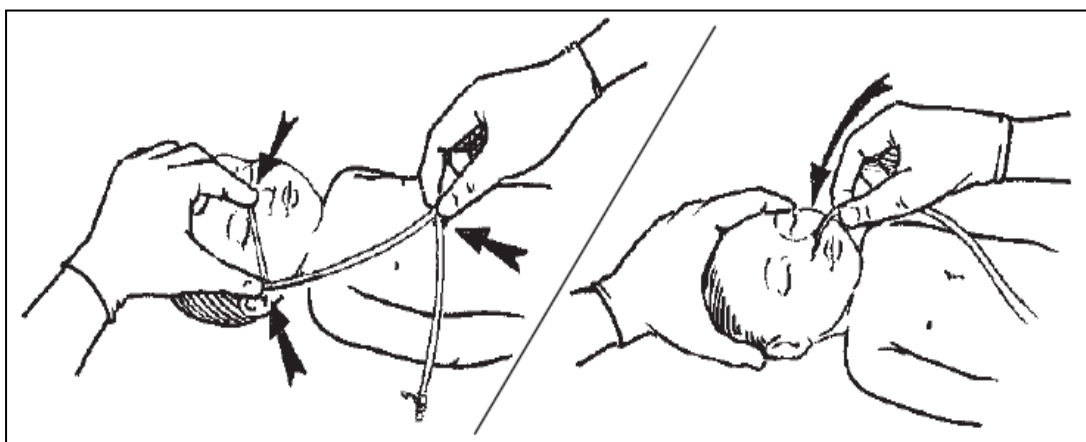
Feeding by tube:

- Measure nasogastric tube as shown in Figure F18
- Pass the tube
- Ensure that it is in the stomach by (a) aspirating back (b) with sterile syringe push 10ml air through tube as you listen with stethoscope over the stomach
- Aspirate the stomach before each feed. If you get aspirate note amount and colour then manage as indicated below

Management of aspirates

- Clear/milk return and decrease feed by same amount
- Blood or bile stained discard and replace by equal volume of normal saline in the intravenous fluid

Figure F18: Measuring nasogastric tube, Ear to nose and down to xiphisternum



Cup feeding - expressed breast milk

Teach the mother how to feed the baby with a cup. *Do not feed the baby yourself!*

The mother should:

- Measure the quantity of milk in the cup
- Hold the baby sitting semi-upright on her lap
- Hold the cup of milk to the baby's lips:
 - Rest cup lightly on lower lip
 - Touch edge of cup to outer part of upper lip
 - Tip cup so that milk just reaches the baby's lips
 - Do not pour the milk into the baby's mouth.

When this is done correctly:

- Baby becomes alert, opens mouth and eyes, and starts to feed
- The baby will suck the milk, spilling some
- Small babies will start to take milk into their mouth using the tongue
- The baby will swallow the milk
- The baby finishes feeding when the mouth closes or when they not interested in taking more
- If the baby does not take the calculated amount:
 - Feed more often or feed by tube

Monitor baby's intake at every shift

Teach the mother to measure the baby's intake over 24 hours, not just at each feed

- If mother does not express enough milk in the first few days, or if the mother cannot breastfeed at all explore to identify the cause or refer
- Feed the baby by cup if the mother is not available to do so

- The baby is cup feeding well if the required amount of milk is swallowed, spilling little, and weight gain is maintained

Signs that the baby is receiving adequate amount of milk.

- Baby is satisfied with the feed
- Weight loss is less than 10% in the first week of life
- Baby gains at least 15g/kg/day
- Baby passes urine as frequently as he/ she feeds
- Baby's stool is changing from dark to light brown or yellow by day 3

Weigh and assess weight gain

Weigh on alternate days and note the weight gain. Continue until the baby is ready for discharge.

Scale maintenance:

- Weighing requires precise and accurate scale (10 g increment)
- Calibrate it daily according to instructions
- Check it for accuracy according to instructions

Simple spring scales are not precise enough for daily/weekly weighing.

Monitoring and follow up care

- Close monitoring of vital signs is imperative to detect any complications
- Do not use glucose or water as the first feed
- Use breast milk unless there is a specific contra-indication
- If the baby cannot suck, use expressed breast milk (EBM) to feed the baby (show mothers how to express breast milk)
- Where breast milk is contra-indicated, use appropriate breast milk substitutes
- Supplement with multivitamins and ferrous sulphate drops. For vitamins start supplementation at 2 weeks after birth

Ensure you give 400 units of vitamin D daily. For Ferrous Sulphate start at 4 weeks after birth and give 2mg elemental iron per kg per day until the baby is one year old

5:2.3 Prevention of infection

- Avoid overcrowding in the new born unit
- Detect and treat infection early
- Isolate those who are infected

Note: Pre-term and small for gestational age babies must be followed up in the Paediatric clinic and the Child Welfare Clinic.

5.2.4 ANAEMIA OF PREMATUREITY

Definition

Anaemia is defined as a reduction of haemoglobin level below normal for age

Table 6: Haemoglobin values in Term and Preterm Neonates

	Hb (g/100 mL)	Hct (%)
Term		
Cord blood	17.0 (14 -20)	53.0 (45 – 61)
Day 1	18.4	58.0
Day 3	17.8	55.0
Day 7	17.0	54.0
Premature (birth weight <1500g)		
Cord blood	16.0 (13.0 – 18.5)	49
Day 7	14.8	45

Diagnosis

- Pallor of skin and mucus membrane
- If severe, tachycardia, tachypnoea or congestive cardiac failure are present
- Recurrent apnoeic attacks

Investigations

Do a Full haemogram /Full blood count or a PCV (heamatocrit) if possible

Prevention

- Give Ferrous Sulphate and folic acid routinely (see feeding the Low birth weight)
- Minimize blood sampling as much as possible

Management

Transfuse if:

- Hb is less than 8gms/100mls
- Baby is not feeding well
- Baby is not gaining weight
- Baby has congestive cardiac failure
- Baby has recurrent apnoeic attacks

5.3 CONGENITAL ANOMALIES

Definition:

These are abnormalities a baby is born with. They are varied and may be major or minor.

Diagnosis

All babies should be examined soon after birth to rule out congenital abnormalities.

Life threatening conditions

These include:

- Gastro intestinal obstruction (GIT) e.g. tracheoesophageal fistula, upper GIT obstruction, imperforate anus.
- Gross cardiac defects.

These conditions require stabilization and urgent referral to the nearest hospital capable of dealing with the problem

Prevention

- Avoid unnecessary drugs and X-rays in pregnancy
- To prevent spina bifida encourage use of folate 400µg daily before pregnancy, encourage adequate diet at all times

Oesophageal Atresia and Tracheoesophageal Fistula:

This is when there is atresia of oesophagus with connection of the oesophagus to the trachea

Features

- Suspect this in a baby with copious amounts of mucus from the mouth
- Baby gets blue when feeding is attempted

When recognized:

- Do not feed baby, but have IV fluid maintenance
- Attempt to pass NG tube and suction gently
- Refer urgently

Imperforate anus:

This is when there is no anal opening.

It can be diagnosed by inspection and subsequent failure to insert a thermometer.

Management:

- Provide emotional support and reassurance to the mother
- Establish an IV line, and give only IV fluid at maintenance volume according to the baby's age
- Ensure that the baby does not receive anything by mouth
- Insert a nasogastric tube and ensure free drainage
- Urgently refer the baby to a tertiary hospital or specialized centre for surgery

Omphalocele and Gastroschisis:

This is when the abdominal wall does not close fully and remains open.

In Omphalocele there is a thin layer covering the bowel and in gastroschisis there may be exposed bowel.

General Management

- Provide emotional support and reassurance to the mother
- Establish an IV line and give only IV fluid at maintenance volume according to the baby's age

Management of Omphalocele:

The baby can be fed with breast milk and needs to be reviewed by a surgeon.

Management

If the defect is not covered by skin:

- Cover with warm sterile saline gauze to reduce fluid and heat loss and to give a degree of protection
- Keep gauze moist at all times, and ensure that the baby is kept warm

Management of Gastroschisis:

Establish an IV line and give only IV fluid at maintenance volume according to the baby's age.

- Insert a nasogastric tube, and ensure free drainage
- Refer the baby urgently to a tertiary hospital or specialized centre for surgery

Note that the baby is susceptible to infections and antibiotic cover is required.

Non life threatening conditions

These include:

- Spina bifida
- Cleft lip and palate
- Talipes (equinovarus)
- Hydrocephaly

Spina bifida

This occurs when there is a defect in the vertebral column

Management

- Provide emotional support and reassurance to parent
- If the defect is not covered by skin:
 - Cover with sterile gauze soaked in sterile normal saline
 - Keep gauze moist at all times and ensure that the baby is kept warm
 - If ruptured give Benzyl Penicillin 50,000units/kg 12hrly and Gentamicin 5mg/kg daily for 5 days
- Organize transfer, and refer the baby to a tertiary hospital or specialized centre for further evaluation or surgical care, if possible

Cleft lip and palate:

There is a defect in the upper lip that may be accompanied by a defect in the palate.

Management

- Provide emotional support and reassurance to parents
- Mother needs to be told that feeding is important to ensure adequate growth until surgery can be performed
- Show mother how to feed the baby with breast milk
- Note that babies with minor clefts can breastfeed
- However those with bilateral clefts must be fed by cup and spoon
- Take care to prevent aspiration
- Refer to surgeon for repair

Talipes equinovarus:

This is a deformity of the foot where the ankle is turned downwards and the front part of foot is turned inwards.

Management

- Apply plaster of Paris
- Revise every 1-2 weeks
- Refer if no response after 3 months

Hydrocephaly:

This occurs when there is an unusually large head arising from blockage in the free flow of CSF in the ventricular system.

Management

- Monitor head circumference
- Refer early for surgical CSF drainage

Management of common genetic birth defects

- Provide emotional support and reassurance to the mother
- If the baby has Down syndrome or unusual facial features, advise the parents about the long-term prognosis, and refer the family to a specialized centre for developmental evaluation and follow-up
- Refer to paediatrician for further care
- If the mother is not going to breastfeed and the mother requests for a contraceptive method, provide family planning services

Counselling:

In all cases of birth defects:

- Counsel parents in all cases.
- Counsel both parents at the same time wherever possible
- Have the most qualified health worker talk to parents
- Ensure honesty, sensitivity and empathy by all staff
- Parents should be shown any obvious defect on the baby and told the implications
- Current and future management to be discussed
- Link with any community support groups should be made

5.4 LARGE FOR GESTATIONAL AGE (LGA) BABY AND INFANT OF DIABETIC MOTHER

Definition

This is a baby with a birth weight of more than 4.0kg; **OR**

A baby whose birth weight is above the 90th percentile for the gestation.

Diagnosis:

Suspect or expect LGA if there is:

- History of diabetes in pregnancy
- History of previous large babies

Associated problems:

The following complications are associated with LGA babies

- Hypoglycemia
- Birth Asphyxia
- Birth injuries
- Jaundice
- In addition, babies born of a diabetic mother are prone to Infections and Respiratory distress syndrome

Prevention

- Adequate control of diabetes in pregnancy
- Anticipate and refer early to deliver in a health facility

Management

- Initiate breastfeeding immediately and continue feeding on demand. If the baby sleeps, wake him/her up and feed at least every three hours
- Closely monitor the baby to promptly recognize the associated problems
- Manage any complications detected
- Test the blood sugar levels where possible
- Keep the baby warm
- If the mother is not already diagnosed as diabetic, investigate to rule out diabetes mellitus. If confirmed positive, ***manage the diabetic mother or refer.***

F6. NEONATAL EMERGENCIES

6.1 RESPIRATORY DISTRESS

Definition

Respiratory distress is when a baby has difficulty in breathing.

Predisposing factors

- Prematurity
- Asphyxia
- Maternal diabetes
- Thoracic malformations
- Caesarean section without labour
- Maternal infections
- Prolonged rupture of membranes
- Meconium aspiration

Diagnosis

Symptoms and signs include:

- Fast breathing > 60/min
- Chest indrawing
- Nasal flaring
- Grunting
- Cyanosis (may be present or not)

Note: A baby having any 2 of the S/S could be having respiratory distress syndrome (RDS) if premature or pneumonia.

Investigations:

- Full haemogram / full blood count
- Blood culture
- Blood sugar
- X-ray where possible

Prevention

- Adequate prenatal care
- Adequate treatment of maternal infections during pregnancy and labour

Specific measures to prevent respiratory distress syndrome:

- Prevent preterm labour if possible
- Give dexamethasone to the mother at least 48 hours before delivery
- Prevention of hypothermia at birth
- Prevention of perinatal asphyxia
- Adequate resuscitation

Specific management

- Keep warm
- Give oxygen
- Where oxygen is not available refer
- Give antibiotics – Crystalline Penicillin and Gentamicin
- Feed the neonate
- Give vitamin K - If term 1mg stat IM; If preterm 0.5mg stat
- **Admit or refer**

Dosages:

Penicillin: 50,000 units per kg 12 hourly.

Gentamicin: 5mg/kg daily for 10 days.

Note:

- In case of referral give pre-referral treatment
- During transport maintain warmth by Kangaroo method
- Feed baby before referral by nasogastric tube

Follow up in the hospital:

- If no response to gentamicin and crystalline penicillin after 3 days, add erythromycin
- Exclude other conditions
- Provide adequate feeding for the baby
- Keep baby warm
- Counsel the mother

6.2 Oxygen therapy

Indications

Oxygen therapy is indicated in the following instances:

- Severe pneumonia
- Bronchiolitis
- Central cyanosis
- Severe respiratory distress – inability to breath
- Severe lower chest wall indrawing
- Respiratory rate > 70 breaths / min
- Grunting with every breath
- Head nodding – sign of severe respiratory distress
- Spells of apnoea or cyanosis
- Resuscitation

Sources of oxygen

- Oxygen cylinders
- Oxygen concentrators
- Piped oxygen

Methods of oxygen administration

- Nasal prongs
- Nasal catheter
- Nasopharyngeal catheter
- Head box
- Face mask
- Incubator

Figure F19a



Oxygen therapy: nasal prongs correctly positioned and secured

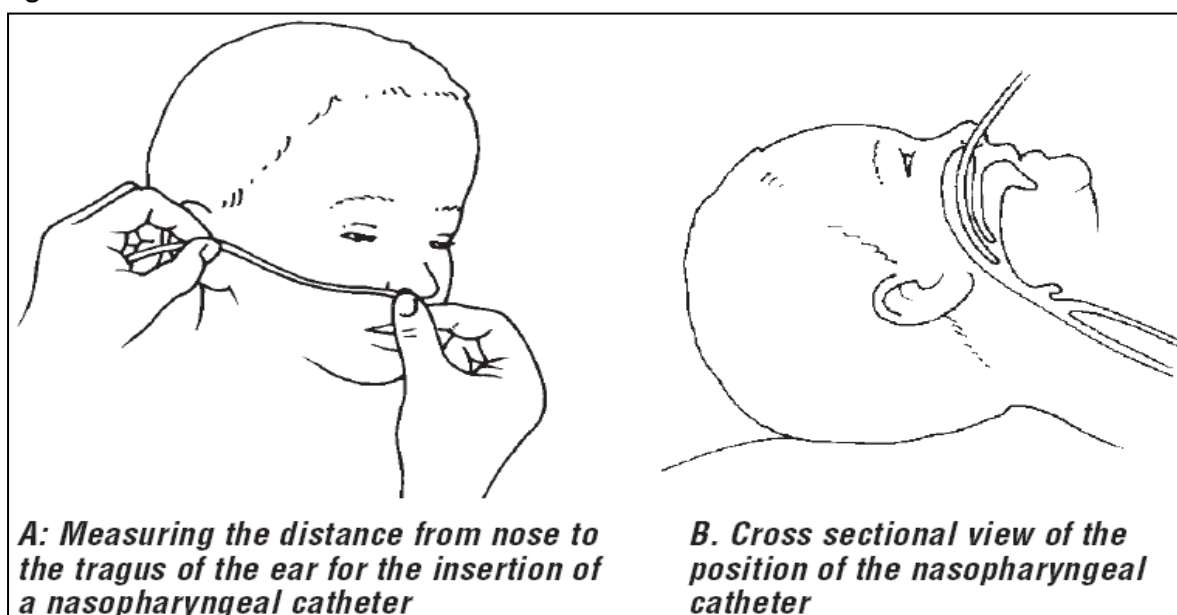


Oxygen therapy: correct position of nasal catheter (cross-sectional view)

NASAL PRONGS

- Use 1-mm prongs for a small baby (less than 2.5 kg at birth or born before 37 weeks gestation) and use 2-mm prongs for a term baby
- Place the prongs just within the baby's nostrils
- Secure the prongs in place using elastic or a piece of adhesive tape
- Adjust the flow of oxygen to achieve the desired concentration
- Change the nasal prongs twice daily. Give oxygen using a face mask while cleaning and disinfecting the prongs, if necessary

Figure F19b



NASAL CATHETER

- Use an 8-F catheter. If the 8-F catheter is too large, use a 6-F catheter
- Determine the distance the tube should be passed by measuring the distance from the nostril to the inner margin of the eyebrow
- Gently insert the catheter into the nostril. If a gastric tube is already in place in one nostril, insert the catheter into the same nostril that the gastric tube is in, if possible
- Ensure that the catheter is correctly positioned:
 - Look into the baby's mouth
 - The catheter should not be visible at the back of the mouth
 - If the catheter is visible at the back of the mouth, pull the catheter out slowly until it is no longer visible
- Adjust the flow of oxygen to achieve the desired concentration
- Change the nasal catheter twice daily. Give oxygen using a face mask while cleaning and disinfecting the catheter if necessary

Table F7: Methods of Oxygen administration

Method	Flow and Concentration	Advantages	Disadvantages
Nasal prongs	• Low = 0.5 L per minute • Moderate = 0.5 to 1 L per minute • High = more than 1 L per minute	• Low flow of oxygen required • Constant concentration of oxygen if applied correctly	• Requires special prongs for use on newborn babies • Requires flow-control device that allows low flow • Directs cold oxygen into baby's lungs
Nasal catheter	• Low = 0.5 L per minute • Moderate = 0.5 to 1 L per minute • High = more than 1 L per minute	• Low flow of oxygen required • Constant concentration of oxygen if applied correctly	• Requires flow-control device that allows low flow • Directs cold oxygen into baby's lungs
Head box	• Low = 3 L per minute • Moderate = 3 to 5 L per minute • High = more than 5 L per minute	• Warms the oxygen • Can give a high concentration	• High flow of oxygen required to achieve desired concentration
Face mask	• Low = 1 L per minute • Moderate = 1 to 2 L per minute • High = more than 2 L per minute	• Oxygen can be administered quickly • Convenient for administering oxygen for short periods of time	• Carbon dioxide can accumulate if flow rate is low or mask is small • Difficult to feed baby while mask is in place • Difficult to keep mask in place
Incubator	• If using a head box inside the incubator, see above • If connecting oxygen directly to the incubator, follow the manufacturer's instructions	• Warms the oxygen	Disadvantages of giving oxygen directly into the incubator: • High flow of oxygen required to achieve desired concentration • Difficult to maintain oxygen concentration when incubator portholes are open for care and procedures

HEAD BOX

- Place a head box over the baby's head
- Ensure that the baby's head stays within the head box, even when the baby moves
- Adjust the flow of oxygen to achieve the desired concentration

Figure F20: Baby receiving oxygen via a head box**FACE MASK**

- Place the mask over the baby's mouth and nose
- Secure the mask in place using elastic or a piece of adhesive tape
- Adjust the flow of oxygen to achieve the desired concentration

INCUBATOR

- Use a head box, following the instructions for a head box or connect the oxygen directly to the incubator according to the manufacturer's instructions
- Adjust the flow of oxygen to achieve the desired concentration

Monitoring

- Train health workers to place and secure prongs and catheter correctly
- Check equipment functioning
- Change or clean prongs or catheter at least twice daily
- Monitor the infant every 3 hourly to:
 - identify and correct any problem
 - SaO₂ by pulse oximetry
 - nasal catheter / prong in position
 - leaks in oxygen delivery system
 - Oxygen flow rate and correct
 - airway obstruction by mucus
 - Gastric distension

Pulse oximeter

- Non-invasive measurement of oxygen saturation in blood
- Uses light beam through the tissues
- Placed on the toe, finger, whole hand, whole foot
- Measures saturation in small arteries therefore arterial oxygen saturation
- Types – Reusable
 - Disposable
- Normal oxygen saturation at sea level in child 95 – 100%
- In some severe chest infections saturation decreases due to lung impedance
- In cyanotic heart disease – saturation does not change with improved oxygen

Duration of oxygen treatment

- If the baby is stable and maintaining saturation > 90% in room environment discontinue and review baby after ½ hour then every 3 hours for 1st day off oxygen to ensure that the baby is stable

Dangers of excessive oxygen

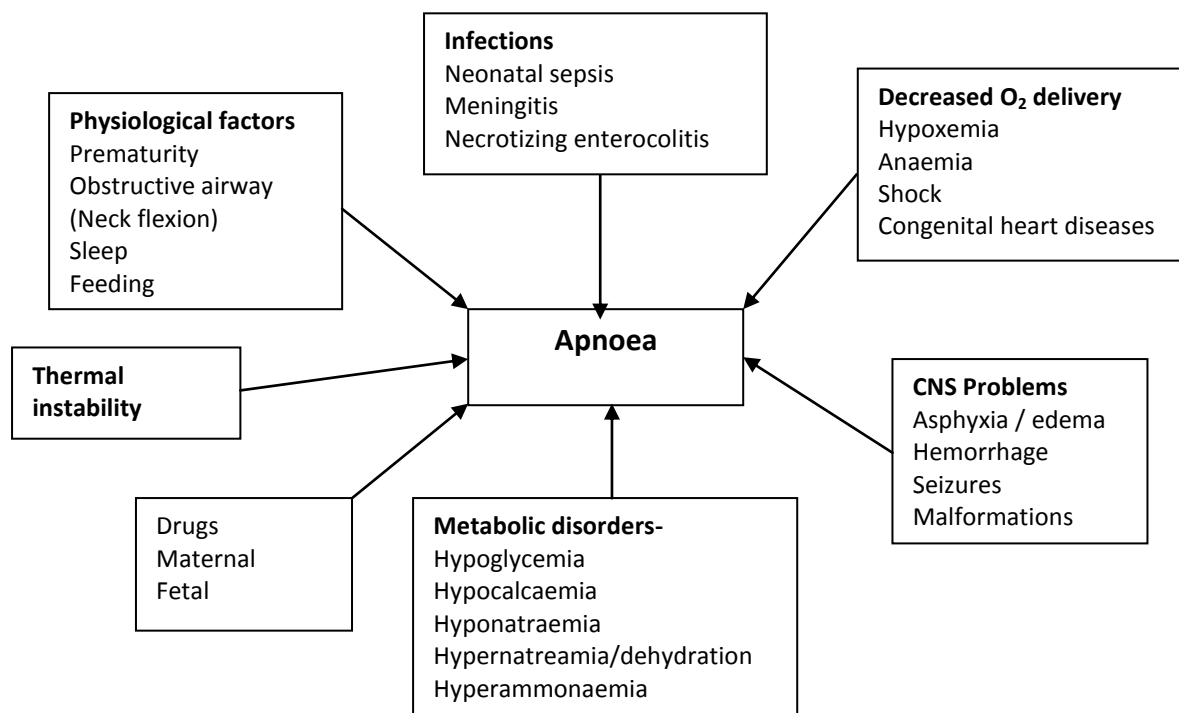
- Retinopathy of prematurity with the possibility of blindness
- Chronic lung disease

6.3 NEONATAL APNOEA

Definition

This is cessation of spontaneous respirations (>20 seconds) accompanied by bradycardia and cyanosis.

Figure F21: Causes



Diagnosis

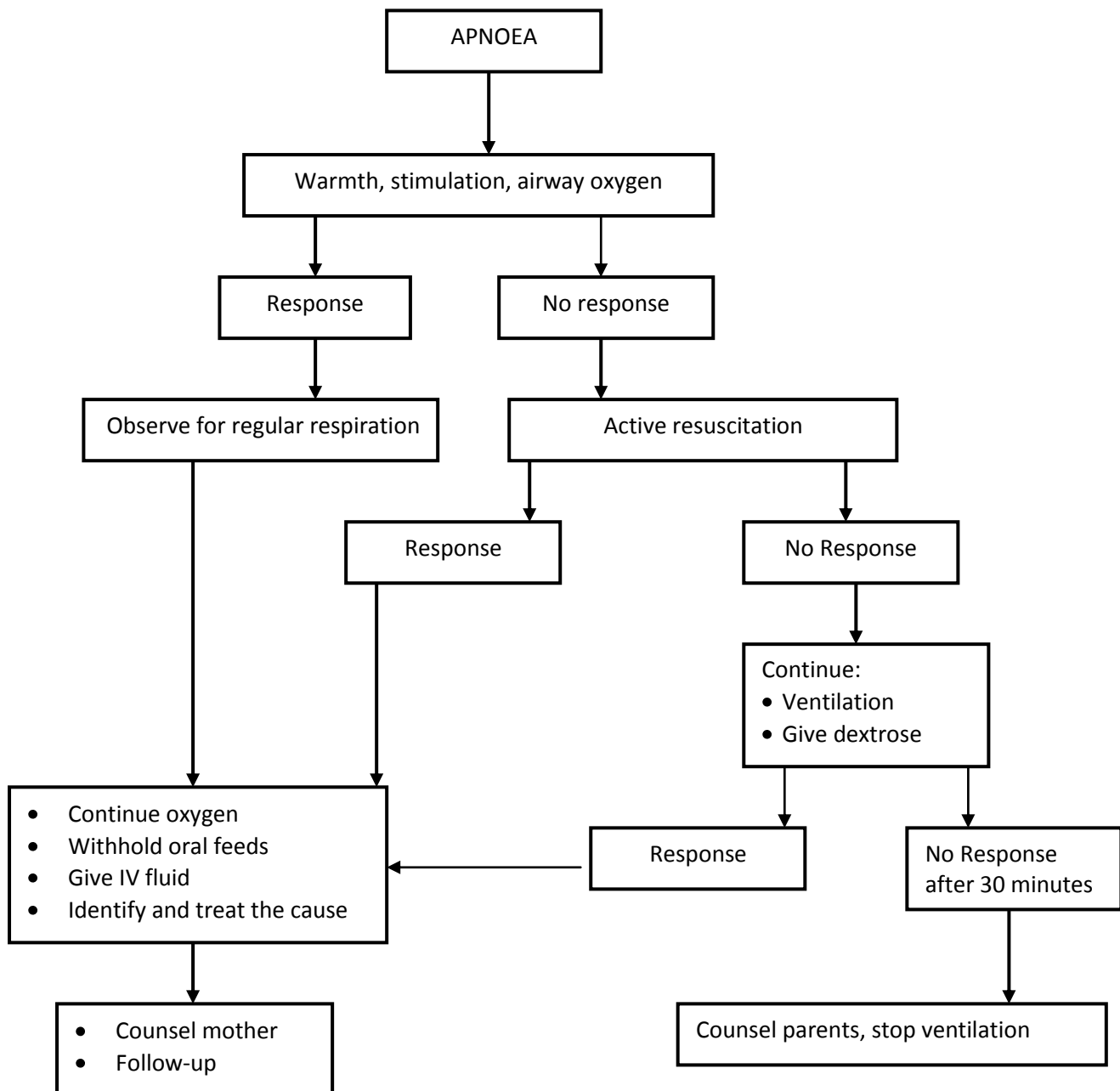
- Absence of respirations lasting 20 seconds or more
- Cyanosis
- Heart rate below 100/minute

Prevention

Educate health care workers and the community on prevention of common problems as listed above.

Management

- Keep baby warm
- Stimulate baby by stroking/rubbing (do not slap) soles of the feet
- Position baby to open airway and Clear airways if necessary
- If still not breathing give oxygen and assist ventilation
- Investigate to establish cause; **Treat cause if known**
- Stop oral feeds and give intravenous fluid (IV) until condition improves
- For apnoea of pre-maturity give Aminophylline 6mg/kg, IV over 1 hour or rectally, then beginning 12 hours after the loading dose, maintain with 2.5 mg/kg rectally 12 hourly

Figure F22 Management of Apnoea

6.4 CONVULSIONS (NEONATAL SEIZURES)

Definition

These are involuntary movements of one or more parts of the body.

Causes

- Hypothermia
- Hypoglycemia
- Meningitis
- Neonatal jaundice
- Birth asphyxia

NB: there is need to differentiate between convulsions due to neonatal tetanus and others as treatment of tetanus differs from that of convulsions.

Diagnosis

- Maternal history of difficult delivery, or infection
 - Perinatal asphyxia
 - History from the mother of abnormal movements.
- Some of the characteristics of a convulsion include:
- Rhythmic jerks (twitches) of one or more parts of the body
 - Episodic increase in tone with stiffening of the body or limbs
 - Abnormal activities e.g. rapid movements of the eyes, repetitive blinking, chewing, sucking without anything in the mouth, cyclic or swimming limb movements, apnoea

Prevention

Proper management of pre-disposing conditions e.g. hypoglycemia, hypothermia, neonatal jaundice, meningitis, hypoxemia, encephalopathy and neonatal asphyxia.

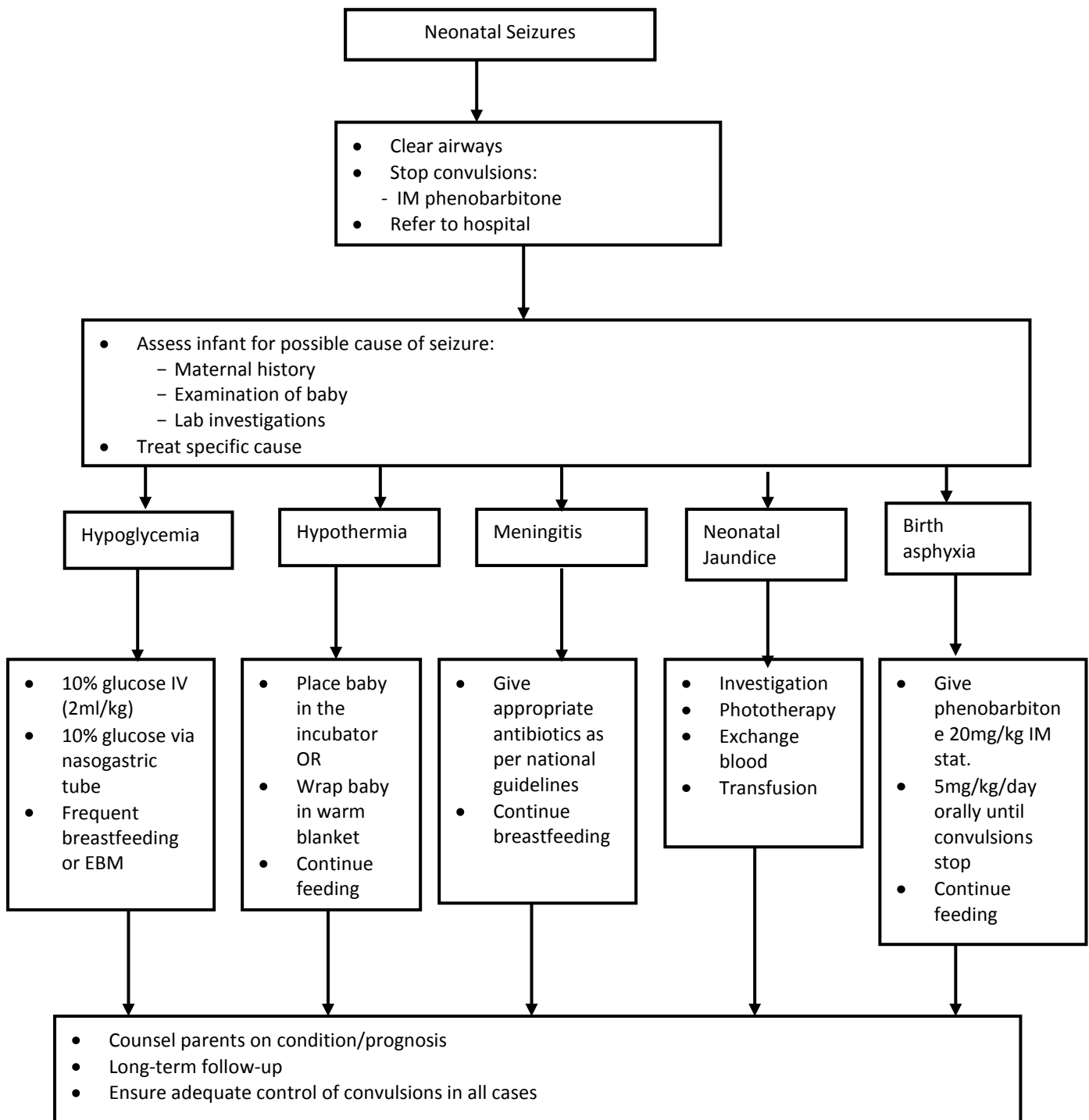
Emergency Management

- Emergency treatment should begin immediately irrespective of the cause
- Support vital functions e.g. position well to ensure patent air-way
- Give oxygen
- Give IM Phenobarbitone 20mg/kg stat. A further 5-10mg/kg can be given within 24 hrs of the loading dose, with maintenance doses of 5mg/kg daily - Do not exceed 30mg/kg of Phenobarbitone in 24 hours
- If convulsions continue inspite of 2 doses of IM Phenobarbitone, give Phenytoin IV 20mg/kg loading dose
- Give 2ml/kg IV 10% dextrose solution as bolus
- Keep the baby warm
- Initiate/resume breastfeeding or give expressed breast milk
- Refer after stabilization to newborn unit if you cannot manage
- Reassure mother; Encourage the mother to hold the baby and avoid excessive stimulation

Subsequent Management

- Monitor vital signs
- Keep baby warm
- Maintain breast feeding or give expressed breast milk
- If not tolerating feeds or condition is poor, give IV fluid
- Investigate to determine the cause
- Treat specific cause of neonatal seizures
- Give maintenance dose of phenobarbitone - 5mg/kg/day given in two divided doses to start 24 hrs after loading dose
- Keep a record of the convulsions
- If convulsions are controlled, gradually reduce the dose and wean off
- For persistent seizures give phenobarbitone 5mg/kg daily for at least 3 months and follow up
- Counsel parents on further care of the baby and prognosis
- Baby should be followed up in the Child Welfare/Paediatric Clinic one week after discharge

Note: Babies with residual brain damage (cerebral palsy) should be followed up and also referred to the occupational therapist for early intervention.

Figure F23: Management of Neonatal Seizures (Convulsions)

6.5 NEONATAL HYPOGLYCAEMIA

Definition

This occurs when the Blood glucose level is below 2.6 mmol /l (45 mg/dl) irrespective of gestation and postnatal age.

Diagnosis

- May be asymptomatic especially in pre-term infants
- Features include jitteriness, sweating, convulsions, apnoea, cyanosis, hypotonia

Prevention

- Early, adequate and regular feeding for all babies
- Infants at risk
 - Pre-term babies
 - Small for gestational age
 - Large for gestational age
 - Infants of diabetic mothers
 - Any sick infant e.g. asphyxiated babies, babies with sepsis and babies with hypothermia

MANAGEMENT

Blood glucose less than 1.1 mmol /l (25 mg/dl)

- Give a bolus of 2 ml/kg body weight of 10% glucose IV slowly over five minutes
- If an IV line cannot be established quickly, give 2 ml/kg body weight of 10% glucose by gastric tube
- Infuse 10% glucose at the daily maintenance volume according to the baby's age
- Assess the blood glucose 30 minutes after the bolus of glucose
 - If the blood glucose is less than 1.1mmol/L (25 mg/dl), repeat the bolus of glucose (above) and continue the infusion then assess blood glucose again after 30 minutes
 - If the blood glucose is between 1.1mmol/L (25mg/dl) and 2.6mmol/L (45 mg/dl) continue the infusion and repeat the blood glucose testing every three hours until the blood glucose is 2.6mmol/L (45 mg/dl) or more on two consecutive tests
 - Allow the baby to breastfeed. As the baby's ability to feed improves, slowly decrease (over a three-day period) the volume of IV glucose while increasing the volume of oral feeds. Do not discontinue the glucose infusion abruptly

Blood glucose between 1.1 -2.6mmol/L (25-45mg/dl)

- If the blood glucose is between 1.1mmol/L (25mg/dl) and 2.6mmol/L (45 mg/dl) allow the baby to breastfeed and repeat the blood glucose testing every three hours until the blood glucose is 2.6mmol/L (45 mg/dl) or more on two consecutive tests
- Once the blood glucose is 2.6mmol/L (45 mg/dl) or more for two consecutive tests;
 - If the baby cannot breastfeed, give expressed breast milk using an alternative feeding method

Frequency of blood glucose measurements after blood glucose returns to normal

- If the baby is receiving IV fluid for any reason, continue blood glucose testing every 12 hours for as long as the baby requires IV fluid. If the blood glucose is less than 2.6mmol/L (45 mg/dl), treat as described above
- If the baby no longer requires or is not receiving IV fluid, assess blood glucose every 12 hours for 24 hours (two more tests):
 - If the blood glucose remains normal, discontinue testing

6.6 HYPOTHERMIA

Definition

This is a condition where the baby's temperature falls below 36.5° C (based on axillary temperature)

Causes

- Exposure to cold environment (Low ambient temperature, cold surface or draught)
- Wet baby
- Under-dressed baby
- Prematurity
- Delayed feeding
- Infections

Note: Classification of hypothermia:

- **Low body temperature 35.5°C to 36.4°C**
- **Very low temperature less than 35.5°C**

Diagnosis

- Baby feels cold on touch especially the extremities
- Poor feeding
- Axillary temperature below 36.5°C
- Extremities are blue and may be edematous
- Heart rate may be low
- Difficulty in breathing or slow shallow breathing
- Lethargy
- Hardened skin

Prevention

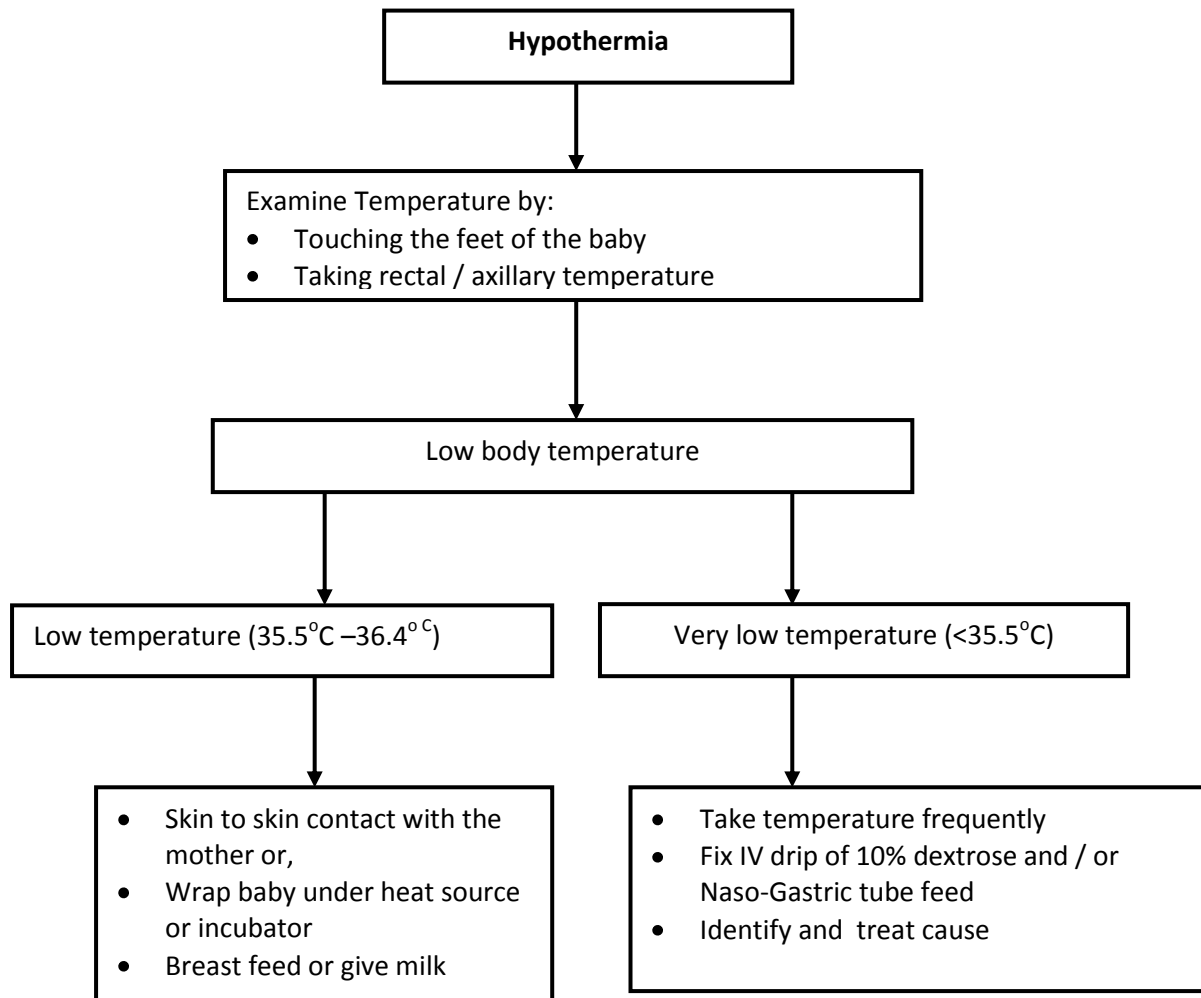
- All newborn babies should be dried immediately after birth and provided with a warm environment
- Provide skin-to-skin contact with the mother and initiate breastfeeding as early as possible within one hour of birth
- Prevent conditions that precipitate hypothermia

Management

Keep the baby warm by:

- Removing wet/cold clothes
- Skin-to-skin contact with the mother and cover with warm linen
- Adequately clothe the baby (including hat and socks)
- Keep clothed baby under radiant heat source; Nurse in a warm incubator if possible
- If baby is blue or having difficulty in breathing give oxygen
- Pass nasogastric tube and give breast milk or other milk if breast milk is contraindicated
- Re-check the temperature after one hour and repeat hourly until it reaches the normal range (36.5°C -37.4°C)
- If after the re-warming procedure the temperature does not rise, refer urgently

Investigate and treat the cause of hypothermia.

Figure F24: Management of Hypothermia

6.7 BLEEDING IN THE NEWBORN

Definition

This is when a baby presents with bleeding

Diagnosis

There may be bleeding from:

- The umbilical cord
- The Gastrointestinal tract
- Into the skin

Note: In acute bleed there could be signs of shock

Others areas where bleeding may occur include:

- Intracranial hemorrhage
- Pulmonary

Predisposing factors

- Prematurity
- Infections
- Birth trauma
- Asphyxia
- Vitamin K deficiency

Prevention

- Prevent the predisposing factors
- Give Vitamin K at birth

Investigations

- Take blood for full blood count
- Group and cross-match blood

Note: Transfuse whole blood at 20 mls/kg (*do not use packed cells*)
Review baby at the end of transfusion and decide whether baby needs more

Management

- Take history and Examine baby; Ensure warmth
- Investigate to identify cause
- Treat the cause immediately.
 - If from cord stump, re-tie or re-clamp
 - If cut, press on bleeding site with sterile gauze
- Give Vitamin K 1 mg/kg IV even if the baby had already been given
- Transfuse if the signs of shock are present and also give oxygen. Give enough blood to correct hypovolaemia
- For babies whose Hb is less than 12 gms/100 mls in the first week of life, transfuse
- For babies whose Hb is less than 10 gms/100 mls after the first week of life, transfuse
- Review baby at the end of transfusion and decide whether the baby needs more

6.8 FLUID MANAGEMENT IN THE NEONATE

Encourage the mother to breastfeed frequently to prevent hypoglycaemia. If they are unable to feed, give expressed breast milk by nasogastric tube.

- Withhold oral feeding if there is bowel obstruction, necrotizing enterocolitis or the feeds are not tolerated, indicated by increasing abdominal distension or vomiting everything
- Withhold oral feeding in the acute phase in babies who are lethargic or unconscious, or having frequent convulsions
- If IV fluid are given, reduce the IV fluid rates as the volume of milk feeds increases
- Babies who are suckling well but need an IV drip for antibiotics should be on minimal IV fluid to avoid fluid overload, or flush cannula with 0.5 ml Sodium Chloride 0.9% and cap.
- Increase the amount of fluid given over the first 3–5 days (total amount, oral and IV) as shown below

Day 1 - 60 ml/kg/day

Day 2 - 80 ml/kg/day

Day 3 - 100 ml/kg/day

Day 4 - 120 ml/kg/day

Day 5 - 140 ml/kg/day

Then increase to 150 ml/kg/day

When babies are tolerating oral feeds well, this may be increased to 180 ml/kg/day after some days. But be careful with parenteral fluid, which can quickly overhydrate a child.

When giving IV fluid, do not exceed this volume unless the baby is dehydrated or under phototherapy or a radiant heater.

This amount is the TOTAL fluid intake a baby needs and oral intake must be taken into account when calculating IV rates.

If the baby is dehydrated, assess and classify as per IMCI guidelines and correct accordingly.

- Give more fluid if baby is under a radiant heater (1.2–1.5X)

DO NOT use IV glucose and water (without sodium) after the first 3 days of life. Babies over 3 days of age need some sodium (for example, 0.18% saline / 5% glucose).

Monitor the IV infusion very carefully!

- Calculate drip rate
- Check drip rate and volume infused every hour; and monitor using a fluid chart
- Weigh baby daily
- If baby needs blood transfusion, *count it as part of the total fluid intake*
- Watch for facial swelling: if this occurs, reduce the IV fluid to minimal levels or take out the IV.
- Introduce milk feeding by nasogastric tube or breastfeeding as soon as it is safe to do so

Table F8: Nasogastric 3 hourly feed volumes for babies on full feeds (no RDS or Asphyxia on day 1)

Weight (kg)	1.7 to 1.8	1.9 to 2.0	2.1 to 2.2	2.3 to 2.4	2.5 to 2.6	2.7 to 2.8	2.9 to 3.0	3.1 to 3.2	3.3 to 3.4	3.5 to 3.6	3.7 to 3.8	3.9 to 4.0
Day 1	14	15	17	18	20	21	23	24	26	27	29	30
Day 2	18	20	22	24	26	28	30	32	34	36	38	40
Day 3	23	25	28	30	33	35	38	40	43	45	48	50
Day 4	27	30	33	36	39	42	45	48	51	54	57	60
Day 5	32	35	39	42	46	49	53	56	60	63	67	70
Day 6	36	40	44	48	52	56	60	64	68	72	76	80
Day 7	41	45	50	54	59	63	68	72	77	81	86	90

Table F9: Intravenous fluid rates in mls/hour for sick newborns on full volumes IV fluid

Weight (kg)	1.1 - 1.2	1.3 - 1.4	1.5 - 1.6	1.7 - 1.8	1.9 - 2.0	2.1 - 2.2	2.3 - 2.4	2.5 - 2.6	2.7 - 2.8	2.9 - 3.0	3.1 - 3.2	3.3 - 3.4	3.5 - 3.6	3.7 - 3.8	3.9 - 4.0
Day 1	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10
Day 2	4	5	5	6	7	7	8	9	9	10	11	11	12	13	13
Day 3	5	6	7	8	8	9	10	11	12	13	13	14	15	16	17
Day 4	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Day 5	7	8	9	11	12	13	14	15	16	18	19	20	21	22	23
Day 6	8	9	11	12	13	15	16	17	19	20	21	23	24	25	27
Day 7	9	11	12	14	15	17	18	20	21	23	24	26	27	29	30

6.9 NEONATAL INFECTIONS

These include:

- Skin infections
- Eye infection
- Oral thrush
- Cord infection
- Septicemia
- Neonatal Tetanus

6.9.1 SEPTIC SKIN SPOTS

Definition

This is inflammation of the skin due to bacterial infection.

Diagnosis:

Signs and symptoms include:

- Redness of the skin
- Pustules or sores on the skin

Common causative organisms:

- Staphylococcus aureus
- Streptococcus

Prevention

- Wash hands before and after handling baby
- Educate mother on personal hygiene and skin care of the baby

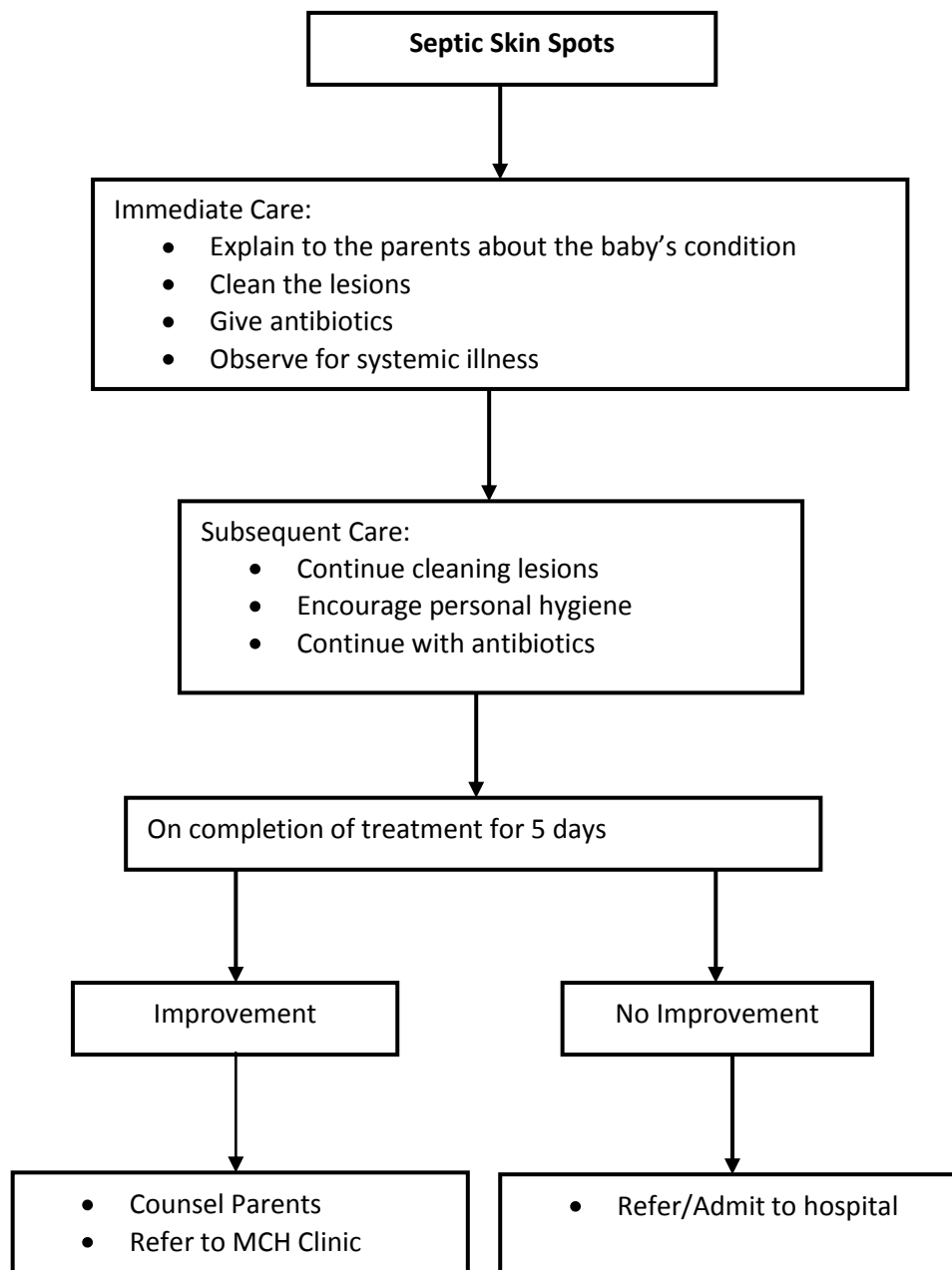
Management

- Wash hands with soap and water before and after handling baby
- Clean skin with antiseptic lotions like Hibitane
- For mild cases give syrup Amoxicillin 62.5mg tid x 5/7 or Cloxacillin 62.5mg tid x 5/7
- For extensive skin lesion admit and start treatment with Crystalline Penicillin and Gentamicin

Dosage:

1M or IV Crystalline Penicillin 50,000U/kg 12 hourly
1M or IV Gentamicin 5 mg/kg daily

- Counsel the mother on subsequent care:
 - Return baby for review after 2 days
 - Return immediately if baby becomes sicker. (See features of neonatal septicemia)

Figure F25: Management of septic skin spots

6.9.2 NEONATAL EYE INFECTION

This is when the baby's eyes are swollen, red and draining pus.

Causes

Gonococcus- signs appear within the first 2 days of delivery

Chlamydia trachomatis- signs appear within 5 to seven days

Staphylococcus

Prevention

- Treatment of the pregnant mother / partner using Erythromycin 2g/day for 7 days
- Tetracycline ointment at birth routinely for all newborns

Management

- Observe infection prevention practices which include washing hands before and after procedure
- Clean babies eyes with normal saline before administering medication
- Administer 1% tetracycline eye ointment 8 hourly (tds) for 10 days
- If no improvement after 24 hours, refer to hospital

Follow up in two days

- Look for pus drainage
- If still draining, check to see if mother is administering treatment correctly
- If incorrect teach her the correct treatment procedure and follow up in two days
- If treatment has been correct refer to hospital

Counsel the mother and show her how to clean the eyes and apply the eye ointment

At the hospital

- If infection is due to Gonorrhoea, give Ceftriaxone 50 mg/kg or Kanamycin 75mg IM stat single dose
- If infection is due to Chlamydia – give erythromycin 50mg 6 hourly (qid) for 14 days

6.9.3 ORAL THRUSH

This is diagnosed when there are thick white patches on tongue or inside the mouth

Management:

- Wash hands
- Clean baby's mouth with a clean soft cloth
- Instill Nystatin drops 1 ml 4 times a day
- Continue breast feeding
- Treat mother's breast with the same medicine
- Follow up after 2 days

Review after 2 days: If worse, refer to hospital, if improving, continue treatment for 5 days

6.9.4 CORD INFECTION

Definition

Cord infection is inflammation of the umbilical stump usually occurring in the first week of life.

Diagnosis

Signs and symptoms may be early or late

Early signs

- Redness at base of stump
- Wetness of Stump
- Offensive smell

Late Signs

- Baby looks ill
- Temperature may be elevated
- Baby may refuse to feed
- Pus discharge from the umbilicus
- Jaundice

Prevention

- Clean hands
- Clean/sterile delivery instruments
- Clean surface
- Clean cutting of the cord
- Clean ligature
- Avoid application of harmful traditional substances (e.g. talcum powder, saliva, cow dung, etc)
- Educate mother on personal hygiene

Management

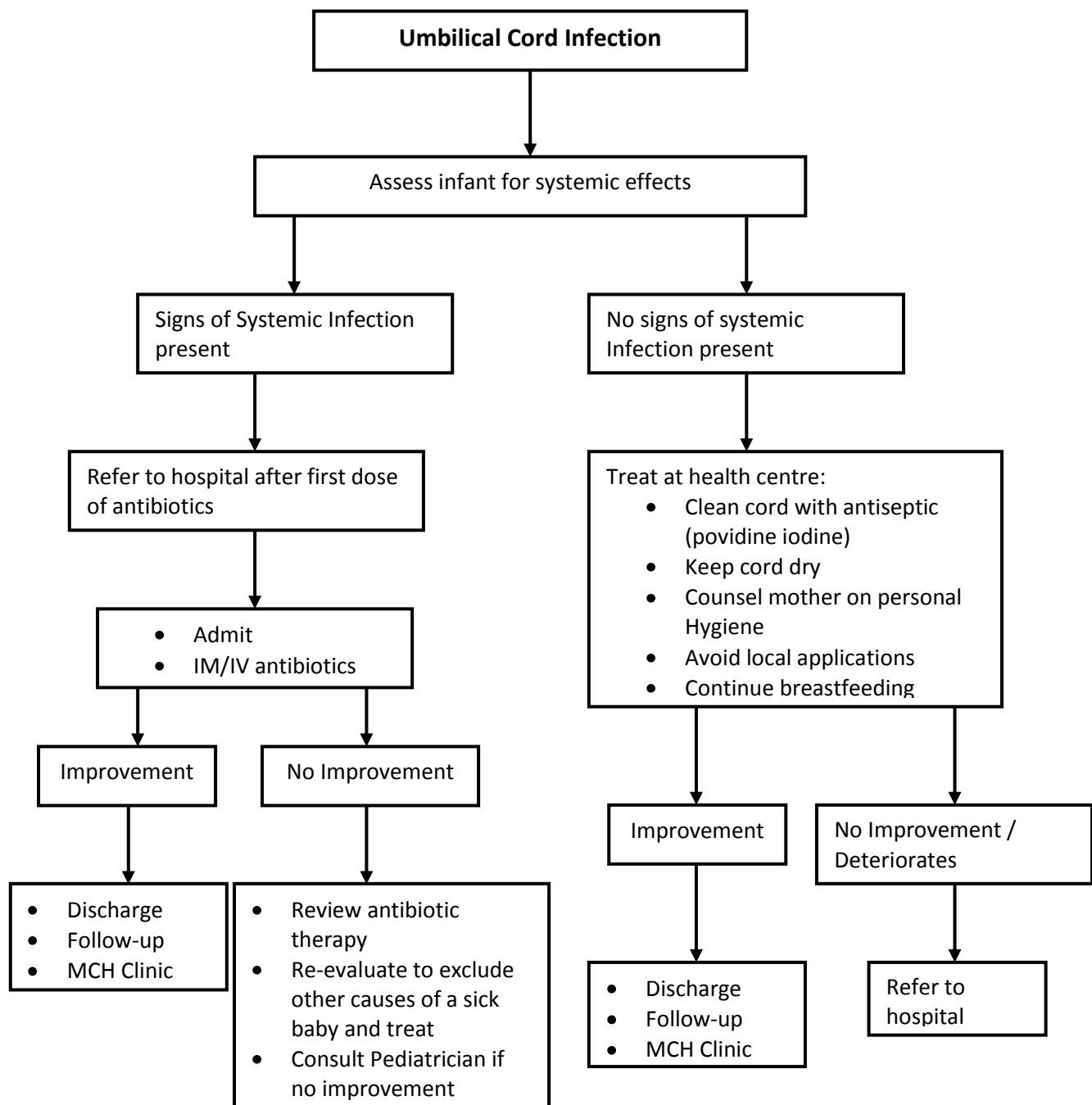
- Wash hands before handling the cord
- Wear clean gloves
- Clean the cord with antiseptic solution e.g. povidine (tincture) iodine with clean gauze/ cotton wool
- Apply Gentian Violet four times a day
- Keep cord dry
- Keep baby clean
- Continue breast feeding
- Give Amoxicillin 62.5g mg/kg – three times a day for 5 days
- Admit baby with late signs
- Review baby after two days
 - Refer or admit if pus or redness remains
 - If improved continue antibiotic for 5 days

Ask the mother to return immediately if the baby gets worse (see signs of Septicemia).

Table F10: Neonatal Drug Dosage

Intravenous / intramuscular antibiotics aged < 7 days						Oral antibiotics aged < 7 days		
Weight kg	Penicillin (50,000iu/kg)	Ampicillin / Cloxacillin (50mg/kg)	Gentamicin (3mg/kg <2kg, 5mg/kg ≥ 2kg)	Ceftriaxone (50mg/kg)	Metronidazole (7.5mg/kg)	Weight kg	Amoxycillin,	Ampicillin / Cloxacillin
	iv / im	iv / im	iv / im	iv / im	iv		25mg/kg	25mg/kg
	12 hrly	12 hrly	24 hrly	24 hrly	12 hrly		125mg/5mls	125mg/5mls
1.00	50,000	50	3	50	7.5			
1.25	75,000	60	4	62.5	10			
1.50	75,000	75	5	75	12.5	2.00	2	2
1.75	100,000	85	6	75	12.5	2.50	3	3
2.00	100,000	100	10	100	15	3.00	3	3
2.50	150,000	125	12.5	125	20	4.00	4	4
3.00	150,000	150	15	150	22.5			
4.00	200,000	200	20	200	30			

Ophthalmia Neonatorum: Swollen red eyelids with pus should be treated with a single dose of: ✓ Kanamycin or Spectinomycin 25mg/kg (max 75mg) im, or, ✓ Ceftriaxone 50mg/kg im		Warning: ✓ Gentamicin – Please check the dose is correct for weight and age in DAYS ✓ Gentamicin used OD should be given im or as a slow iv push – over 2-3 mins. ✓ If a baby is not obviously passing urine after more than 24 hours consider stopping gentamicin. ✓ Penicillin dosing is twice daily in babies aged < 7 days ✓ Chloramphenicol should not be used in babies aged < 7 days. ✓ Ceftriaxone is not recommended in obviously jaundiced newborns – Cefotaxime is a safer cephalosporin in the first 7 days of life	
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Figure F26: Management of Cord Stump Infection

6.9.5 NEONATAL SEPTICAEMIA (SEPSIS)

Definition

This is when a baby has generalized clinical features of a sick infant; ideally blood culture positive.

Diagnosis

Any sick infant is regarded as having neonatal sepsis until proved otherwise.

Clinical Features

- Poor feeding or refusal to feed
- Lethargy or poor cry or unusually sleepy
- Cry excessively (irritable)
- Unconscious
- Has difficulty in breathing
- Frequently stops breathing (apnoeic attacks)
- Convulsions
- Feels too cold or warm (temperature $< 35.5^{\circ}\text{C}$ or $\geq 37.5^{\circ}\text{C}$)
- Diarrhoea and vomiting
- Appearance of pustules all over the body
- Yellow body (Jaundice)
- Periumbilical redness or pus from cord

Note: A baby with any of these features may have any of the conditions in the section on neonatal emergencies.

Investigations

- Do a full blood count including WBC differential
- Blood culture
- Blood glucose
- Chest x-ray if indicated

Prevention

- Adequate treatment of maternal infection during pregnancy, labour and delivery
- Vaginal swabbing with antiseptic during labour (e.g. hibitane)
- Clean delivery
- Clean/sterile equipment
- Observe infection control at all levels of handling baby
- Hand washing before and after handling baby
- Early initiation of breast feeding
- Exclusive breast feeding
- Avoid overcrowding especially in the newborn unit

Management of Neonatal septicaemia

Immediate Care:

- Give pre-referral treatment (IV Crystalline Penicillin and Gentamicin)
- Keep baby warm
- Prevent hypoglycemia by feeding the baby (breast feeding/ Expressed Breast Milk)
- If blood sugar low refer to section on hypoglycemia

Subsequent Care (Hospital)

- Keep baby warm depending on baby size
- Isolate as much as possible
- Give (IV Crystalline Penicillin and Gentamicin), if there is skin infection use Cloxacillin instead of Crystalline Penicillin
- Ensure adequate feeds - oral or IV (refer to section on fluid management)
- Frequently monitor vital signs (hourly for the first 6 hours then 3 hourly till stable)
- Counsel the mother
- On discharge refer to MCH

6.9.6 MANAGEMENT OF NEONATAL TETANUS

Definition

Any neonate with normal ability to suck and cry during the first 2 days of life and who, between 3 and 28 days of age, cannot suck normally and becomes stiff or has spasms (i.e. jerking of the muscles)

Diagnosis

- Inability to feed orally
- Muscle spasms
- Clenched mouth – risus sardonicus
- Stiff body that is arched backward like a bow (opisthotonus)
- Stiff arms and legs

Prevention

- Ensure that all pregnant mothers are given Tetanus Toxoid according to the National Immunization schedule
- Provide education on the importance of the 5 cleans (see section on appropriate cord care)
- Appropriate cord care

Management

Sedate the baby by giving IV or rectal:

Note: Watch respiration during sedation

- Phenobarbitone 20 mg/kg stat; or
- Diazepam 0.2mg/kg over 3 minutes. Repeat every 30 minutes up to 3 doses
- Do not exceed 2mg/kg/24 hrs

While baby is sedated:

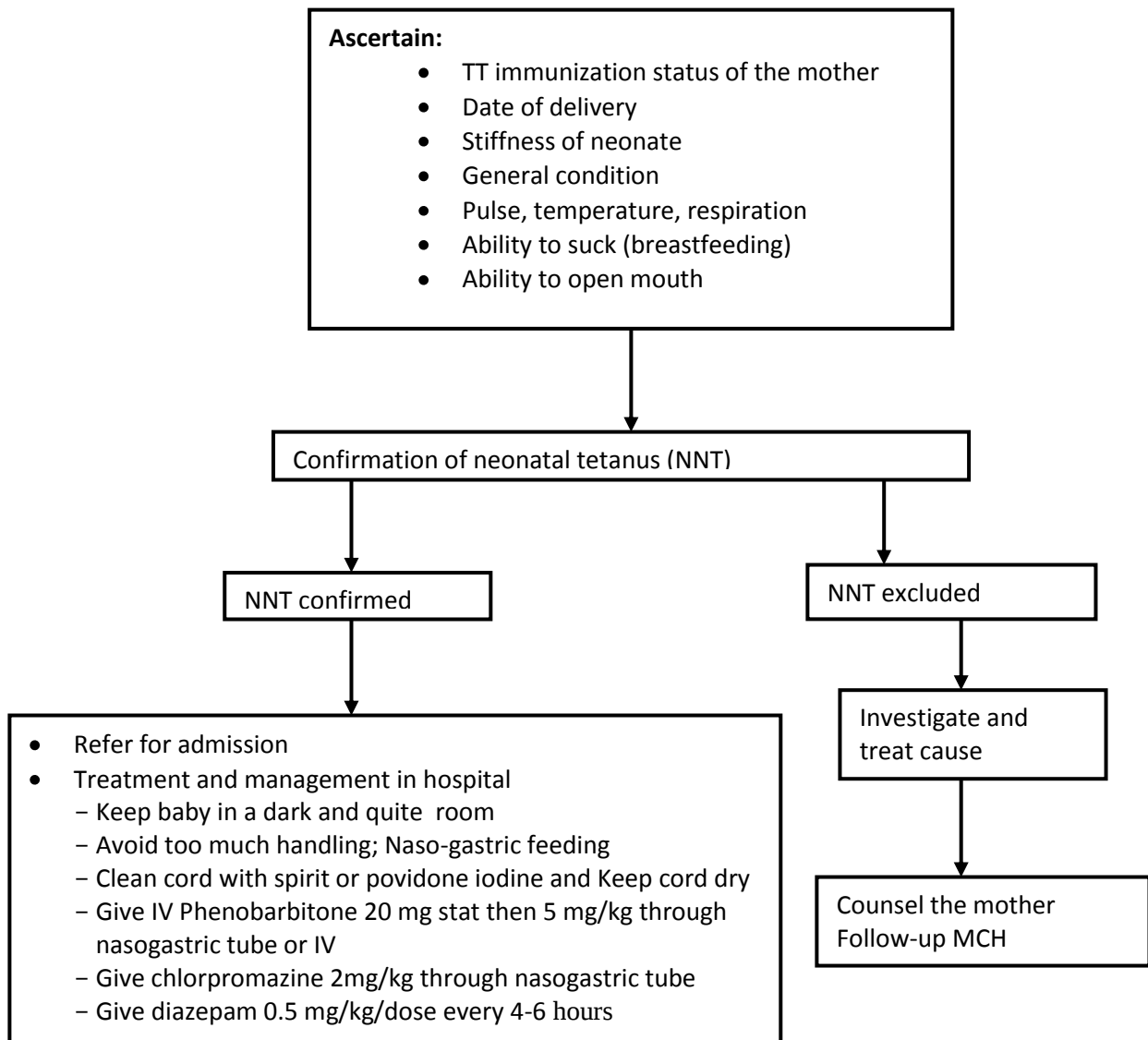
- Clean the cord thoroughly
- Pass a nasogastric tube for feeding

Subsequent Care:

- Counsel the mother
- Keep baby in a quiet dark room
- Frequent monitoring of vital signs – watch respiration
- Avoid too much handling
- Keep umbilical cord clean and dry
- Paint cord with providine iodine or spirit
- Feed Expressed Breast Milk through nasogastric tube (See section on feeding)
- Maintain sedation with:
 - Phenobarbitone 5mg/kg/day in 2 doses
 - Chlorpromazine 2mg/kg/day

(These can also be given as continuous infusion).

- Give antibiotics – IV Crystalline Penicillin 50,000 units/kg 12 hourly
- Refer to ICU if facility is available
- Immunize the mother and ask her to complete immunization as per the National schedule
- If baby recovers refer to MCH for immunization

Figure F27: Management of Neonatal Tetanus

6.10 MANAGEMENT OF NEONATAL JAUNDICE

Definition:

It is the yellow discoloration of the skin and mucous membranes as a result of raised bilirubin levels occurring in the first 28 days of life.

It may be classified as physiological or pathological jaundice.

Physiological Jaundice

- This is a common problem in the newborn especially the pre-term
- Usually appears after 48 hours of birth and resolves in 7-10 days or a little longer in the pre-term
- Mainly occurs in the skin and eyes
- Baby looks and feeds well

Pathological Jaundice- refers to

- Jaundice which appears any time within the first 24-48 hours of life and later
- Lasts longer than 14 days in term babies and 21 days in the pre-term
- Jaundice with fever
- Deep jaundice usually involving palms and soles

Common causes

Physiological jaundice

It is due to normal physiological breakdown of the large red blood cell mass.

Pathological Jaundice- may be caused by:

- Rhesus incompatibility
- ABO incompatibility
- Neonatal infections
- Intra-uterine infection
- Congenital hypothyroidism
- Liver diseases such as hepatitis and biliary atresia
- Asphyxia
- Birth injuries

Investigation

- Full haemogram
- Blood for bilirubin levels
- Baby and mother's blood groups
- Direct Coombs test
- Septic screen if indicated
- Syphilis test

Prevention

- Good antenatal care with proper management of a Rhesus negative mother
- Prevention of birth injuries and birth asphyxia
- Infection prevention and prompt treatment during pregnancy, labour and delivery and thereafter

Management**Take history to determine the cause of jaundice for all babies**

- History of previously affected siblings, and if so, what treatment e.g. phototherapy or blood exchange transfusion
- Colour of urine and stool
- Mother's blood group
- For RH negative mothers, ask if she has had abortions previously and whether she received Anti-D

On examination check on:

- Yellowness of skin and mucus membranes
- Colour of urine and stools
- General behavior and activity
- Signs of infection
- Ability to suck properly
- Check for pallor
- Monitor for signs of kernicterus and act promptly
- Monitor bilirubin levels

Note: RH-ve Mothers should be delivered where there are facilities for exchange blood transfusion.

Treatment

- No treatment is necessary for most cases of physiological jaundice but encourage breastfeeding
- Keep baby warm
- Continue breastfeeding or give EBM
- Give antibiotics when indicated
- Phototherapy if:
 - Jaundice on day 1
 - Deep jaundice involving palms and sole of feet
 - Prematurity and jaundice
 - Jaundice due to haemolysis
- Exchange blood transfusion when indicated

Indications for immediate Exchange blood transfusion (i.e. at birth)

- Hb below 11g/100 mls
- Bilirubin levels above 4 mg/100 mls (70 mmol/L)
- Signs of Congestive Cardiac failure

Table F11: Treatment of jaundice based on serum bilirubin level

	Phototherapy				Exchange transfusion			
	Healthy term baby		Preterm or any risk factors		Healthy term baby		Preterm or any risk factors	
	mg/dl	μmol/l	mg/dl	μmol/l	mg/dl	μmol/l	mg/dl	μmol/l
Day1	Any visible jaundice ^c				15	260	13	220
Day 2	15	260	13	220	25	425	15	260
Day 3	18	310	16	270	30	510	20	340
Day 4 and thereafter	20	340	17	290	30	510	20	340

Continue phototherapy until serum bilirubin level is lower than threshold range or until baby is well and there is no jaundice of palms and soles.

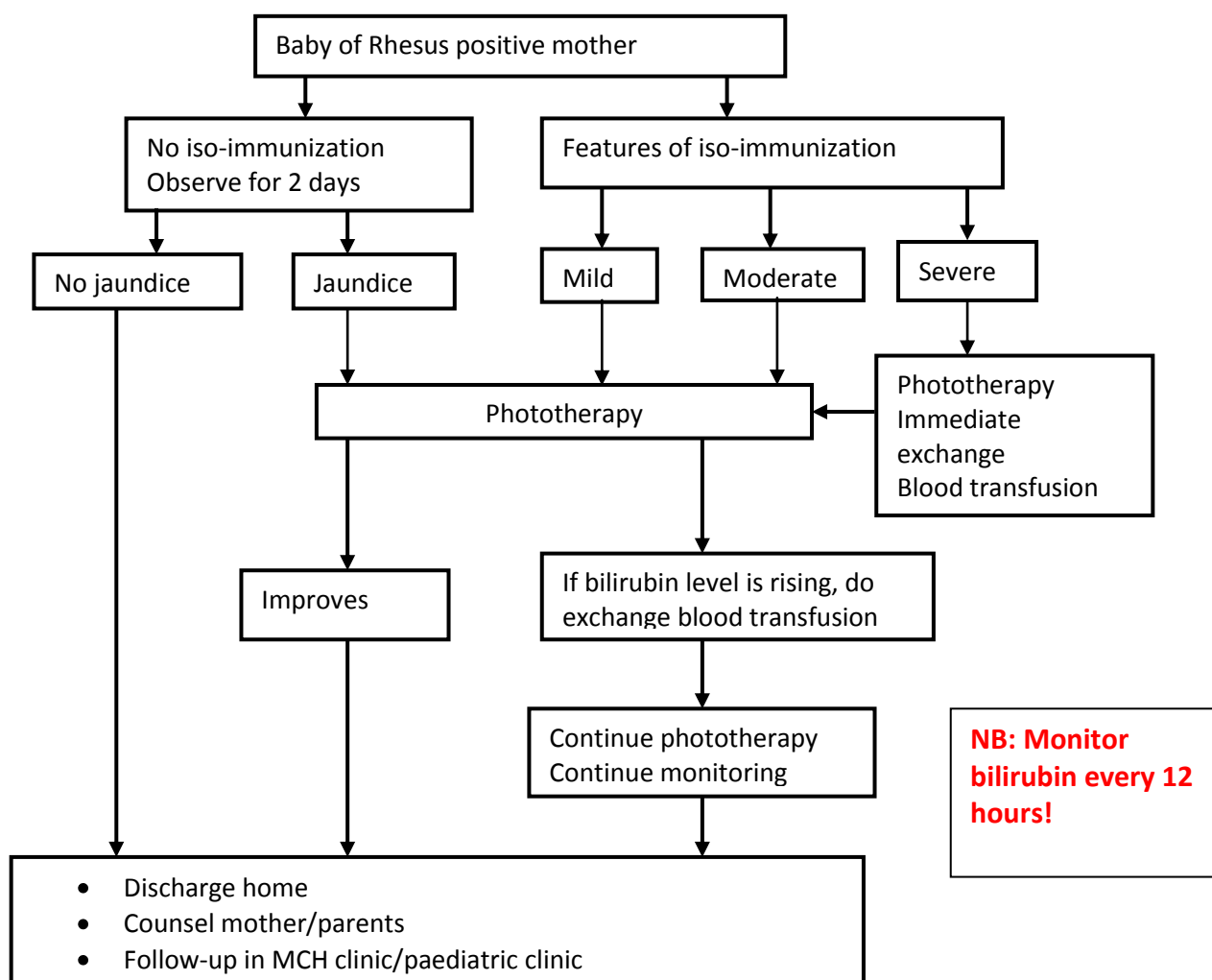
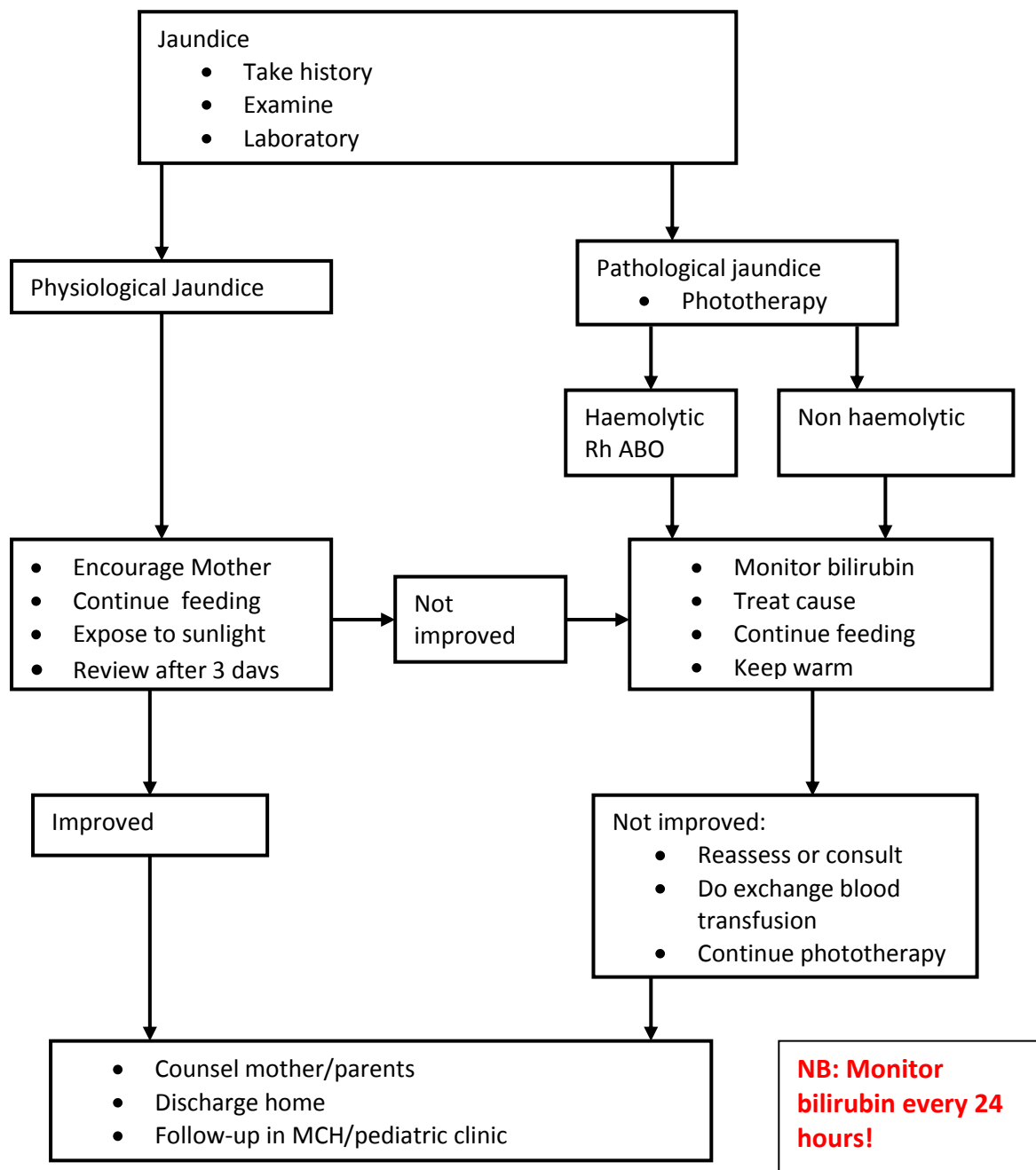
Figure F28: Management of Rhesus Incompatibility

Figure F29: Management of Jaundice in the Newborn

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Division of Reproductive Health
Ministry of Public Health & Sanitation
Old Mbagathi Road
P. O. Box 43319, Nairobi. Tel: 725105/6/7/8
E-mail: drh-head@africaonline.go.ke
Website: www.drh.go.ke