Mentors' Manual
Volume: 3

Essential New Born Care at 24/7 PHCs

NATIONAL HEALTH MISSION
राष्ट्रीय स्वास्थ्य मिशन

KHPT
Karnataka Health Promotion Trust

Mentors' Manual
Volume 3

Essential Newborn Care at 24/7 Primary Health Centers

Sukshema

Maternal, Neonatal a

Government of Karnataka
Department of Health and Family Welfare
National Health Mission

PREFACE

Institutional deliveries in Karnataka have risen over recent years due to the efforts by the state health directorate which were strongly complemented by various innovations and schemes implemented under the National Rural Health Mission (NRHM) such as Janani Suraksha Yojana (JSY) and Janani Shishu Suraksha Karyakram (JSSK), ASHA support, 108 ambulance services, etc. There has been a reduction in maternal and newborn mortality rates (MMR, NMR), but not enough to achieve the proposed state targets. With over 80% of pregnant women now delivering in facilities, it is critical that these deliveries are conducted as per the highest standards for quality of care. To accommodate this rising demand, government had prioritized upgradation of Primary Health Centres into 24/7 facilities to provide delivery services in rural areas and reduce the burden on district and larger hospitals enabling them to function more appropriately as first referral units (FRU) to provide emergency care. To achieve good quality of services provided in public health facilities it is important that the service providers working at these facilities are proficient in skills and practices that are appropriate particularly with reference to pregnant women, mothers and new-borns. To facilitate this, the need for dedicated teams to improve and monitor quality is crucial.

As a part of technical assistance to NRHM, Karnataka Health Promotion Trust and its consortium of partners developed an innovative nurse mentor led quality improvement program after detailed situation assessment and consultations with government. It was pilot tested in Bellary and Gulbarga during 2012-2013 where trained Nurse Mentors worked with 24/7 primary health centres (PHCs) staff to improve the quality of delivery and postpartum care. The mentoring programme integrated elements of clinical mentoring with facility-based quality improvement processes. Another critical component of the intervention was the use of revised case sheets by the staff that helped them in multiple ways, i.e. as job aid to adhere to standard practices, as a simple case documentation tool and as a tool to monitor and audit quality of care. The intervention results showed marked improvements in facility readiness and provider preparedness to deal with institutional deliveries and associated complications. Subsequently the program was scaled up in the remaining high priority districts of northern Karnataka and further taken up both within and outside the country.

As a part of this intervention, several technical products and training material were developed; they consist of 1) process documentation of the intervention that details the process of planning, implementing and monitoring the mentoring program, 2) Facilitator/ Trainer and Participant manuals. These materials have as annexures within them, various tools including the case sheets that were implemented under this initiative. We sincerely hope that these resources will be found useful by program managers in terms of gaining an in-depth understanding of the intervention and replicating it in their respective contexts.

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About the Manual

The Sukshema project aims at providing technical support to National Rural Health Mission of Karnataka to improve the maternal, newborn and child health (MNCH) outcomes in Karnataka with a focus on eight districts of northern Karnataka. As a part of the project, several interventions are implemented at facility, community and health systems level to improve the availability, accessibility, quality, utilization and coverage of critical MNCH services. One of the interventions is onsite mentoring to 24/7 PHCs to improve the quality of delivery and postpartum care with the help of a new cadre of nurse mentors. Being a new cadre, the project designed a training program and manuals for training this cadre. The nurse mentors are expected to be proficient in clinical skills related to delivery and postpartum care and also have the right attitudes and abilities to provide mentorship to the PHC staff. They will be responsible for onsite, on the job coaching and facilitating change in provider practices that will ensure better quality care for mothers and newborns. The purpose of this manual is to guide the MNCH mentors of the Sukshema project in how to assist health care providers at primary health care centers (PHCs) to improve the quality of labour and delivery, postpartum and newborn care services. This manual is used by participants during initial training and also as a guide during mentoring activities in the field.

This manual is divided into 3 volumes.

Volume 1 – Volume 1 has two sections.

Section A - Quality Improvement Principles and Approaches

This section introduces the context of MNCH mentoring intervention in the Sukshema Project, Karnataka, principles of quality improvement, Sukshema's quality improvement approach and tools, and their use at various levels, qualities of an MNCH mentor, and mentor responsibilities.

Section B - PHC Systems Strengthening

This section contains technical information related to systems strengthening in PHCs and covers infection prevention, referral system strengthening and supply chain management.

Volume I appendix include various tools and reporting formats that the MNCH mentors use to plan, implement and report on their PHC visit activities.

Volume 2 – Skilled Birth Attendance during Labour, Delivery and Postnatal Periods at 24/7 PHCs

This volume contains information related to clinical knowledge and skills required to provide quality care during labour, delivery and postnatal period at 24/7 primary health centers. The section covers both provision of routine delivery and postnatal care as well as identification, management and referral of most common maternal complications during these periods.

Volume 3 – Essential Newborn Care at 24/7 PHCs

This volume contains information related to clinical knowledge and skills required to provide quality care during the early neonatal period at primary health centers. The section covers both provision of routine newborn care as well as identification, management and referral of most common newborn complications.

Though this manual is divided into three volumes for the convenience of readers, each volume has links and cross references with the others. It is highly recommended that the mentors consult all three volumes when preparing for a mentoring visit and also have them available for ready reference during a mentoring visit.

In the first volume of the manual we introduce the A.M.M.A approach to quality improvement. A.M.M.A approach refers to assess (A), manage (M), measure (M) and advocate (A) for continuous quality improvement and has at its core, the key principles of client and provider rights, self assessment and team building, and mentoring. This approach can be used at several levels to improve PHC linkages with the community, to address PHC level problems, to improve individual provider's knowledge and skills and to improve PHC linkages with the wider health system.

Abbreviations

ABO	-	Blood groups A, B, O
A.M.M.A	-	Assessing and diagnosing, managing, measuring and advocating
AMTSL	-	Active management of the third stage of labour
ANC	-	Antenatal care
ANM	-	Auxiliary nurse midwife
APH	-	Antepartum hemorrhage
ASHA	-	Accredited social health activist
ART	-	Antiretroviral therapy
AWW	-	Anganwadi worker
AZT	-	Zidovudine
BCC	-	Behaviour change communication
BEmONC	-	Basic emergency obstetric and neonatal care
BM	-	Breast milk
BMV	-	Bag and mask ventilation
BPL	-	Below poverty line
CBO	-	Community-based organisation
CCT	-	Controlled cord traction
CEmONC	-	Comprehensive emergency obstetric and neonatal care
CHC	-	Community health centre
CBMWTF	-	Common bio-medical waste treatment facilities
CMO	-	Chief medical officer
COC	-	Combined oral contraceptive
CPD	-	Cephalopelvic disproportion
CVS	-	Cardiovascular system
DBF	-	Direct breast feeding
DDK	-	Disposable delivery kit
DHO	-	District health officer
DMPA	-	Depot medroxyprogesterone acetate
DNS	-	Dextrose normal saline
DPS	-	District programme specialist
EBM	-	Expressed breast milk
ECP	-	Emergency contraceptive pill
EDD	-	Expected date of delivery
FEFO	-	First expired, first out
FHR	-	Fetal heart rate
FHS	-	Fetal heart sound
FIFO	-	First in, first out
FRU	-	First referral unit
FS	-	Female sterilisation
GoI	-	Government of India
H/O	-	History of
Hb	-	Haemoglobin
HBV	-	Hepatitis B virus
HCP	-	Health care providers
Hg	-	Mercury
HBsAg	-	Hepatitis B surface antigen
HCG	-	Human chorionic gonadotrophin

HIV	-	Human immuno deficiency virus
HLD	-	High level disinfection
HMIS	-	Health management information system
HR	-	Heart rate
H_2O	-	Water
IM	-	Intramuscular
Inj	-	Injection
IV	-	Intravenous
ICTC	-	Integrated counselling and testing centre
IFA	-	Iron and folic acid (supplements)
IMNCI	-	Integrated management of neonatal and childhood illness
IUCD	-	Intrauterine contraceptive device
IUD	-	Intrauterine deat
IUGR	-	Intrauterine growth retardation
JSY	-	Janani Suraksha Yojana
JHFA	-	Junior health female assistant
KMC	-	Kangaroo mother care
LAM	-	Lactational amenorrhea method
LBW	-	Low birth weight
LHV	-	Lady health visitor
LMP	-	Last menstrual period
$MgSO_4$	-	Magnesium sulfate
MM	-	MNCH mentor
MMR	-	Maternal mortality ratio
MNCH	-	Maternal neonatal and child health
MO	-	Medical officer
MoHFW	-	Ministry of Health and Family Welfare
MoWCD	-	Ministry of Women and Child Development
MPHW	-	Multipurpose health worker
MRP	-	Manual removal of placenta
MTP	-	Medical termination of pregnancy
MVA	-	Manual vacuum aspiration
NFHS	-	National Family Health Survey
NGO	-	Non-governmental organisation
NRHM	-	National Rural Health Mission
NS	-	Normal saline
NSSK	-	Navjaat Shishu Suraksha Karyakram
NSV	-	No-scalpel vasectomy
PEP	-	Post-exposure prophylaxis
PHC	-	Primary health centre
PIH	-	Pregnancy induced hypertension
PIP	-	Project implementation plan
PNC	-	Postnatal check-up
POC	-	Products of conception
PPE	-	Personal protective equipment
PPH	-	Postpartum hemorrhage
PPTCT	-	Prevention of parent-to-child transmission
PPV	-	Positive pressure ventilation
PRI	-	Panchayati Raj Institution
PROM	-	Premature or pre-labour rupture of membranes
P/A	-	Per abdomen
P/S	-	Per speculum
P/V	-	Per vaginum
QI	-	Quality improvement
RCH	-	Reproductive and child health

RDK	-	Rapid diagnostic kit
Rh	-	Rhesus factor
RL	-	Ringer lactate
RPR	-	Rapid plasma reagin
RR	-	Respiratory rate
RTI	-	Reproductive tract infection
SBA	-	Skilled birth attendant
SC	-	Sub-centre
SDM	-	Standard days method
SN	-	Staff nurse
STI	-	Sexually transmitted infection
TBA	-	Traditional birth attendant
TT	-	Tetanus toxoid
UTI	-	Urinary tract infection
VDRL	-	Venereal Disease Research Laboratory
VHND	-	Village health and nutrition day
WBC	-	White blood cell
WHO	-	World Health Organization
3TC	-	Lamivudine

Units of measurement

@	-	At the rate of – to measure speed
%	-	Percent – to compare anything to 100
°C	-	Degree celsius – for temperature
cc	-	Cubic centimetre – to measure volume
cm	-	Centimetre – to measure length
dl	-	Decilitre – to measure volume
°F	-	Degree Fahrenheit – for temperature
gm	-	Gram – to measure weight
hrs	-	Hours - to measure time
IU	-	International units – to measure dose
KCal	-	Kilocalories- to measure energy produced
Kg	-	Kilogram - to measure weight
L	-	Litre to measure volume
lb	-	Pound to measure pressure
mcg	-	Microgram to measure weight
mg	-	Milligram to measure weight
min	-	Minute
ml	-	Millilitre to measure volume
mm	-	Millimetre to measure length
mmHg	-	Millimetre of mercury to measure BP
secs	-	Seconds
U	-	Units to measure dose

Glossary of Terminology:

Abortion: Termination of pregnancy by the removal or expulsion of a foetus or embryo from the uterus before 20 weeks of pregnancy

Abscess: A localized collection of pus in any part of the body, with pain and redness.

Amniotic fluid: Fluid present in the uterus during pregnancy which protects the fetal inside

Amnionitis: Infection of the protective lining around the baby (amnion or inner lining); occurs in PROM

Anaemia: Condition caused by low hemoglobin in blood

ANC: Check up done during pregnancy to determine the condition of the woman and fetus

APGAR: The APGAR score indicates the newborn's well-being. It will be calculated at 1 minute and at 5 minutes after birth. An APGAR score of more than 7 is considered satisfactory. Less than 7 APGAR babies need referral to a higher centre for further management

APH: Bleeding in pregnancy (before delivery)

Asphyxia: Condition in a newborn due to severely deficient supply of oxygen to the body when the baby is unable to breathe normally

Atonic: Lack of muscle tone; loose or soft

Assisted deliveries: Vaginal delivery when the baby's delivery has to be assisted/helped out by using forceps or vacuum extraction applied to the baby's head

Blurred vision: Unclear or hazy vision, associated with high blood pressure, weakness

Breech presentation: When the buttocks of the fetus are in the lower area of the uterus

Chorioamnionitis: Infection of the protective lining around the fetus (amnion or inner lining and chorion or outer lining); occurs in premature rupture of membranes (PROM)

Clammy skin: When the skin is cool, moist, and pale. Sign of emergency such as shock, dehydration

CPD: Size or space of pelvis is narrow and does not allow baby to pass through

CVS: System related to heart and circulatory system

Diastolic blood pressure: Lower reading of blood pressure

Depressed/depression: Sadness, no interest in surroundings; may be seen in postnatal period

DMPA: Injectable contraceptive whose action lasts for 6 months

ECP: To be taken by a woman within 72 hours of unprotected, unplanned sexual contact to prevent a pregnancy

Effacement: Thinning of cervix at the time of labour

Endometritis: Infection of uterus; after PROM, repeated per vaginal (PV examination, unsterile conditions, after abortion/ MTP done in unsterile conditions

Engorgement: Filling up/ swelling

Flank pain: Pain in the side of the abdomen below the ribs

Fluctuant: Moving

Floppy: Poor muscle tone, limp

Fetal: Developing unborn baby inside the uterus

Fetal distress: Condition when the fetus is having some problem inside the uterus; detected by abnormal heart rate (FHR more than 160/min or less than 120/min), or irregular FHR

Fundal height: Height of the uterus which increases with pregnancy and decreases after delivery; measuring the upper border of the uterus and comparing with the standard in weeks of pregnancy gives the approximate duration of pregnancy

Gestation: Pregnancy / the period of development of the fetus in the uterus from conception until birth

Gestational age: Age of an embryo or fetus; calculated in weeks

Gravidity/gravid: The number of times the woman has been pregnant

Icterus: Jaundice or yellowish discolouration of sclera (white part of eye) in adult or skin in newborn

Infant: Baby from one month after birth to one year of age

IUGR: Inadequate/ slow growth of a fetus inside the uterus

Jerky movement: Fast movements which are not controlled and that have no purpose. Seen in fits

KMC: Care given to small baby by placing over the chest of mother/parent to provide extra warmth to the baby

LAM: Used as a traditional temporary method of contraception, when a woman does not have her monthly periods due to breast feeding

Latent: Developing or present but not visible

LBW: When the baby weight is below 2500gms (standard weight)

Lump: A localised swelling; may be hard or soft

Lochia: Discharge from the vagina from delivery up to a week

Liquor: Same as amniotic fluid

LMP: First day of last menstrual period a woman had before pregnancy, used to calculate EDD

Madilu kit: This is a postnatal kit given to mothers after delivery under a government scheme for postnatal care of mother and baby

Mastitis: Infection of breast; seen as pain and redness

Meconium: Yellow or green coloured stools passed by the fetal inside uterus or by newborn at birth

MRP: Done by removing the placenta by hand in condition of retained placenta

Murmur: An abnormal sound of the heart

MVA: Method of performing MTP where suction is created by a manual pump to remove contents in uterus

Misoprostol: Drug used to cause contraction of uterus and thereby prevent or treat postpartum hemorrhage; available as tablets of 200mcg; not given to women with asthma

Magnesium sulfate: An anti-convulsant drug used for preventing/treating eclampsia/severe pre eclampsia without causing sedation in mother or baby

Monitoring: Observe and check the progress or quality over a period of time

Nasal flaring: An increase in nostril size due to any difficulty in breathing

Newborn: A recently born baby

Obstetric: Related to pregnancy

Obstructed: Blocked; unable to come out

Oedema: Swelling due to accumulation of water

Outcome: End result

Pallor: Lack of colour especially in the face; seen in anaemia and long standing diseases

Parity/Para: Total number of deliveries and abortions a woman has had till present pregnancy

Pelvis: Cavity formed by joining together of the two hip bones and sacrum; contains, protects, and supports the intestines, bladder, and internal reproductive organs

Perineum: Area around vagina and the anus in females

PIH: Increased blood pressure (more than 140/90 mmHg) without proteinuria in a woman after 20 weeks gestation

Preterm: Pregnancy less than 37 completed weeks gestation

Pre-referral management: Activities carried out to stabilise the complicated cases before referring to a higher centre

Presentation: That part of the fetal lying over the pelvic inlet which would be first to come out at delivery

P/S: Using the speculum to view the vagina and cervix

P/V: Vaginal examination

Prolonged: Long duration/delayed

PROM: Rupture of membranes (bag of waters) before labour has begun; can be before 37weeks – premature or before delivery – term or mature

Puerperal: The period immediately after delivery to 42 days

Purulent: Containing pus

Pustule: A small boil over skin filled with pus; a pimple

Retained: To hold in a particular place; not coming out

RPR: A newer blood test to screen routinely for syphilis in pregnant women

RR: Rate of breathing in one minute

Respiratory distress: Condition in which patients are not able to breathe properly and get enough oxygen

SBA: Person (doctor, nurse, ANM) trained in pregnancy, delivery, postnatal and newborn care

SDM: Used as a traditional temporary method of contraception where a woman tracks the days of her menstrual cycle and avoids unprotected sexual contact on fertile days of the cycle

Sepsis: Condition where infection from any site spreads throughout the body

Seizures: Convulsions, fits

Spontaneous: Without any effort or natural

Sterilization: A procedure to make free from live bacteria, virus or other microorganisms, used for cleaning needles and surgical instruments

Stillbirth: Birth of a dead fetus any time after the completion of 20 weeks of gestation.

Syphilis: A sexually transmitted disease which in pregnancy may cause congenital defects in the fetus

Systolic blood pressure: The upper level of blood pressure

Tender/tenderness: Pain felt if touched

Term: State of pregnancy which has completed 37 weeks

Transverse: Lying across

Traction: Pulling force

Tubectomy: It is a female sterilization procedure where a part of the fallopian tubes is cut. It is a permanent method of female sterilization

Umbilicus: A scar where an umbilical cord was attached

Unconsciousness: Person not responding to calls, stimulus

Uterine massage: Gently rubbing the uterus after the delivery of placenta to help the uterus contract and become hard

Uterine tone: Tightness of uterine muscles

Vasectomy: A surgical procedure performed on males in which the vas deferens (male tubes) are cut. It is a permanent method of male sterilization

VDRL: Blood test done routinely for syphilis in pregnant women; similar to RPR test

Vertex: Normal presentation of the fetus in which the head lies at the opening of the uterus

Voiding: Emptying the urinary bladder

Chapter 1

Neonatal Health Situation in Northern Karnataka

1.1 Introduction

Four in ten under-five deaths occur during the first month of life, globally. Every year 4 million neonates die (in the first four weeks of life) . The current neonatal morality rate 32 per 1000 live births accounts for two-thirds of infant mortality and 40% of under-five mortality. About 40% of neonatal deaths occur in the first day of life, almost half within three days and nearly three fourth in the first week of life. There are wide variations in neonatal mortality based on rural and urban residence and based on socioeconomic status of communities. India alone contributes to quarter of all neonatal deaths in the world.

Neonatal mortality includes early and late neonatal mortality. Neonatal mortality is lower in communities or states where there are more institutional deliveries. In India nearly 67% of deliveries occur at home with only 46.6% of these being attended by skilled birth attendants (doctors, nurses, midwives).

1.2 Definitions

Neonatal mortality rate is the number of newborns dying before the completion of 1 month for every 1000 live births.

The perinatal mortality rate is the number of still births (late fetal deaths after 28 weeks of pregnancy) and plus newborns that die within one week of birth for every 1000 live births and stillbirths.

1.3 Understanding the Neonatal Health Situation in Karnataka

What are the causes of death in newborns?

The commonest causes of neonatal death are birth asphyxia, severe infection such as sepsis, and prematurity or low birth weight. These three causes account for nearly 80% of all neonatal deaths in India.

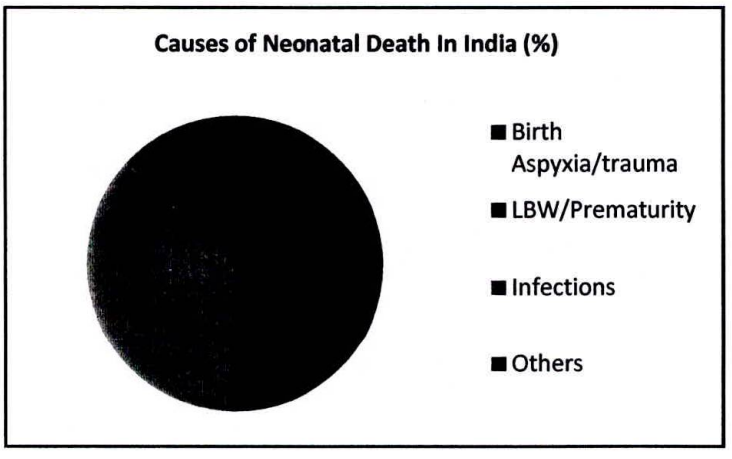


Figure 1.1: Causes of neonatal death in India

When do most newborns die?

Nearly three fourth of neonatal deaths occur in the first week of life, and 40% of deaths occur in first two days of life. Several reasons could contribute to these, but with effort, measures such as delaying pregnancy amongst young women (15-19 years); encouraging at least four antenatal visits during pregnancy and institutional deliveries; and increasing awareness amongst the community and pregnant women about danger signs and when to seek professional help could go a long way in reducing neonatal mortality. In addition having facilities for safe childbirth along with essential newborn care such as providing warmth and newborn resuscitation could reduce these numbers.

The most important period is the first two days (48 hours) of life. Close watch on the newborn could help identify danger signs early, and this could help in quicker response of nurses to refer the newborn for higher facility care nearby.

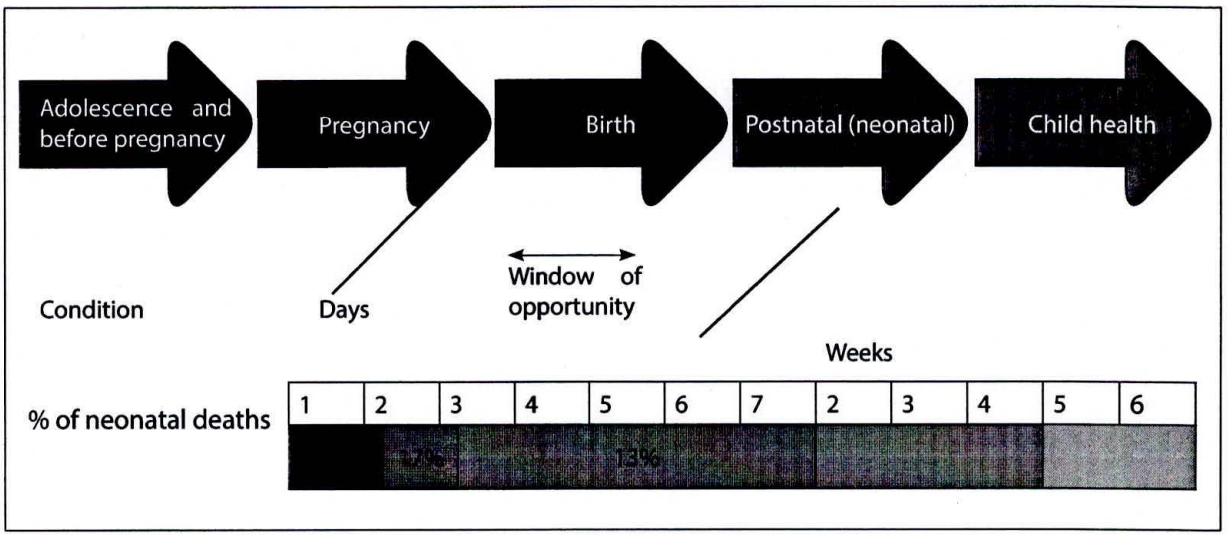


Figure1.2: Timing of neonatal deaths

What is the urgency associated with these deaths?

Two important characteristics of these deaths are:

- Predicting (or anticipating) the possible risk factors through a good initial assessment of the woman in labour can alert the PHC staff to be ready for diagnosing early any problem, providing initial management and referring the newborn as fast as possible to a higher facility
- The risk of neonatal deaths is lower when the family is close to facilities where advanced care is available (sick newborn care unit); and the risk of neonatal deaths are higher when Emergency Neonatal Care (ENC) facilities are not available.

The average duration from onset until death is short especially in the case of birth asphyxia. Thus it is important that these conditions are identified as soon as possible and action is taken immediately to reduce the chance of a newborn dying (Table 1.1).

Table 1.1: Time to act for common neonatal conditions

	Neonatal Condition	Average duration until death if condition very serious
1.	Birth Asphyxia	10 minutes (if no intervention) to 20 minutes
2.	Prematurity / LBW	Anytime after 3 days
3.	Infection	3-7 days

What does this mean for your district?

See the estimated number of births and neonatal deaths in a 12-month period in each of your districts (Table 1.2). About one-fifth of these births occur in primary health centres (PHCs). Thus as nurse mentors you can help to prevent many deaths by maintaining quality of care in the important window of opportunity period (that means during labour, delivery and early neonatal period).This could include simple actions such as following infection control guidelines; identifying danger signs such as newborn not crying at birth (asphyxia), weak newborn whose temperature is low and not feeding (sepsis), starting initial management and referring such newborns quickly.

Table 1.2: Project Sukshema districts with their population and estimated number of live-births and neonatal deaths per year

District	Population (year 2011)	Neonatal deaths per year*	Live-births*
Bagalkot	2476587	1630	57900
Bellary	1848941	1210	43300
Bidar	1678599	1100	39200
Bijapur	2134790	1400	50000
Gulbarga	2522079	1660	59000
Koppal	1370023	900	32100
Raichur	1897372	1250	44400
Yadgir	1148788	760	26800

*assuming crude birth rate = 23.4/1000 and neonatal mortality rate =28/1000 in northern Karnataka (year 2011)

Chapter 2 Classification of a Newborn at Birth

Learning Objectives

By the end of this chapter you will be able to

- Recall how to classify a newborn newborn by gestational age (history/ ultrasound report or physical characteristics) or by birth weight
- Demonstrate how to classify newborns by gestational age, weight or physical features
- Demonstrate accurate documentation of gestational age of newborn
- Demonstrate mentoring skills for classification of newborn

2.1 Introduction

Newborns could have different outcomes based on their gestational age. The normal term newborn is 37 completed weeks of pregnancy / gestation. One important task a PHC staff must do before and if not possible soon after delivery is to calculate the gestational age of the newborn (in weeks). Early identification of a high risk newborn at birth is important for the survival and long term growth of the newborn. Hence a PHC staff who conducts a delivery must either anticipate the birth of a high risk newborn or identify one soon after birth by a quick assessment so that appropriate care can be given.

2.2 Components of Classification of Newborn and its Importance

This can be done by either

Estimating the gestational age by weeks from the history of the LMP or ultrasound report if available

- Preterm newborn : less than 37 weeks
- Term newborn : 37-42 weeks
- Post term newborn : more than 42 weeks

Figure 2.1 Preterm newborn

Checking the weight of the newborn at birth:

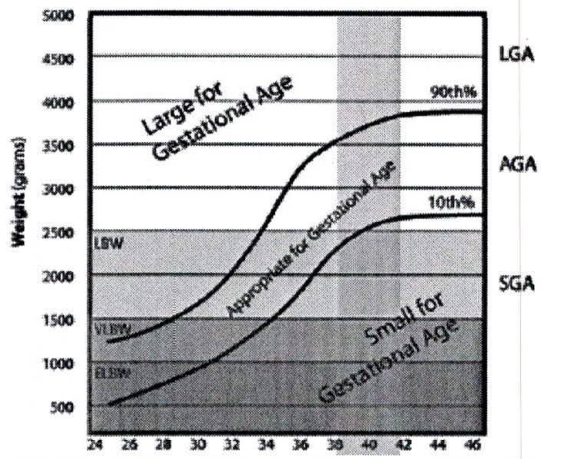
Newborns are classified by weight and size

- Low birth weight (LBW) less than 2500 gms
- Very LBW less than 1500 gms
- Extremely LBW less than 1000 gms

Newborns are classified by size and gestation age

- Small for gestational age (SGA)
- Appropriate for gestational age (AGA)
- Large for gestational age (LGA)

This can be assessed by plotting the newborn's weight (in gm) against the gestational age (in weeks) on the standard chart. If the plot falls between the two curved lines in the graph the newborn is considered to be appropriate for gestational age (AGA = 2.5-3.5 kg). If the plot is below the lower curved line (below 10th percentile) then the newborn is considered to be small for gestational age (SGA) and above the upper red line (above 90th percentile), the newborn is large for gestational age (LGA).



http://en.wikipedia.org/wiki/Small_for_gestational_age

Figure 2.2: Standard chart to plot weight (gm) and GA (weeks)

Assessing physical features of a newborn newborn

The posture; examination of physical features of the ears, breast buds, genitalia, and sole creases could help in estimating broadly whether the newborn is term or preterm. This is important especially if the gestational age cannot be calculated when the mother is not able to provide a reliable history.

2.3 Importance of Components

Classification by gestational age

- Smaller and less mature newborns are known to have more problems than a term newborn. Hence knowledge of this even before a newborn is born or at birth could help a PHC staff to be prepared for any health problem soon after.
- It is best that the PHC staff knows the gestational age of the newborn even before being born by asking the mother her LMP or her EDD or looking at the Thayi card.

Classification by weight and size

- Classification of newborns could help to identify those newborns that have a higher chance of becoming sick.
- It is important to check the weight of the newborn accurately using the infant weighing scale on the first day of life. This must be recorded in the case sheet. Based on the weight the newborn can be classified as low birth weight or small for gestational age. Those newborns whose weight is low or who is small for gestational age could have a greater chance of developing hypoglycemia, hypothermia and other long-term problems.
- Therefore these newborns must be watched carefully after birth and mothers must be encouraged to feed them frequently.

Classification by physical features

- Sometimes a mother may not know the LMP or there would be no ultrasound report or thayi card. An abdominal examination might help in estimating gestational age. But this might not be possible if such a mother comes in to the PHC in active labour.
- Then observation of physical characteristics could help to broadly classifying newborns as term or preterm.

2.4 Requirements for Classification of Newborn

Equipment and supplies

- Case sheet to counter check the gestational age based on record of LMP or ultrasound report or abdominal examination of fundal height
- Infant weighing scale to assess the weight of the newborn
- Clean cloth
- Spirit to clean the tray of the weighing machine
- Chart to plot and check if newborn is SGA, AGA or LGA (in under 5 card)

Clinical skills

Check WEIGHT OF NEWBORN

1. Keep articles ready such as infant weighing machine; clean towel/cloth; cleaning solution – 0.5% chlorine solution to wipe tray and clean cloth to wipe the wet tray.
2. Wash hands thoroughly before handling the newborn.
3. Explain the procedure to the mother and ensure that the newborn's weight is checked before the newborn leaves the labour room.
4. Place the newborn on the towel. Wait till the weight stops fluctuating to the nearest 0.01 kg. Remove the newborn.
5. Cover the newborn immediately and hand over to mother or rewarm by asking the mother to provide kangaroo mother care (KMC) or keep under radiant warmer if needed
6. Record the weight in the newborn's case sheet.
7. Refer a newborn with birth weight "less than 1800 gms" for further management

Figure 2.3: Weighing a newborn

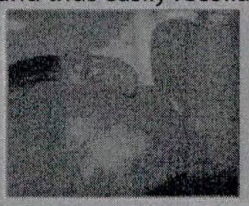
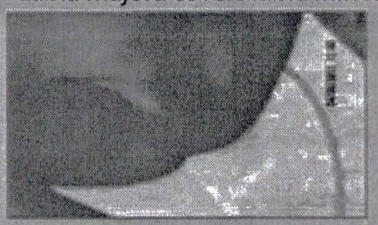
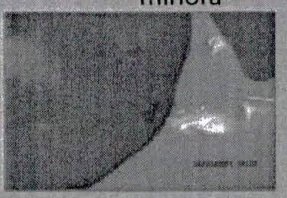
Classify by GESTATIONAL AGE USING LMP

1. Ask the mother for the date of her LMP or look in the Thayi card or case sheet for the same
2. Calculate the gestational age in weeks
3. Make inference of gestational age as follows:
   a. Preterm : less than 37 weeks
   b. Term : 37 -42 weeks
   c. Post term : more than 42 weeks

Check GESTATIONAL AGE BY PHYSICAL FEATURES

1. Use the chart given in Table 2.1 to classify the newborn as preterm or term. This is based on physical features. It is a quick way to decide the approximate age of the newborn especially when the gestational age is not known.

Table 2.1: Guide to determine age of newborn, when gestational age is not known

Physical features	Term newborn	Preterm newborn
1. Posture	Flexed 	Semi flexed 
2. Ear examination	Incurvature complete, cartilage thick and thus easily recoilable 	Incurvature incomplete, not easily recoilable 
3. Breast buds	Areola and nipple well defined and seen 	Barely visible areola and nipple 
4. Genitalia – female	Labia majora covers labia minora 	Labia majora does not cover the labia minora 
5. Genitalia – male	Testes descended, scrotal rugae present 	Scrotal rugae absent, increased chance of undescended testes 
6. Sole creases	Present 	Absent 

2.5 Key Messages - Do's and Don'ts

Do's	***DO be prepared.*** Make sure all necessary equipment and supplies are available and functional in the newborn corner. Being prepared makes it easy to complete the task faster.
	DO place the newborn immediately on the mother's chest/abdomen and dry with a warm cloth. This encourages skin-to-skin contact, keeps the newborn warm and promotes bonding.
	DO know that the normal birth weight of newborns is 2500-3500 gms (2.5-3.5 Kgs) and gestational age is 37 completed weeks of gestation. If the newborn is less than 2500 gms (2.5 kgs) or less than 37 weeks gestation there is more chance of newborn complications.
	DO remember that a newborn that has a weight less than 2500 gms (2.5 kgs) is classified as low birth weight. A newborn newborn who is between 1800 gms (1.8 kgs) and 2500 gms (2.5 kgs) can be managed in the PHC
	DO refer those newborns below 1800 gms (1.8 kgs) to a higher center for further management. Such newborns might have complications of breathing, hypoglycemia or a higher chance of infection. They will need to be watched carefully and would need specialized care in a neonatal unit.
	DO remember that gestational age below or above 37 weeks indicate either preterm or post term respectively. If gestational age is not known, certain physical characteristics can indicate prematurity.
	Do remember that a newborn can lose up to 10% of its birth weight in the first week of life -- this is normal. But weight loss of more than 10% in the first week is a flag sign that something might be wrong.
Don'ts	***DO NOT delay in assessing the gestational age and weight of the newborn once he/she is stable.*** It is best checked before the newborn and mother are shifted out of the labour room.
	DO NOT expose the newborn to open air for too long when checking the weight or making observations of physical characteristics to estimate the gestational age. This could lead to hypothermia in the newborn.
	DO NOT delay referral of a newborn that is less than 1.8 kgs. This newborn can either be SGA or preterm and would require more intensive care.

Chapter 3 Care of a Normal Newborn at Birth till First Hour of Life

Learning Objectives

By the end of this chapter you will be able to

- Recall the steps of routine care in the first hour of birth
- Demonstrate how to assess and provide routine care in the first hour of birth
- Demonstrate accurate documentation of immediate care of the newborn such as drying and wrapping the newborn; providing skin-to-skin contact; using radiant warmer; cleaning umbilical cord and eyes; checking temperature by touch and the thermometer; administering Vitamin K; assisting a mother to initiate breast feeds
- Demonstrate mentoring skills for provision of routine care of newborn

3.1 Introduction

The first hour after birth is the most crucial period and care provided during this period could help in preventing complications and ensuring quality of life. A normal newborn weighs more than 2500 gms (2.5 kgs), breathes normally and regularly, has warm trunk and soles (temperature 36.5-37.2°C / 97.7- 98.6°F), is pink in colour with spontaneous body movements and actively sucks on breast. Immediate care of newborn would help in good adjustment from intrauterine life to extra-uterine life. PHC staff that pay specific attention to the basic components of warmth, breathing, and breastfeeding initiation could help in reducing risks of hypothermia and hypoglycaemia. In addition a quick screening for malformations or birth trauma could assist in getting the right help for the newborn at the right time.

3.2 Components of Routine Care of Newborn at Birth and their Importance

Call out the time of birth and sex of newborn

- Check the time of birth on the watch
- Record the time, date and sex of the newborn on the case sheet
- Call for help from other PHC staff if needed

Assess if newborn is breathing

Soon after birth, a newborn must have a strong cry, be pink and active. This indicates that the newborn is breathing normally and is warm enough.

- Check if the newborn is breathing
- Check if the newborn is active and pink

Dry and keep newborn warm with skin-to-skin contact

- Dry the newborn with towel. At the same time check for breathing or cry. If breathing well or crying, place the newborn over mother's abdomen or on mother's chest as soon as possible for direct skin-to-skin contact. Cover the newborn with the second clean towel/cloth.

Check APGAR score at 1 and 5 minutes:

APGAR is an acronym but used backwards i.e.

- R: Respiration
- A: Activity
- G: Grimace
- P: Pulse or Heart rate
- A: Appearance

It is used to determine the health outcome of the newborn and not to decide if resuscitation is needed. Each criterion is scored from 0-2 and thus a total score of 8-10 indicates a healthy newborn newborn.

Clamp, cut and clean the umbilical cord

- Wait for cord pulsations to stop (1-3 minutes). Clamp the cord at approximately 2-3 cms from the newborn's abdomen using umbilical clip and an artery clamp placed 2-3 cms from the umbilical clip
- After the placenta is delivered, cut the cord between the clamp and artery forceps
- Clean the cord with dry sterile cotton
- Tie the napkin below the umbilical stump

Give eye care

- Clean eyes of newborn with a sterile cotton swab from the medial to lateral aspect of lid. Use a separate cotton swab for each eye.

Give injection vitamin K

- Above 1500 gm give 1mg of Vitamin K intramuscularly on day 1 of birth for all newborns
- Give 0.5 mg of vitamin K IM for newborns weighing less than 1500 gm (1.5 kgs) gm

Assist to initiate breastfeeding

- Help the mother to position herself and see that the newborn has attached correctly to the breast .

Check for malformations and trauma

- Quickly screen for malformations that require immediate attention within an two hours of birth.

3.3 Importance of Components

Call out the time and sex of newborn at birth

- The birth of a newborn is an important vital event. It has important cultural and legal implications.
- A PHC staff must thus record accurately the time and sex of the newborn on the case sheet after she has confirmed with mother, significant family member or support person about so that there is no confusion later.

Assess the breathing of the newborn

- The first minute is considered the golden minute of life.

- A newborn who does not cry or who is inactive soon after birth flags a danger sign that requires immediate attention of the PHC staff to begin initial steps of resuscitation within 30 seconds of birth.
- Dry the newborn and keep warm by skin-to-skin contact
- A newborn is usually wet with the amniotic fluid when born. Since newborn newborns ability to maintain temperature is not very good it is important that the newborn is dried immediately with a clean warm towel/ cloth that is kept on the mother's abdomen (Figure 3.1). This could help in preventing heat loss.
- Skin-to-skin contact on the mother's abdomen or between the mother's breasts could help in transfer of heat from the mother's skin to the newborn's skin. This could keep the newborn naturally warm and promote comfort of the mother and newborn. The newborn must be covered with another dry towel (Figure 3.2).
- The large surface area of the head could contribute to heat loss easily. It is thus necessary to cover the head with a cap.
- A newborn whose feet and palms are blue is a flag to the PHC staff that the newborn is not warm enough. Action must taken such as drying the newborn, maintaining skin-to-skin contact with the mother and covering the newborn with a clean warm towel or cloth. If needed additional heat source could be used.

Figure 3.1: Dry newborn keep warm

Figure 3.2: Skin to skin contact

Check the APGAR score

- APGAR score could help to identify a newborn at risk for breathing difficulty. Since it is checked only at 1 minute after birth, it is not used as an indication for starting resuscitation.
- APGAR score also helps in determining the long term health outcome of the newborn.
- Thus APGAR score less than seven must make a staff PHC staff alert; she should refer the newborn and watch the newborn for any possible complication till transport.

Clamp, cut and clean the umbilical cord

- Delay in cutting the cord (1-3 minutes depending on whether the newborn has cried or is breathing) could help in more blood being delivered to the newborn. This is reported to have important health benefits.
- The cord blood transports nutrients and stems cells to the newborn. The chance of the newborn to develop anemia for as much as six months is reduced.
- In addition the placenta is known to shrink as it pumps out more blood. Thus the placenta can be delivered more easily.
- The umbilical cord heals best when kept dry and clean (Figure 3.3).

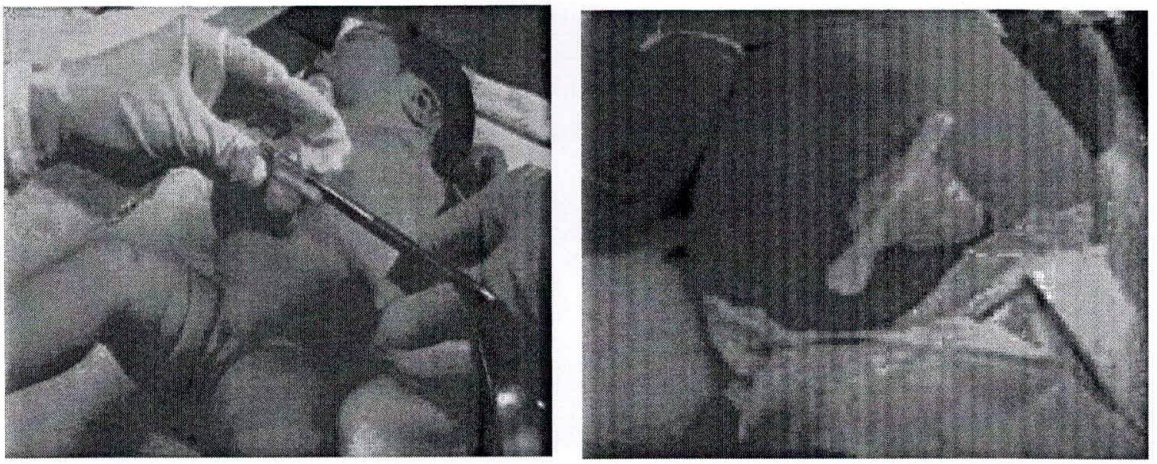


Figure 3.3: Clamp umblical cord at birth

Eye care

- A newborn newborn can pick up an infection. Thus it is important that the eyes are cleaned of any secretions present as a result of the newborn's passage through the vaginal canal soon after birth .
- Using separate sterile cotton swabs could prevent spread of infection from one to the other eye.

Maintain skin-to-skin contact between mother and newborn

- This will help in transfer of heat from the mother's skin to the newborn. The temperature of the newborn is stabilised.
- There are other benefits of skin-to-skin such as it helps the newborn to start breastfeeding early, since the newborn smells colostrum at birth. This gives more chance to explore and search for milk when the newborn is alert (usually for half an hour soon after birth).
- Place the newborn if stable between the mother's breasts, the newborn naturally moves towards the nipple and starts feeding

Give injection Vitamin K

- Bleeding could occur within the first 24 hours of birth or within the first week of birth. Vitamin K helps to prevent bleeding disorder of the newborn.

Assist to initiate breastfeeding

- Breastfeeding must be started as soon as possible after the newborn is born. Early initiation of breastfeeding is known to reduce neonatal deaths by 22%.
- The PHC staff must be able to assist the mother and the newborn to begin feeding. This can be done by skin-to-skin contact and supporting the newborn.
- Other benefits of early breastfeeding include it helps the uterus to contract and bleed less. It stimulates milk production. The newborn is more comfortable and would be able to cope with pain of injection much better.

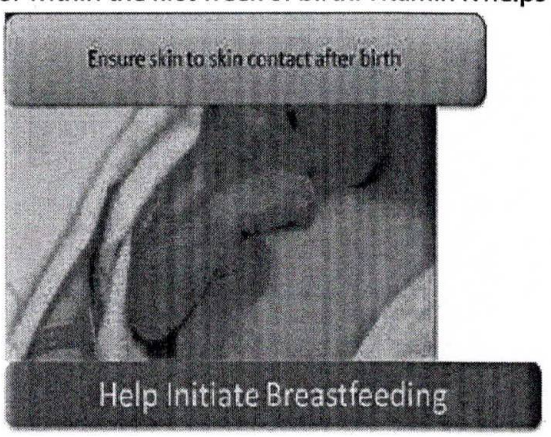


Figure 3.4: Place newborn in skin to skin contact at birth

Examine the newborn for any malformations that might require a immediate referral

- Sometimes malformations might not be anticipated and it might be detected late. Thus a systematic and targeted physical examination could help detect abnormalities fast enough to get the needed action.Quickly screen for malformations that require immediate attention within an two hours of birth.

3.4 Requirements to Provide Care at Birth for Normal Newborns

Equipment and supplies

- Case sheet to document the time and date of birth, gestational age and sex of the newborn newborn
- Clean cloth / towels - two
- Cord clamps / tie
- Scissors to cut cord
- Cotton swabs for cleaning cord and eyes and administering injection Vitamin K
- Injection vitamin K ampoule
- Syringe and needle of appropriate size
- Thermometer
- Spirit to clean injection site, clean thermometer

Clinical skills

Provide ROUTINE CARE FOR NEWBORN AT BIRTH

1. Place newborn over the towel on mother's abdomen
2. Dry the newborn. Cover with the second dry clean towel /cloth
3. Check breathing
4. Clamp and cut the cord
5. Place between mother's breasts
6. Clean eyes
7. Give injection Vitamin K
8. Assist to initiate breastfeeding
9. Monitor the newborn's vital signs every 15 minutes

2. How to WRAP THE NEWBORN

1. Wash hands
2. Encourage the mother to watch the procedure so that she can learn how to do so when she is at home
3. Take a long clean cloth or towel. Spread the sheet on a flat surface. Fold one corner on itself- place the newborn's head on the infolded corner so as to cover the head till the hairline on the forehead. Cover the right shoulder and tuck on left side. Fold from the foot end and tuck beneath the chin. Finally cover the left shoulder and tuck on the right side

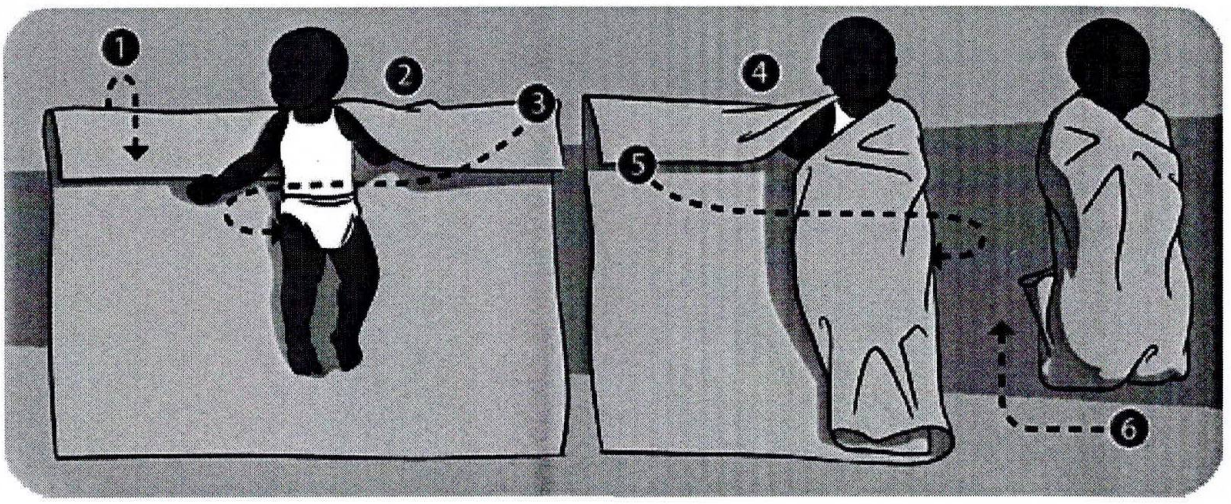


Figure 3.5: How to wrap the newborn

Check AXILLA TEMPERATURE

1. Wash hands before procedure
2. Collect all articles required (thermometer, cotton swab, kidney tray)
3. Clean the thermometer, shake it down so that the mercury reads less than 35° C (95°F)
4. Wipe the underarm of the newborn
5. Place the bulb end of the thermometer under the arm, in the middle of the armpit. Hold the arm against the body and keep the thermometer in place for 3 minutes
6. Remove the thermometer, wipe it dry with cotton swab
7. Read the temperature by raising thermometer at eye level
8. Record the temperature in the case sheet
9. Wipe thermometer with spirit swab
10. Store in a clean container

Give INJECTION VITAMIN K INTRAMUSCULARLY

1. Collect all articles required such as injection Vitamin K ampoule, syringe (2cc/1cc), needle (26 G), cotton swabs, spirit, kidney tray, container to discard the needle and syringe
2. Wash hands
3. Assemble needle and syringe. Choose a 2ml or 1ml and a 26G needle
4. Break the ampoule carefully and draw the required amount in the syringe
5. Identify the site for the injection mediolateral (Vastus lateralis). This means it is between the middle and side surface of thigh
6. Wipe the site with spirit swab in a circular motion. Allow to dry

7. Grasp the muscle gently with thumb and fingers. Insert the needle at 90 degrees angle, aspirate and administer the medication if no blood visible
8. Withdraw needle. Massage the site
9. Discard the needle in puncture proof container or use needle cutter, the syringe in other materials in appropriate bin
10. Wash hands
11. Record the injection name, dose, site, and route in excel Sheet
12. Check if the newborn is comfortable

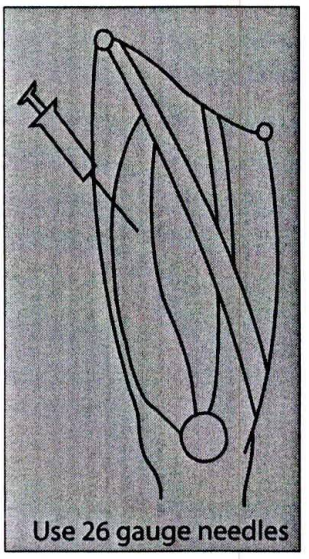


Figure 3.6: Site for IM injection for a NB

5. Check APGAR AT 1 AND 5 MINUTES

1. Assess the newborn at 1 minute for respiration, activity, grimace, pulse/ heart rate, and appearance. As given in the Table 3.1
2. Alert yourself if APGAR is less than 7. Watch the newborn carefully. Stimulate if needed. Keep the newborn warm. Resuscitate if needed. Refer as soon as possible to a higher center.

Table 3.1: APGAR scoring chart

Indicator	0	1	2
Respiration (breathing / cry)	Absent	Slow, irregular, weak cry	Good strong cry
Activity (muscle tone)	Flaccid/floppy (looks very weak	Limited movement / some flexion of extremities	Moves all extremities spontaneously / good flexion
Grimace (frowning face, irritability)	No responses	Grimaces, weak cry to stimulation	Cries / pulls away to stimulation
Pulse (heart rate)	Absent	Less than 100	More than 100
Appearance	Pale/blue	Blue extremities / body pink	Pink/red body and extremities

3. The APGAR (short form for each indicator Appearance, Pulse, Grimace, Activity and Respiration) score is assessed by evaluating the newborn on five simple indicators on a scale of zero to two. The score range is from 0 -10.

❖ Inference of APGAR score

- More than 8 = normal
- Less than 7= indicates asphyxia

3.5 Mentoring skills

Sample example for mentoring – observation

Instructions for mentor

- During a regular visit to the PHC make a random check of the following items as given as given in Table 3.2
- After the observation tell the staff nurses about your observations starting and ending with good points. Also highlight the points for improvement
- Brief the staff nurses and other members on the importance of maintaining the warm chain. Use information given in Table 3.2
- Help them to make a plan on what they would want to achieve by the next mentoring visit

Table 3.2: Warm chain maintenance checklist

At Birth	*Y/N*	*After Delivery*	*Y/N*
Delivery room temperature is warm (25°C/77°F)		Newborn kept with the mother in the same bed	
Windows / doors closed to avoid drafts		Newborn clothed adequately wrapped with head covered	
Newborn dried immediately		Newborn wrapped with clean cloth or towel	
Wet towel/ cloth removed		Bath not given for the first 24 hours	
Newborn kept on mother's abdomen or between breasts for skin to skin contact		LBW newborns are given Kangaroo mother care (KMC)	
Newborn wrapped with clean dry cloth			

Sample example for observation - "Clean chain to prevent infection" during a mentoring visit

Instructions for mentor

- During a regular visit to the PHC make a random check of the following items as given in Tabe 3.3
- After the observation tell the staff nurses about your observations starting and ending with good points. Also highlight the points for improvement
- Brief the staff nurses and other members on the importance of maintaining the clean chain. See information given in Table 3.3
- Help them to make a plan on what they would want to achieve by the next mentoring visit

Table 3.3: Clean chain maintenance checklist

Clean delivery	Y/N	After delivery	Y/N
Attendant's hand clean (wear gloves)		All caregivers wash hands before handling the newborn	
Delivery surface clean		Only breast milk given, clean feed	
Cord cutting instrument is clean		Clothes worn for the newborn are clean	
Cord tie / clamp is clean		Nothing is applied on the cord. It is clean and dry.	
Cloth used to wrap the newborn is clean		Napkin changed whenever soiled/wet	
Mother used clean cloth to wrap self		Eyes are clean	

Sample case sheet audit

- Check if vital signs are recorded in the case sheet
- Check the newborn's breathing and temperature every 15 minutes for the first hour and then hourly (See Table 3.4)

Table 3.4: What to audit in the case sheet for care of newborn

Parameter	What to Look for
Breathing	Look in the case sheet to see if breathing is recorded every 15 minutes for the first hour Check if any abnormalities are recorded
Colour	See if colour of the newborn is recorded every 15 minutes for the first hour Note if any abnormality is recorded. Check the recording with an examination of the newborn
Warmth	Counter check if temperature of the newborn is recorded every 15 minutes for the first hour Observe directly Does the mother know how to check temperature by touch method? This could have been taught by the staff nurses Can the mother recognise if the newborn's skin is mottled (spotty) it indicates low temperature
Cord	Check if any recording is made on the case sheet about the cord such as bleeding or discharge.

Sample: How to do one to one mentoring for example on identification of malformations

Instructions to mentor

- ❖ The chart (Table 3.5) could be a guide for you to teach staff nurses
- ❖ This could be a planned teaching, done later once the staff nurses have learned more important skills
- ❖ Teach staff nurses to identify malformations (see Table 3.5)

Table 3.5: Identify malformations / problems

Ask	Look for	Feel for
✓ Antenatal details such as drug abuse or any other problems	✓ Any breathing difficulty	✓ Any swelling
✓ Any investigations done during pregnancy that showed a specific defect	✓ Colour: any cyanosis	✓ Capillary refill time
✓ Newborn passed meconeum within 24 hours; urine within 48 hours	✓ Any drooling of saliva	✓ Palpate the abdomen
	✓ Flat abdomen and bulging chest	✓ Feel for testes in male newborn
	✓ Any defect in lips or palate	
	✓ Any swelling on head	
	✓ Symmetry and posture	
	✓ Any bulge or sac on the back	
	✓ Anal opening	
	✓ Simian crease	

- ❖ Help staff nurses to recognise malformations: Although malformations are not very common (see against each malformation approximate time of occurrence), it is important that life threatening malformations are identified immediately, initial action is taken and referral is made to a higher center as soon as possible.

How to recognise	Malformations
❖ Breathlessness, cyanosis, empty abdomen	- Diaphragmatic hernia
❖ Drooling sometimes with cyanosis	- Tracheo esophageal fistula every 4 yrs.
❖ Anal opening absent	- Anorectal malformation every 10 yrs.
❖ Swelling on head that does not cross suture	- Cephalhematoma once every 2mons.
❖ Cyanosis	- Congenital heart malformation
❖ Swelling on back	- Spina bifida once every 5 yrs.
❖ Opening on palate, newborn chokes when feeding	- Cleft palate once every 1.5 yrs.

- ❖ Teach staff nurses to provide initial management for newborns with malformations
  - Provide immediate care: warmth, cord care, eye care, Vitamin K and initiate breast feeding if not contraindicated
  - Refer urgently for immediate management:
    - Newborn with respiratory distress
    - Newborn with drooling
    - Newborn with cyanosis
    - Newborn who has not passed meconium x24 hours
    - Newborn who has not passed urine x48 hours
  - Any newborn with a malformation – to see the doctor within 1 week
- ❖ Teach staff nurses to monitor
  - Help staff to maintain a register of all newborns that have been referred to a higher center for any malformation. This can provide important information on the quality of care provided by the staff nurses

3.6 Key Messages - Do's and Don'ts

Do's	***DO be prepared.*** Make sure all necessary equipment and supplies are available and functional in the newborn corner. Being prepared makes it easy to complete the task faster.
	DO place the newborn immediately on the mother's chest/abdomen and dry with a warm cloth. This encourages skin-to-skin contact, keeps the newborn warm and promotes bonding.
	DO check if the newborn is breathing and active soon after birth. Decide on need for resuscitation depending on whether or not the newborn is breathing, crying actively and is pink
	DO check the APGAR score at 1 minute and 5 minutes to have an idea of health outcome of the newborn
	DO wait to clamp and cut the umbilical cord till it stops pulsating,
	DO give Vitamin K injection intramuscularly to all newborns to help prevent hemorrhagic disease of the newborn.
	DO assist mother to initiate immediate breastfeeding. This releases oxytocin in the mother. This helps contract the uterus and prevent postpartum hemorrhage.

Don'ts	***DO NOT delay in deciding if the newborn requires resuscitation*** or not.
	DO NOT expose the newborn to external environment as it can cause sudden drop in its body temperature.
	DO NOT milk the umbilical cord before clamping and cutting it, since this procedure has been linked with increased chance of neonatal jaundice.
	DO NOT delay cutting the umbilical cord for those newborns requiring resuscitation
	DO NOT delay in initiating breastfeeding. If the newborn breastfeeds early, will be established faster.
	DO NOT forget to observe the newborn every 15 minutes for the first 1 hour of life
	DO NOT forget to change the newborn's napkin if wet or soiled, cover the head and feet always
	DO NOT wrap the newborn too tight so that movements of the newborn is prevented

Chapter 4 Newborn Resuscitation including Preparation of Newborn Corner

Learning Objectives

By the end of this chapter you will be able to

- Recall the steps in basic newborn resuscitation with their indications and rationale
- Demonstrate the steps of basic resuscitation on the mannikin.
- Demonstrate accurate documentation of basic neonatal resuscitation measures done for the newborn
- Demonstrate mentoring skills for basic newborn resuscitation

4.1 Introduction

The first few minutes soon after birth are important for the health of the newborn. It is important to make sure that the newborn has a strong cry or breathes soon after birth. Approximately 10% of newborns require some assistance to begin breathing at birth. Of these newborns, about 1% would need extensive resuscitative measures to survive. It is sometimes hard to predict which newborns require resuscitation. Hence it is important to be prepared at ALL times.

If initial steps of resuscitation are started as soon as required, it could help reduce long term sickness like seizures, cerebral palsy and other disabilities and developmental delay or even death. Trained PHC staff and a well equipped PHC are important factors for effective resuscitation.

4.2 Components of Basic Newborn Resuscitation

Anticipate before delivery

- Do a thorough initial assessment of a mother in labour at admission
- Keep all equipment, articles and supplies needed for resuscitation always ready for use

Key to Successful Resuscitation

- Anticipate – keep articles/supplies/equipment ready
- Be prepared – see that articles and equipment are always in working order
- Call for help – to initiate resuscitation quickly step by step

Be ready ALWAYS.
A newborn might require resuscitation ANYTIME

Figure 4.1: Key to Successful Resuscitation

Assessment at birth and be ready to resuscitate if the newborn does not cry / breathe at birth

- Follow the protocol always to decide when a newborn needs resuscitation as given in the Table 4.1 and the Neonatal Resuscitation Chart (Figure 4.2)

Table 4.1: How to decide when to resuscitate a newborn at birth

The newborn is crying at birth	The newborn is not crying but the chest is rising regularly at 30 to 60 times per minute
• NO resuscitation • NO routine suctioning • Give back to mother • Give routine care	• NO help if chest is rising 30-60 times per minute and colour is good • Give back to mother for skin-to-skin contact • NO suctioning needed
The newborn is gasping, does not breathe regularly and there are long between each breath	**The newborn is not breathing**
• Give help to breathe • START resuscitation within1 minute	• Needs help immediately with breathing • START resuscitation within 1 minute

Perform initial steps of resuscitation if the newborn does not breathe or cry soon after birth

- Call for help
- Maintain warmth of newborn
- Keep airway open by positioning newborn in sniffing position and suctioning mouth and nose
- Give tactile stimulation to the newborn.

Provide positive pressure ventilation (PPV) even if after 30 seconds of initial steps newborn does not improve

- Use bag and mask to provide PPV at a rate of 40-60/minute.
- Check heart rate after 5 inflations and chest rise

Evaluate the effectiveness of PPV after 30 seconds

- Check heart rate and breathing
- Continue bag and mask if heart rate is good (more than100/minute) but breathing is still less
- Add oxygen with bag and mask ventilation

Initiate chest compressions if after 30 seconds of PPV, HR less than 100/minute

- Start chest compressions if after 30 seconds of PPV heart rate continues to be less, at a rate of 3:1 (compression to breath delivered through bag and mask).

Refer for further management if no improvement

- Continue same steps till the newborn can be transported to a higher center or stop if after 20 minutes no improvement and the newborn fails to breathe

If newborn improves, give post resuscitation care

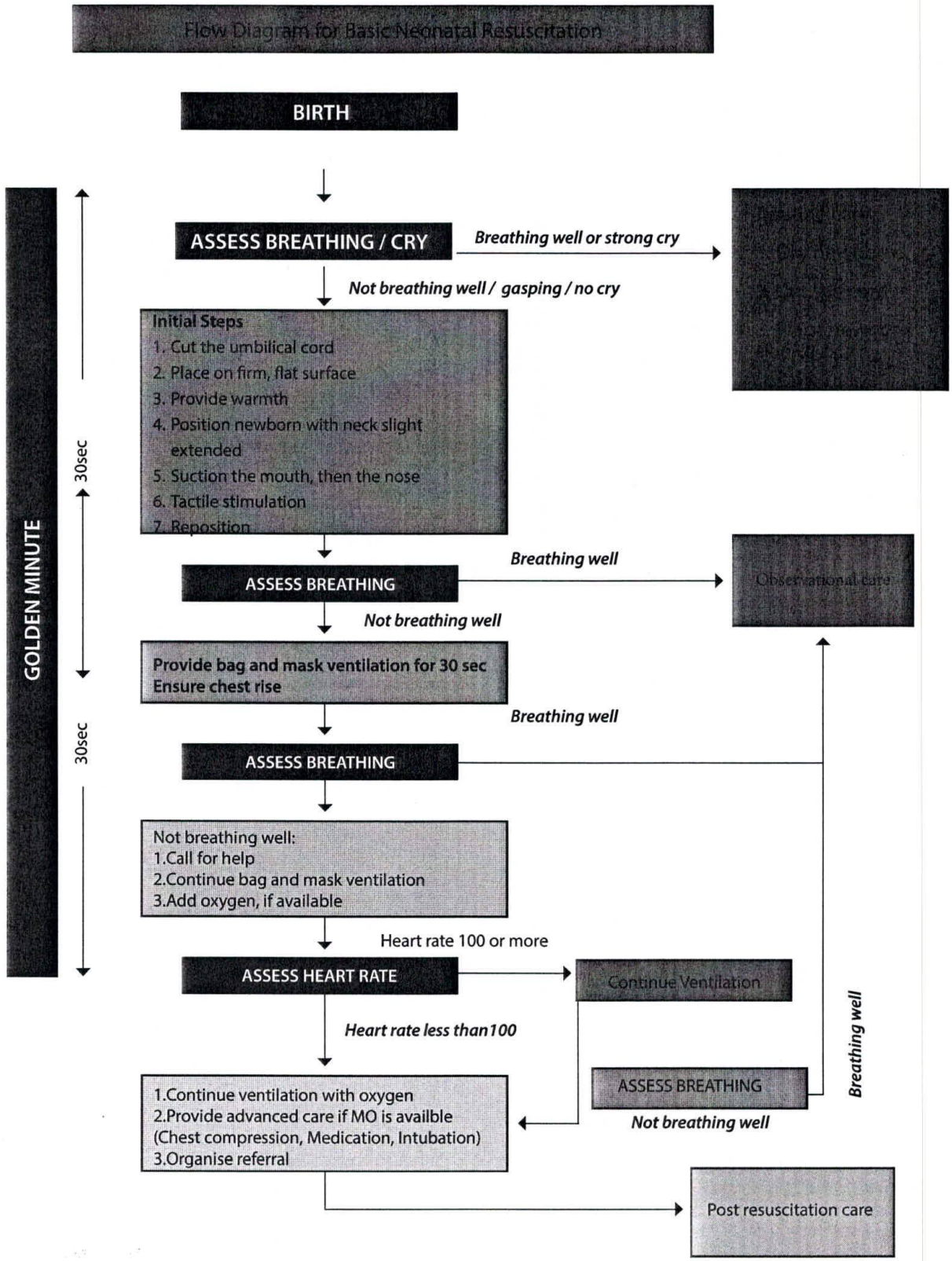


Figure 4.2: Flow chart for resuscitation

4.3 Important of Components

Anticipate before delivery and preparation of newborn corner

- The need for newborn resuscitation can be anticipated by presence of risk factors. Be alert of the need for resuscitation in a mother with chronic illness, bad obstetric history; pre eclampsia, multiple pregnancies, a preterm delivery, abnormal presentations of the fetus, cord prolapse, prolonged rupture of membranes or of labour, meconium stained liquor. But for at least half of newborns the need for resuscitation at birth may not be predicted before delivery. Therefore it is important, to be prepared at every delivery for resuscitation.
- Being prepared could prevent loss of time, and thus promote better health outcomes. Being ready includes, seeing that the temperature of the delivery room is comfortable (not too cold) –ideally more than 25°C (more than 77°F). This will help the newborn to keep warm and to transition from intra uterine to extra uterine environment.
- A newborn corner must be made in one part of the labour room. This must
  - Have clear floor space: 20-30 square ft in size,
  - Have large enough space to keep the radiant warmer and for personnel to resuscitate the newborn
  - Be away from draught of air, so that the temperature of the newborn can be maintained.
  - Have enough space to keep the oxygen cylinder so that oxygen could be administered if needed.
  - Have an electric outlet
  - Radiant warmer since any newborn requiring resuscitation would need to be kept warm;
  - Suction apparatus for airway suctioning
  - Other articles and equipment required such as gloves, bag and mask, feeding tubes, DeLee's mucus trap, suction catheter and oxygen cylinder / source with flow meter and humidifier must always be ready for use.
- The PHC staff must check the equipment and articles at each shift to ensure that they are clean and in working condition. This could reduce the chance of infection and thus promotes better health outcomes.

Assess newborn at birth and be ready to resuscitate based on protocol

- It is normal for a newborn to have a strong cry soon after birth. This is an indication that breathing has been initiated. However few newborns may not cry immediately after birth. A newborn, who does not cry soon after birth or gasps, is a flag to take immediate steps to help the newborn breath.
- The first minute is considered the golden minute and any action must be initiated before this one minute.
- Ask the following question at birth
  - Is the newborn crying or breathing? If yes, it means that there is no problem
- But if the answer is no to any one of the questions above, then it is important to begin initial steps within seconds of birth.
- Ventilation would be the most important step if the newborn is not breathing. It can improve the heart rate of the newborn. Ventilation also decreases the chance of hypoxic (reduced oxygen supply) injury to the brain. This could help prevent long term damage.

Perform initial steps of resuscitation

- The initial steps of resuscitation include providing warmth by placing the newborn under a radiant heat source, positioning the head in a sniffing position to open the airway, clearing the airway with a suction catheter or DeLee's mucus trap, drying and stimulating the newborn. The initial steps must be able to help the newborn establish regular respirations that are sufficient to improve colour and maintain a heart rate.
- A heat source will help in reducing the risk of hypothermia, and this will stabilise the newborn faster. Drying the newborn with a warm towel can help in preventing heat loss. A newborn who has cyanosis (acrocyanosis/central) must be warmed fast for better health outcomes. Acrocyanosis (blue colour of hands and feet alone) is a flag for cold stress. Central cyanosis (blue discoloration of trunk, extremities and mucus membranes is a flag for low levels of oxygen circulating in the body (see Chapter 6).
- By opening the airway and clearing the air passages of secretions, a newborn that is not very sick will be able to achieve and maintain pink mucus membranes (lips) without supplementary oxygen. It is important to remember that this transition is a slow process.
- Rubbing the newborn gently on the back or the feet could help in stimulating the newborn to breathe sooner.

Provide positive pressure ventilation after 30 seconds of initial steps

- Providing PPV means you are forcing the newborn to get oxygen within the first few minutes of life.
- If after initial steps the newborn still does not breathe, it indicates that the newborn would require help. PPV administers room air through mask to the newborn provided the airway is clear of secretions and the airway is open by a good position. This is enough to help the newborn breathe.
- The bag must be compressed at a rate of 40-60 times/minute to be able to get a heart rate to more than100 beats/minute. The bag and mask gives only 21% oxygen. This is enough for the first 30 seconds of PPV. If the heart rate (HR) does not increase or the breathing does not improve after 30 seconds of PPV this is a flag to give more oxygen. If an oxygen tube is connected to the bag, 40-60% oxygen is administered. But if a reservoir is connected to the bag, 100% oxygen is given.
- The pop up valve of the bag would help in delivering the required pressures of 30-40cm of H_2O.

Evaluate the effectiveness of ventilation

- Evaluate the effectiveness of PPV after 30 seconds of its administration.
- PPV is considered as effective when there is increase in HR, improvement in colour and tone, audible breath sounds and chest movements. But if these signs are not seen, then it is a flag more advanced resuscitation steps.

Initiate chest compressions after 30 seconds of PPV with 100% oxygen, if HR less than 60 beats/minute

- Chest compressions would be needed if the myocardium (heart muscle) is depressed because of low oxygen levels. Mechanical pumping of heart would help to increase the perfusion to the lungs and thus reduce these effects.
- Chest compressions mean compressing the chest externally just above the xyphoid sternum, one third the depth of chest wall, so that the heart is pressed against the spine. This will help to increase the intrathoracic (space between ribs) pressure. Thus blood circulates to the vital organs.

- The PHC staff must reassess the condition of the newborn after 30 seconds to a minute. It can be stopped when HR more than 60 beats/minute.

Refer for further management

- All those newborns who required initial steps of resuscitation could be transferred to the mother's side. However these newborns must be monitored frequently for the first two hours to see if all was well with them.
- Those newborns who required PPV or more advanced resuscitation must be referred for further management as they might require intensive care

If newborn improves provide post resuscitation care

- Post resuscitation care is essential to know whether the newborn has stabilised or not.
- A newborn who has stabilised would have a heart rate between 120-130/minute; respiratory rate 40-60/minute; posture would be flexed; they would be active; colour would be pink.
- Thus monitoring these vital signs every 15 minutes for the first hour and every half an hour for the next hour would help to know if the newborn has stabilised before referring to a higher center for further management.

4.4 Requirements for Newborn Resuscitation

Equipment and supplies

- Ambu bag (250-500ml)
- Cord clamps
- Delee's mucus trap (Figure 4.3)
- Dextrose 5-10% for IV drip
- Glucometer
- Epinephrine 1:10,000 (if 1 ml ampoules of epinephrine 1:1000 is available then it must be diluted in 10ml of saline)
- Feeding tubes size 6 and 8
- Gloves
- Mask (0-1 size)
- Needles 23, 24, 26 Gauge
- Normal saline sterile to clean eyes
- Oxygen cylinder
- Oxygen tubing
- Radiant warmer and or 200 watt bulb source with electric outlet
- Ringer lactate for IV drip
- Scalp vein sets
- Shoulder rolls
- Sterile cotton swabs to clean eyes
- Stop clock indicating seconds and minutes

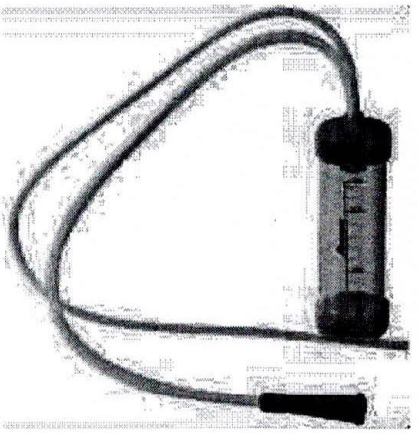


Figure 4.3: Delee's mucus trap

- Suction tubes 8,10 size
- Syringes 2, 5, 10cc
- Warm towels

Clinical skills

Checking EQUIPMENT/SUPPLIES IN NEWBORN CORNER

1.Test all equipment and articles for working condition and availability

2. Bag and Mask

- Check if clean. Clean with soap solution and keep dry. Wrap with plastic sheet for next use after checking working condition
- Fit mask onto the bag (Figure 4.4) and deliver test breaths against the palm of hand. If you feel pressure in the palm as the bag is squeezed, it is working well (Figure 4.5).
- Once you release after squeezing the bag, it must re inflate quickly

3. Radiant warmer

- See that the radiant warmer tray is clean and dry. Clean with soap solution with a piece of cloth and dry daily.
- Check radiant warmer/overhead lamp. Switch on at least 20 minutes before anticipated time of delivery.
- In the event of power failure use a 200 watt bulb source, close the windows to avoid any direct wind to the newborn. Keep two clean dry towels/clothes to wrap the newborn.

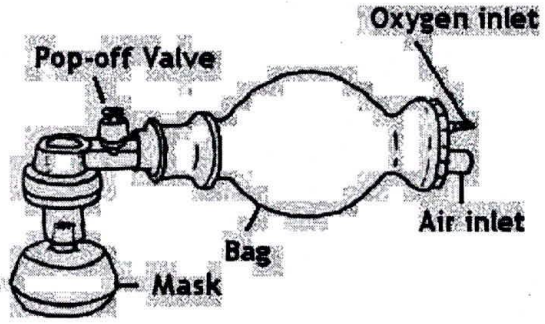


Figure 4.4: Bag and mask

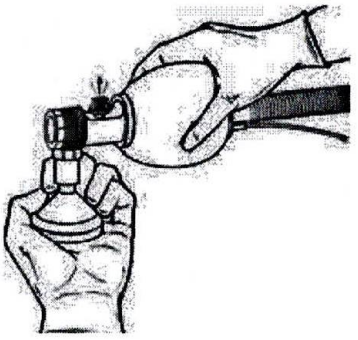


Figure 4.5: Testing bag and mask

4. Suction apparatus

- Use mucus extractor that has a trap (20m). Remember it is for single use only. Discard in appropriate plastics bin after use.
- Check if suction apparatus is working. See that suction is not more than a negative pressure of 100mmHg or 130 cm of H_2O.

5. Oxygen cylinder and tubing:

- Clean cylinder and tubing daily or as per need with soap solution and wipe dry.
- Check if the cylinder has sufficient oxygen at each shift. Keep a spare cylinder ALWAYS.

- Check if the oxygen flow meter is working, so that you can deliver 5-10L/minute of oxygen when needed.
- Keep cylinder close to newborn corner as well as for mother if needed
- Use a "Y" connection so that the same cylinder could be used for both newborn and mother if needed.

6. Laryngoscope

- Clean the laryngoscope and blade with spirit and see that it dries.
- Check if the bulb is working by extending the laryngoscope blade
- Remove battery and keep close at hand so that it could be replaced immediately when needed.

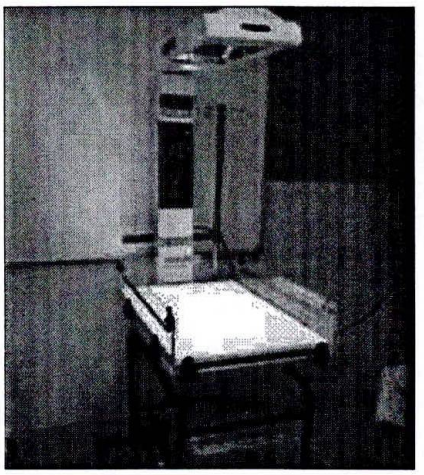


Figure 4.6: Radiant warmer

Providing INITIAL STEPS OF BASIC NEWBORN RESUSCITATION

1. Decide if routine care is needed – newborn crying/breathing; active; pink in colour; warm;
2. Provide a warm environment (See Chapter #)

- Keep resuscitation equipment on the radiant warmer locker so that it can be accessed easily when needed
- Put radiant warmer on 20 minutes before its anticipated use.

3. Position the newborn and open the newborn's airway

- Place the newborn on the back
- Position the head so that it is slightly extended (this opens the airway) (Figure 4.7)
- Place a folded piece of cloth (not too thick or too thin) under the newborn's shoulder

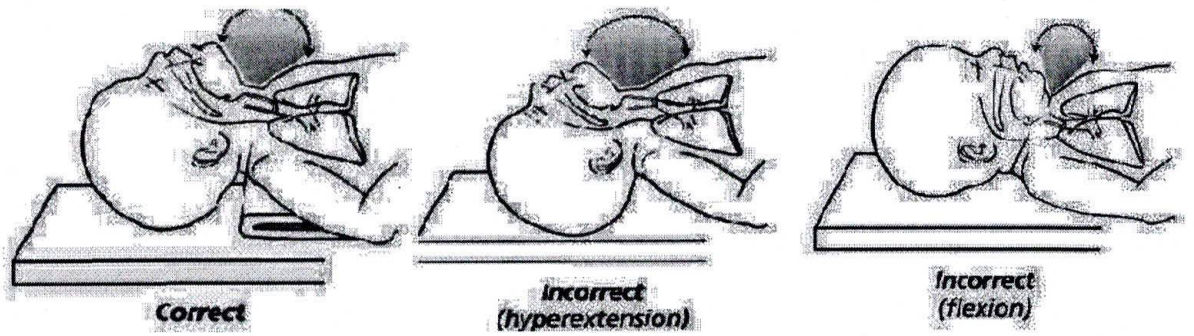
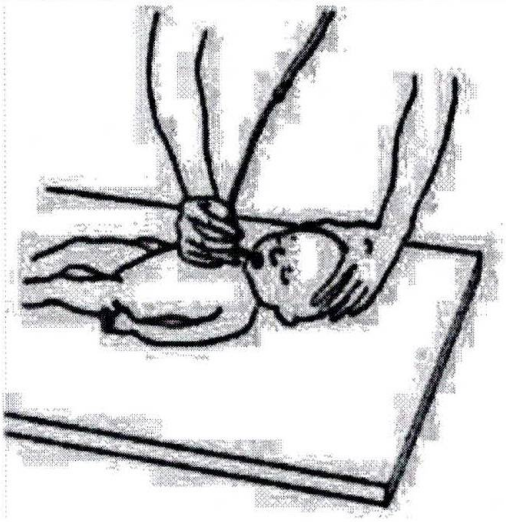


Figure 4.7: Position of the head slightly extended

4.Suction the mouth and nose

- Insert suction tube not more than 5cm beyond the lip, apply pressure while withdrawing tube
- Insert the tube 1-2 cm into each nostril, apply suction while withdrawing the tube
- Stop suctioning when all secretions are cleared



Points to remember:

Suction mouth first then nose

Routine suction of all newborns is not needed

Suctioning alone may stimulate the newborn to breath

Figure 4.8: Suction mouth then nose

5. Stimulate to breathe by using tactile stimulation (see Figure 4.9)

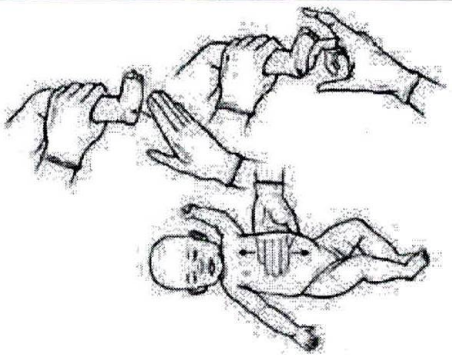
Acceptable Forms of Tactile Stimulation	Forms of Tactile Stimulation that could be Dangerous
	▯ DO NOT slap the back ▯ DO NOT squeeze the rib cage ▯ DO NOT force the thighs into the abdomen ▯ DO NOT dilate anal sphincter ▯ DO NOT use hot or cold compresses or baths ▯ DO NOT shake newborn vigorously or roughly
Use tactile stimulation gently ✓ Flick the feet ✓ Rub the abdomen with back of fingers ✓ Rub the back with the palm	**Do not use these methods at any time!!**

Figure 4.9: Forms of tacticle stimulation

6.Reassess the newborn's breathing

- ❖ Place the newborn with mother, if the newborn starts breathing after either suctioning or tactile stimulation
- ❖ Provide observational care

7.Observational care

- ❖ Keep the newborn warm and with the mother
- ❖ Teach mother skin-to-skin contact and encourage her to practice this

- ❖ Observe breathing and temperature every 15 minutes for the first one hour; every half an hour for next hour; every hour for the next 4 hours
- ❖ Look for any convulsions, drowsiness, non response
- ❖ Refer if any complications present
- ❖ Initiate breastfeeding if vigorous (active, good colour).

Starting BAG AND MASK VENTILATION (BMV)

1. Start if at the end of 30 seconds of initial steps of resuscitation, the newborn does not breathe or the breathing is abnormal.
2. Prepare for bag and mask ventilation

- ❖ Select the appropriate mask based on how well it fits the newborn's face (see Figure 4.10).
- ❖ Check the resuscitation bag and mask before usage

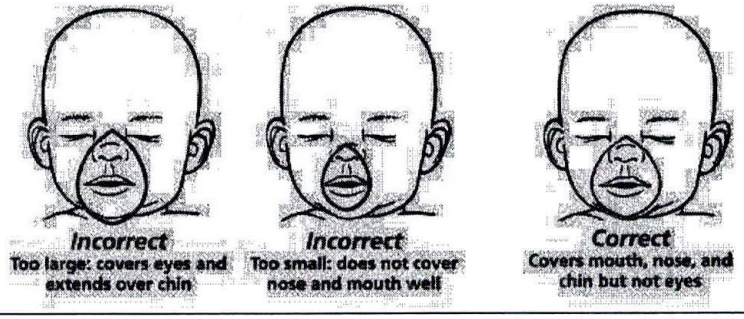
Correct and incorrect mask sizes	Remember
	The rim of the mask must cover the tip of the chin, the mouth and the nose but not the eyes Too large mask can cause eye damage and will not seal well

Figure 4.10: Correct size of mask for resuscitation

Table 4.2: Check bag and mask before using

The resuscitation bag	Remember
Check the safety mechansim in the form of a pressure release valve to prevent too much pressure to the newborn's lungs. It is set to release at 30-40cm of water. It is called the pop up valve. The ideal size of the bag is 250-500ml capacity The bag and mask must be assesmbled correctly and connected to oxygen only when indicated. When self inflating bag is used be sure to attach the oxygen reservoir.	Check if the bag and mask work by pressing the mask against your palm ✓ Feel pressure ✓ Force pressure-release valve open ✓ Valve moving well

3.Clear the airway and be assured it is open

- ❖ Suction the mouth and nose one moretime to assure the airway is clear
- ❖ Check if the newborn's head is in sniffing position
- ❖ Use shoulder roll if needed

4.Position yourself at the bedside

- ❖ Position yourself either at the side or head of the newborn (Figure 4.11)

- Control the bag with your dominant hand (right hand for the right handed person) and the hold the mask with the other hand
- Be sure that you can observe for chest movement of the newborn during ventilation

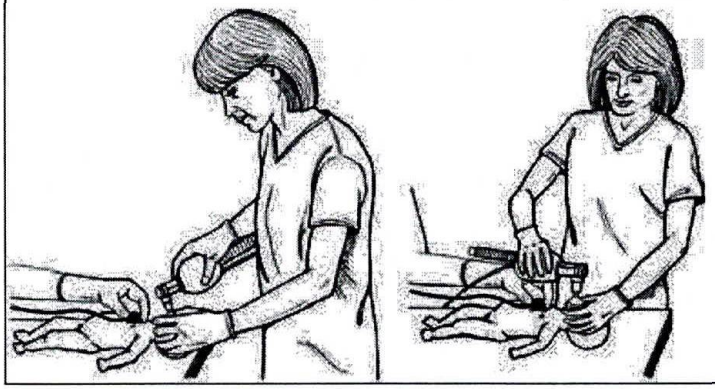
Correct positions to visualise chest movement	Be sure that you can
	Hold the mask comfortably on the newborn's face Observe chest movements of the newborn during ventilation

Figure 4.11: Position yourself at side or head of newborn for BMV

5. Position the bag and mask

- Place the mask first by cupping the chin and then cover the nose
- Ensure that the mask is placed correctly so that its rim covers the nose, mouth and tip of the chin (Figure 4.12)
- Hold the mask on the face with the thumb, index and /or middle finger encircling the rim in a 'C' shape. Use the ring and fifth fingers to bring the chin forward
- Use slight downward pressure on the rim to form an air tight seal.

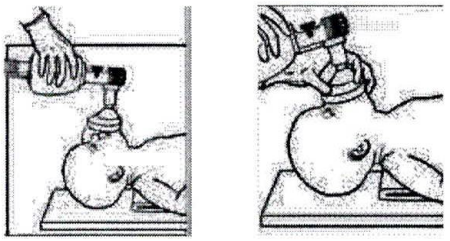
Correct position of newborn and mask	Follow these precautions
	- Do not 'jam' the mask down the face. Too much pressure can bruise the face - Do not rest your fingers on the newborn's eyes - Check for airtight seal so that ventilation is effective

Figure 4.12: Position newborn and mask correctly

6. Initiate ventilation

- Squeeze the bag with enough pressure so that chest rises gently
- Check for chest rise and heart rate after five ventilations. If no chest rise follow steps given in Table 4.3
- Deliver 40-60 breaths per minute during the initial stages of resuscitation. Say breathe-two-three, say "breathe" when you squeeze the bag; and then "two-three" when you release it, to ensure proper rate (Figure 4.13)

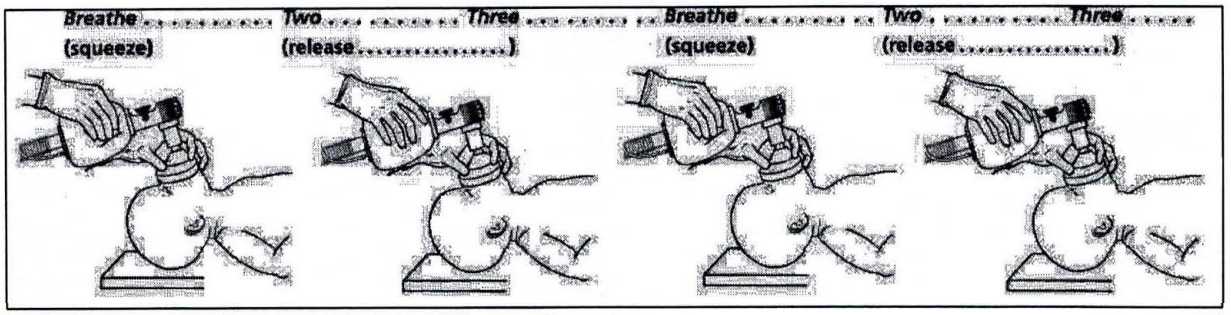


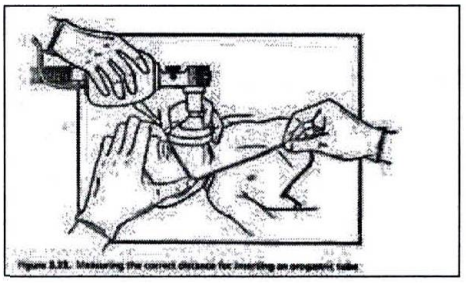
Figure 4.13: Deliver 40-60 breaths per minute

Table 4.3: Reasons for inadequate or absent chest rise

Reasons for inadequate or absent chest rise	What to do?
I. The seal is inadequate	Reapply the mask to the face. Use little more pressure on the rim of the mask Lift the jaw slightly more forward Remember the most common place for a leak is between the cheek and bridge of nose.
II. The airway is blocked	Check the newborn's position, extend the neck a bit farther Check the mouth and nose for secretions Ventilate if needed with newborn's mouth slightly open
III. Not enough pressure is being given	Increase the pressure to squeeze the bag until you can see rise of chest

7.Insert oro gastric tube

- Measure the infant feeding tube from the tip of the nose to ear lobe and then to midway between the xiphoid sternum and umbilicus
- Insert the feeding tube through mouth into the stomach
- Aspirate contents with a syringe and discard the content in kdney tray
- Fix the tube on the cheek with micropore or remove it if the abdomen is soft
- Discard the tube in the appropriate bin
- Record the amount of aspirate



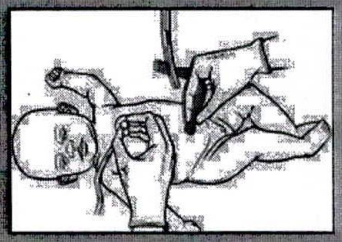
Use size 6 or 8 based on size of newborn

Discard feeding tube after use

Figure 4.14: Measure orogastric tube

8.Evaluate the effectiveness of ventilation

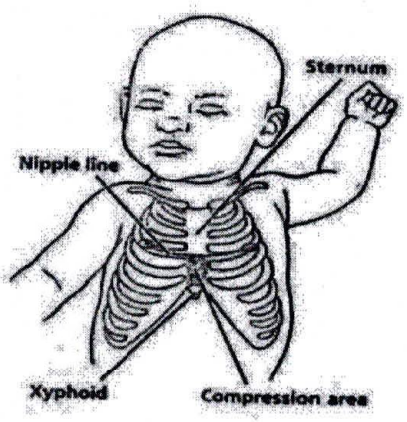
Table 4.4: Evaluate the effectiveness of ventilation

<table>
<tr><td>Spontaneous breathing</td><td>Ask yourself is the newborn breathing on its own after 30 seconds of ventilations
If yes reduce the rate and volume of breaths, watch for breathing</td></tr>
<tr><td colspan="2">❖ A newborn who is breathing well will be crying or breathing quietly and regularly (chest movements symmetric) and with frequency of 30-60/minute
❖ Stop ventilation
❖ Provide observational care</td></tr>
<tr><td>No spontaneous breathing or gasping</td><td>Ask yourself is the newborn breathing on its own after 30 seconds of ventilation
If yes, continue ventilation and do further evaluation</td></tr>
<tr><td colspan="2">❖ Call for help
❖ Continue bag and mask ventilation
❖ Provide oxygen through bag and mask if available
❖ Assess heart rate</td></tr>
<tr><td> 
Figure 4.15 Feel umbfical pulse</td><td>Feel the pulse in the umbilical cord or
Ask the person who helps you to use a stethoscope to count heart rate within 6 seconds
Multiply this rate by 10 to give you beats per minute</td></tr>
<tr><td>❖ Heart rate of 100 per minute but newborn is not breathing well</td><td>Heart rate is slow (less than 100 beats per minute)</td></tr>
<tr><td>Continue ventilation for 30 seconds
Does not change, continue ventilation and organise referral or advanced care</td><td>Continue ventilation and reassess heart rate after 30 seconds
Call doctor to provide advanced care such as endotracheal intubation, chest compressions and medications
Arrange for referral if advanced care not available</td></tr>
<tr><td colspan="2">❖ Stop all procedures if after 20 minutes of birth, there is no signs of breathing or heart rate</td></tr>
</table>

Providing EXTENSIVE RESUSCITATION

1.Start chest compression:

- Begin chest compressions if heart rate is less than 60 beats per minute.
- Locate the site on the lower two third of sternum, avoiding the xyphoid (Figure 4.16)
- Place the thumb (preferred) or fingers immediately above the xyphoid (Figure 4.17) and NOT on it
- Apply pressure one third of anteroposterior (front to the back) diameter of the chest (Figure 4.18)
- Take compression of chest followed by release as ONE COMPRESSION (Figure 4.19)
- DO NOT lift thumb or finger off the chest between compression as it would waste time, risk of trauma by compressing the wrong area or loss of control over depth of compression
- Give one chest compression and follow it with three breaths
- Count heart rate after 30 seconds and if it is above 60 per minute, stop chest compressions
- Continue bag and mask method till heart rate is above 100/minute or the newborn is breathing spontaneously



Fingers must be placed on the lower third of the sternum:

- Feel for intermammary (between nipples) line
- Feel the xyphoid
- Place finger just above xyphoid

Avoid the xyphoid process

Figure 4.16: Location of site for chest compression

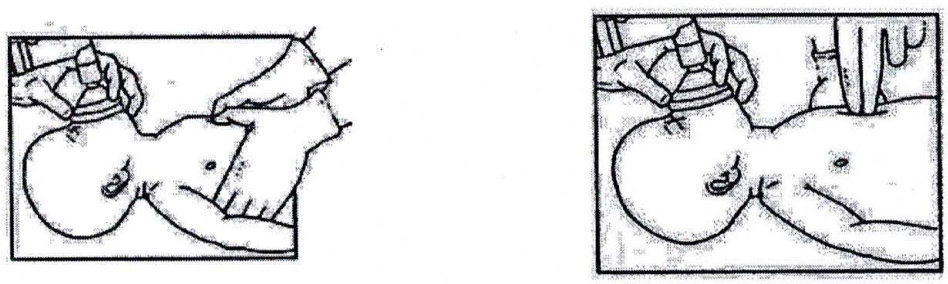
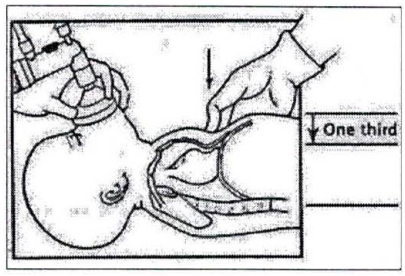


Figure 4.17: Preferred technique: thumb technique over the two finger technique

2.What is the rhythm to be followed?

- Deliver one breath, for every third compression given.
- Give in ratio of 90 compressions to 30 breaths (3:1)

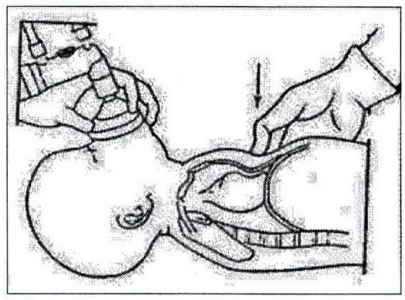


Approximately one third of the anterioposterior diameter of the chest

Do not lift fingers between compressions as you will

- Lose location
- Damage to internal organs
- Lose time

Figure 4.18: How much pressure is needed?



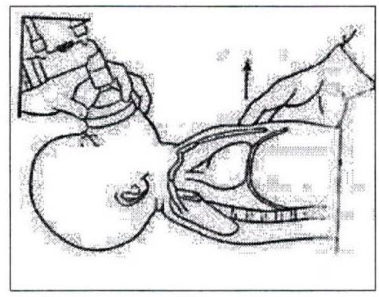


Figure 4.19: Phases of one chest compression: Apply pressure and release

3.When to stop chest compressions

- Count the heart rate, after approximately 30 seconds of chest compressions and positive pressure ventilation (bag and mask). If it is more than 60 per minute, stop chest compressions.
- Continue PPV if heart rate is 40-60beats/minute till heart rate is to "more than"100/minute or newborn is breathing spontaneously.
- Refer the newborn if no improvement and if the medical officer is available assist in endotracheal intubation before transfer of the newborn.

Provide POST RESUSCITATION CARE

1.Give newborns who have received ventilation for a short time observational care

2.Give those newborns who required prolonged positive pressure ventilation supervised medical care and refer to a higher center as sooon as possible. This includes the following

- Provide warmth
- Check the vitals (temperature, breathing, colour and capillary refill time)
- Monitor blood sugar if available or watch for signs of hypoglycaemia such as lethargy, cold extremities, drowsiness, seizures
- Initiate breastfeeding if well, or give slow feeding
- Record all information and events and refer.

4.5 Mentoring Skills

Sample case study for mentoring

Case Study 4.1 - Normal delivery

A 19 year old comes to the PHC in active labour at term. She said her bags had burst (membranes ruptured) 1 hour before arrival. Amniotic fluid was clear. She delivered a newborn girl through a normal vaginal delivery. The newborn cried at birth, became pink quickly and is placed on mother's chest to remain warm and to complete transition.

What questions will you ask to decide if action is to be taken?

Key for case study 4.1

Possible questions that I will ask to decide action that needs to be taken;

- Is this amniotic fluid clear of meconium?
- Is the newborn breathing or crying?
- Is there good muscle tone?
- Is the colour pink?
- Was the newborn born at term?

If all the answers are "yes" the newborn can receive routine care to continue transition. If the answer is "no" to any one question or if the newborn is preterm, the newborn might require some form of resuscitation.

Use A.M.M.A. approach at mentoring visits for newborn corner

1. First Visit

- Use self assesment tools, assess the availability of the equipment in the newborn corner, if any of the equipment is not functioning or not available (assess), consider the solutions if available (Table 4.3)
- Take appropriate action such as assisting staff to indent for reused equipment or teaching them how to maintain and use equipment (manage)
- Demonstrate if needed how to use various equipment. This could be planned or incidental based on the need and time available.

Table 4.5: Troubleshooting for equipment in newborn corner

Equipment	Difficulty	Trouble shooting –what can be done
Radiant warmer	No current System alarm Skin probe failure alarm Skin temperature alarm high or low	❖ Power alarm goes ❖ To keep a 200 watt bulb source always at hand. This will work with the inverter when there is no current ❖ Otherwise look for alternative source such as KMC ❖ Change warmer since there would be an error in the electric and electronic circuit. It would need to be repaired ❖ Reconnect or change the sensor as the alarm sounds when the probe sensor is not connected properly or it is not working ❖ The alarm goes when the newborn's temperature differs from the SET temperature by more than 0.5^0 C. Change from servo to manual mode with maximum output if newborn is having low temperature
Suction apparatus	No current	❖ To keep the manual operated suction apparatus or the DeLee's mucus sucker at hand ❖ Keep enough mucus suckers at hand
Oxygen tubing	Does not look clean	❖ Check how they clean the tubing ❖ Tubing with an oxygen tank needs replacing every three months, unless it is cracked or it looks dirty or there is humidified water in the tubing. ❖ The cylinder and tubing can be wiped externally with a clean damp cloth once a week unless indicated more often ❖ The tube and mask can be washed with soap and water and dried, packed in plastic bags for next use
Syringe and needles	Used needles and syringes found lying around	❖ Check with staff for what purpose the syringe and needle was used. ❖ Inform to discard in the appropriate container (for needle use needle burner / for syringe in plastic container)
Bag and mask	Bag and mask look dirty	❖ Check with staff how they clean the bag and mask, how often they clean it and when must they clean the bag and mask ❖ Inform them that the bag and mask can be washed with soap and water, dried and replaced for next use.

Mucus sucker	Only one left	❖ Check number of deliveries in a month ❖ Ask them to indent for the average number required per month plus three more if the indent happens once a month.
Laryngoscope	Bulb is not working	❖ Check if the battery is placed correctly ❖ Check if the last person who signed the checklist has signed against it. ❖ Inform staff nurse to check the laryngoscope at each shift if the bulb is working. And once it is checked to remove the battery and keep it beside the laryngoscope since it might leak when inside. ❖ The laryngoscope can be cleaned with alcohol and allowed to dry once used
Newborn corner	Dusty	❖ Check if the area has been cleaned ❖ Remind staff nurse that the surface of the radiant warmer must be cleaned with soap water solution and allowed to dry.

2. At each subsequent visit make sure to check the newborn corner for equipment/articles and supplies

- ❖ Reinforce all the positive changes that you see occurring such as the checklist is filled completely; all articles are available, equipment in working condition etc. (monitor)
- ❖ Reinforce the need for this to be maintained all the time (advocate)

4.6 Key Messages - Do's and Dont's

Do's	*DO be prepared.* Make sure all necessary equipment and supplies are available and functional in the newborn corner.
	DO clean all articles / see that all articles and equipment are cleaned before using. Soap solution can be used to clean surface of radiant warmer, suction apparatus and tubing, oxygen tubing and cylinder. The mask and ambu bag can be washed with soap and water, allowed to dry before reuse.
	DO dry the newborn immediately with a clean towel and place on the mother's chest/ abdomen if stable, cover with a second dry towel/cloth.
	DO provide routine care to the newborn if the newborn is breathing and active soon after birth.
	DO follow the protocol for starting resuscitation measures for a newborn. Remember the golden minute.
	Do refer all newborn who require either bag and mask ventilation or more intensive form of resuscitation.

Don'ts	***DO NOT delay*** in deciding if the newborn requires resuscitation or not.
	DO NOT clean the radiant warmer, oxygen tubing, etc with oil or alcohol based solution since they are easily combustible and thus not safe. Use soap solution to clean the surface of radiant warmer; oxygen cylinder and tubing's
	DO NOT expose the newborn to external environment as it can cause sudden drop in its body temperature.
	DO NOT suction mouth and nose with a bulb mucus sucker. The bulb mucus sucker could be a source of cross- infection as it cannot be cleaned easily.
	DO NOT suction using pressures more than 130cms of H_2O. This can cause a vagal response causing heart rate to slow down or breathing to stop ***DO NOT use an ambu bag without a pop up valve.*** The pop valve ensures pressure of 30-40cms of H_2O is delivered. Any pressure more than this can be harmful.
	DO NOT jam the mask down the face. Too much pressure can bruise the face
	DO NOT use 100% oxygen for newborns who are premature
	DO NOT give chest compressions without identifying the site correctly
	DO NOT lift the fingers from the chest compression site once you start administering it. This will prevent injury to internal organs and xiphoid process by wrong positioning.
	DO NOT forget to monitor the newborn once every 15 minutes for the first hour of life and once every half an hour for the next hour, till stable.

Chapter 5 Breastfeeding

Learning Objectives

At the end of this chapter you will be able to

- Recall the physiology of lactation, benefits of breastfeeding, role of the health care personnel in assisting mother to initiate and establish breastfeeding and manage breastfeeding problems
- Demonstrate how to assist a mother to establish breastfeeding
- Demonstrate where to document counselling on breastfeeding
- Demonstrate how to mentor staff on initiating and assisting women to establish breastfeeding

5.1 Introduction

Breast milk is the best food for a newborn. All healthy normal weight newborns must be exclusively breast fed till the age of 6 months. Breastfeeding has several advantages and must be encouraged as the best milk for newborns.(Table 5.1)

Table 5.1: Benefits of breast milk

Benefits to newborn	Benefits to mother	Benefits to family/society
❖ Complete food ❖ Best for newborns ❖ Easily digested and well absorbed ❖ Protects against infections (diarrhea, ear and chest infections) ❖ Promotes emotional bonding ❖ Better brain growth	❖ Helps involution of uterus ❖ Delays pregnancy ❖ Lowers risk of breast and ovarian cancer ❖ Decreases mother's workload	❖ Saves money ❖ Promotes family planning ❖ Decreases need for hospitalization ❖ Contributes to child survival

5.2 Components of Implementing Breastfeeding Practices

Preparation during pregnancy

- Do a breast examination
- Counsel on benefits of breastfeeding
- If HIV positive counsel about benefits and risks of breastfeeding and dangers of mixed feeding (giving both breast milk and artificial milk). Help a woman make choice of feeding based on availability, feasibility, acceptability, affordability, safety, sustainability and support (AFAASSS). "Only if the woman is sure that she can say yes to AFAASSS, can she be supported to give alternate feeding. However it must be her choice.
- Ask history
- Is this your first newborn?
- How did you feed your previous newborn for the first 4-6 months?
- Did you give your newborn...food? If so when? and why?
- How do you plan to feed this newborn?

Preparation during labour and delivery

- Avoid use of sedatives unless absolutely essential
- Give extra support and encouragement to high risk mothers and those who had caesarean section
- Place newborn on mother's abdomen or between breasts. This stimulates the oxytocin reflex and milk will be secreted easily

Helping mother to breastfeed

- Prepare the newborn and the mother by placing newborn with direct skin-to-skin contact between mothers breast
- Demonstrate correct position for breastfeeding
- Assist mother to support her breast
- Help her to help the newborn to attach to the breast
- Check if newborn is suckling and swallowing effectively and feed is adequate

Express breastfeeding if needed

- Identify mothers who have to be taught the skill
- Educate and teach mothers how to express, store, feed the newborn expressed breast milk

Manage breastfeeding difficulties

- Assess breastfeeding problems daily
- Teach mother how to manage various breastfeeding problems such as inverted nipple. Sore nipple, breast engorgement, too little milk, breast mastitis

5.3 Importance of Components

Preparation during pregnancy

- All women must have their breasts examined during pregnancy When a woman comes for antenatal visits, she must be educated about breastfeeding, its advantages and examined for any possibility of feeding difficulty (flat nipple) or asked about any previous history of such difficulty. This could reinforce that a woman could be successful in breastfeeding and identify mothers with potential problems for breastfeeding.
- In addition a woman with a flat nipple or inverted nipple could be taught how to manage the same during pregnancy so that she will be able to feed her newborn without much difficulty in the postnatal period.

Preparation during labour and delivery

- It is known that if a woman is given adequate support during labour and the early postnatal period, breastfeeding outcomes are better both in the immediate postpartum period as well as several weeks after birth.
- Pain during labour that is beyond the woman's ability to manage, could also have a negative impact on breastfeeding. A woman who has had an episiotomy could also have a lot of pain. This could affect the let down reflex and thus milk will not flow easily to the newborn. A woman in pain is a flag to the PHC staff to look for breastfeeding difficulty.
- Breastfeeding success is also affected by the behaviour of the newborn. Depressed or delayed suckling which can be caused by medications given to the mother, could lead to delayed or suppressed lactogenesis (production of breast milk) and this is a flag to act by the PHC staff.

Helping mother to breast feed

- The newborn's suckling instincts are very strong soon after birth. However a mother soon after birth might be very exhausted. This might prevent her from making efforts to help the newborn to feed. Thus keeping the newborn with skin-to-skin contact soon after birth between the mother's breasts has several advantages:
  - The smell of the newborn could stimulate milk to be secreted
  - Breast milk smells similar to amniotic fluid. Thus in the first half an hour after birth when the newborn is very alert, this could help the newborn search for breast milk (remember the breast crawl video)
  - The newborn will naturally search for feed when placed in contact with skin.
  - It keeps the newborn warm. This could prevent the newborn from losing energy. The newborn will be active and thus be able to feed
- Getting started with breastfeeding however does not come naturally. Both mother and the newborn may need practice at breastfeeding. Thus it is important that PHC staff help the mother to assume the most comfortable position and the newborn to latch correctly.
- Mothers with newborns who have cleft lip and palate might require extra help to initiate breastfeeding using the dancers hold. "Refer such newborns to a higher center, as soon as stable". The dancers hold helps to support the breast as well as the jaw of the newborn (Figure 5.1).
- The football hold/underarm position can be used for mothers to feed twins. This can help both newborns to feed together. In addition if one newborn is suckling well, it would stimulate the milk to

drip from the other breast. The newborn who does not feed will automatically start drinking as milk drips in his/her mouth

Expressing breast feed if needed

- Not all newborns can breast feed directly at birth. Some examples are premature newborns. These newborns may not attach on breast easily. Such mothers and newborns could be helped by expressing breast milk. Expression of breast milk could also help mothers who have engorged breasts or those who have to be out for a long time.
- Expression of breast milk can be done using the hand efficiently. We do not need any special equipment to express breast milk. The oxytocin or let down reflex helps women to relax and breastfeed. Skin-to-skin contact stimulates oxytocin reflex. Secondly gently massaging breasts and asking the mother to relax could stimulate the milk to flow easily.
- It is important that the thumb is placed 4-5cm away from the nipple and other fingers below so that they form a "C" around the areola. The fingers are squeezed together, pushing the hand back against the chest wall. This must be continued in a circular motion around the areola. If the finger and thumb is too close to the nipple the squeeze will hurt and be ineffective as the ducts will not be compressed. If a mother has pain when she expresses breast milk it is a flag she is using the wrong technique.

Managing breast feeding difficulties

- Most breastfeeding problems can be prevented or managed. It is important to teach mothers how to manage the various difficulties. The various difficulties include inverted nipple, sore nipple, breast engorgement, too little milk, mastitis.
  - ***Inverted nipple***: This must be detected in the antenatal period and corrected then. But if not corrected then it must be corrected in the postnatal period. A newborn suckling at the breast is the best remedy. There are other ways by which it could be corrected such as by using a syringe. If a mother is feeding only from one breast, it could be a flag that she might be having difficulty feeding from the other. Hence it is important to examine the breasts of the woman and assist her.
  - ***Sore nipples:*** Are common among new breastfeeding mothers especially in the first week. Sore nipples are a flag to poor attachment or thrush (yeast infection of the mouth) in the newborn that could spread to the mother.
  - ***Breast engorgement:*** This is most likely to occur in second to the fifth day after birth. It would be normal for the breasts to feel heavier, little tender as they begin to produce greater quantities of milk. Some of the fullness could be due to extra blood and lymph fluid in the breast tissue. However it is a flag that the mother is not feeding the newborn frequently or thoroughly enough to drain the breasts.
  - ***Low milk supply:*** Many women think that their milk supply is inadequate. This is most often when they first begin to breast feed, or if milk stops leaking from nipples or they lose the feeling of fullness in the breasts. However these are signs that the body has adjusted to the newborn's feeding requirements. However if a woman voices this feeling it is a flag to check if the mother is feeding the newborn often enough. Reasons for this could be because of nipple pain, lethargic newborn, poor latch on.
  - ***Mastitis:*** When the breast become painful, hard, red, feel warm and inflamed (usually one breast at a time) it is called mastitis. It might be a flag for infection or caused by milk staying in the breasts. Infection might result from cracked nipples. Stress, fatigue and first time mothers are at higher risk of mastitis.

5.4 Requirements to Initiate Early Breastfeeding for Newborn

Equipment and supplies

- Syringe 10cc to express breast milk or for inverted nipple
- Cups with a lid to collect expressed breast milk
- Paladai to feed expressed breast milk
- Soap and water to wash hands

Clinical skills

Implementing GOOD BREASTFEEDING PRACTICES

1. Preparation during pregnancy:

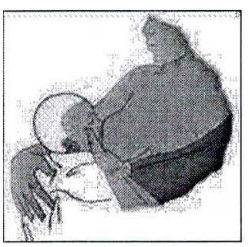
- Do a breast examination
- Counsel on benefits of breastfeeding
- If HIV positive counsel about benefits and risks of breastfeeding. Help a woman make choice of feeding based on availability, feasibility, acceptability, affordability, safety, sustainability and support
- Ask history of how she fed previous newborn

2. Preparation during delivery

- Avoid use of sedatives
- Give extra support and encouragement to high risk mothers and caesarean mothers

3. Help a mother to breastfeed

Dancer's hold



Football hold

Figure 5.1 Position for breast feeding

Table 5.2: Steps to intiate breastfeeding

Step 1	***Prepare the newborn and mother*** ❖ Ensure newborn is clinically stable and alert. ❖ Place the newborn with skin-to-skin contact between mother's breasts. ❖ Check if the mother is comfortable and relaxed in a convenient position. Encourage to initiate breast feed within half an hour of birth

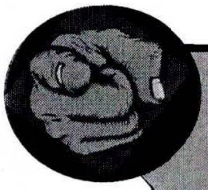
Step 2	***Demonstrate positions for breastfeeding*** ❖ Help mother to assume the different positions (Figure 5.1 and 5.2) based on her comfort ❖ Check if newborn's position is correct ❖ Remind her to always support the newborn's back and head with one arm ❖ Assist her once and then supervise when she decides to feed the newborn, even when providing KMC
Step 3	***Show mother how to support her breast with other hand*** ❖ Put her fingers below her breast ❖ Use her first finger to support the breast ❖ Put her thumb above the areola, helping to shape the breast ❖ Avoid keeping her fingers near the nipple using a scissor shape since it will compress the duct
Step 4	***Show mother how to help the newborn to attach*** ❖ Ask mother to express little milk on her nipple ❖ Touch the newborn's cheek to her nipple. The newborn will naturally turn in the direction of the breast. ❖ Wait until newborn's mouth is wide open, and tongue is down and forward. Help the newborn attach by supporting the head ❖ Avoid keeping her fingers near the nipple ❖ Look for signs of good attachment
Step 5	***Assess if newborn is suckling and swallowing effectivelyand adequacy of feed*** ❖ Check if newborn is sucking effectively ❖ Observe if newborn is sleeping enough, contended and alert when awake ❖ Encourage to feed on demand during day and night ❖ Check if breastfeeding is adequate for newborn by the following signs • Passes urine 6-8 times in 24 hours • Goes to sleep 2-3 hours after the feed • Gains weight at the rate of 10-15 gm / day • Look for signs of good attachment

Underarm –football hold Position

Using the opposite arm

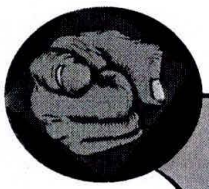
Mother in lying down position

Figure 5.2 Positions for breastfeeding



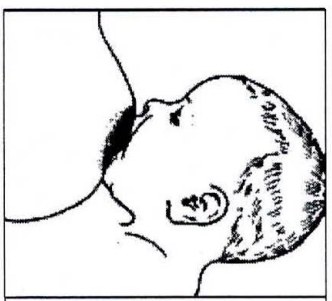
Remember: Regardless of position, newborn's position is correct if newborn's

- Head and body is straight
- Face, faces mother's breast
- Body is close to mother's body
- Body is fully supported



Remember

Skin-to-skin contact as soon as the newborn is born and rooming in are two important factors that aid in initiating breastfeeding



Good attachment | Poor attachment

Four key signs of good attachment

- ✓ More aroela is visible above the newborn's mouth than below it
- ✓ Newborn's mouth wide open
- ✓ Newborn's lower lip is turned outwards
- ✓ Newborn's chin is touching the breast

Figure 5.3 Attachment for breastfeeding

How to EXPRESS BREAST MILK

1. To whom should we teach expressing breast milk?

- ❖ All mothers must be taught so that when and if the need arises, they will know how to do so.
- ❖ **Indications**
  - Sick mother, local breast problems
  - Preterm / sick newborn
  - Working mother
- ❖ Storage
  - Clean wide-mouthed container with tight lid
  - At room temperature: 6 hrs
  - Refrigerator: 24 hours; Freezer (-20°C): for 3 months

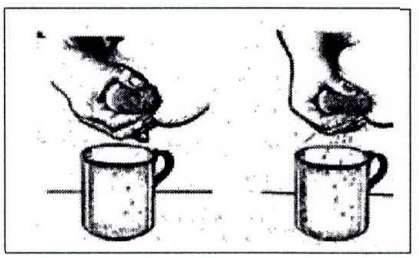


Figure 5.4 Choose cup for EBM

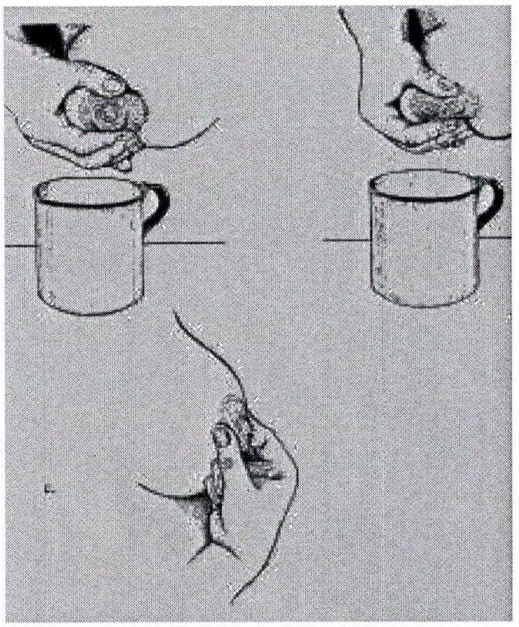
2. How to prepare a container for EBM?

- Choose a cup, glass with wide mouth
- Wash it with soap and water
- Pour boiling water into it and leave for a few minutes
- When ready to express milk, pour water out

3. ***Teach a mother how to express breast milk adequately.*** Inform her it would take 20-30 minutes, especially in the first few days when only a little milk is produced. However this time can shorten as more milk is produced (see Table 5.3 / Figure 5.8).

Table 5.3 Steps to express breastmilk

Step 1	***Preparation of container*** ❖ Choose a cup, glass, with a wide mouth ❖ Wash the cup with soap and water ❖ Pour boiling water into the cup, cover and leave it for a few minutes (kills the germs) or boil the cup in water, keep covered till needed ❖ When ready to express milk, pour water out of the cup or take cup from the container where it was boiled
Step 2	***Massage the breast before expression (10-15 minutes before expression)*** ❖ Take a wet warm towel and wrap the breast in it for at least 5 minutes ❖ With two fingers massage the breast towards the nipple using circular motion. Use the pads of fingers only with modest pressure or use the base of the fist.
Step 3	***Expression of milk*** ❖ Wash the hands thoroughly ❖ Make mother sit or stand comfortably and hold the container near her breast ❖ Encourage her to visualise the newborn ❖ Encourage her to put her thumb above the nipple and areola and her first finger below the nipple and areola opposite the thumb, and to support the breast with rest of the fingers ❖ Press thumb and first finger slightly inward towards the chest wall. Avoid pressing too far as it might block the ilk ducts ❖ Press and release, press and release. This should not hurt unless the technique is wrong. Milk will start dripping after pressing a few times ❖ Press the areola in the same way from the sides to make sure milk is expressed from all segments ❖ Express one breast for at least 3-5 minutes until the flow slows; then express the other side; and then repeat both sides. She can use either hand for either breast and change when they tire



Avoid when expressing breast milk

- Rubbing and sliding fingers along the skin
- Squeezing the nipple itself as it

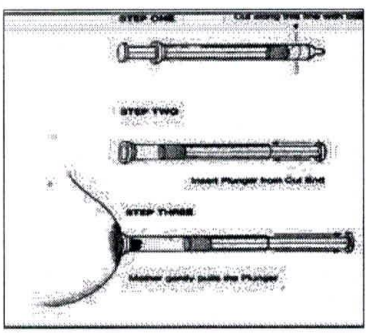
Alternative method: syringe method

Use a 10cc syringe. Cut the tip of the syringe with a sharp heated blade. Take out the plunger and put it in from the cut end. Place the open end of the syringe to encircle the nipple. Pull the plunger gently back. This will create negative pressure, causing the nipple to be sucked out.

Figure 5.5 How to express breast milk

4.How to use a syringe pump to express breast milk

- Put plunger inside the outer cylinder
- See that the rubber seal is in flexible condition
- Ensure it touches skin all around – airtight seal
- Pull the outer cylinder down, the nipple is sucked into the funnel
- Release the outer cylinder and then pull down again
- Milk flows after a minute and collects



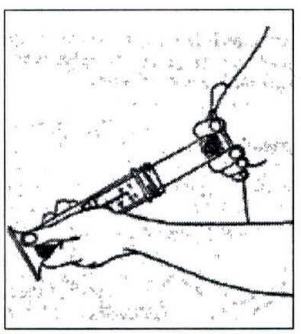


Figure 5.6 Syringe to express breast milk

Figure 5.7 Warm bottle for expressing breastmilk

5. Follow Algorithm for Expressing Breast Milk

6. Other methods to express breast milk – warm bottle method

- Pour hot water into a bottle
- After a few minutes, pour out the hot water
- Hold warm bottle over the nipple in an air tight seal
- Store the breast milk safely
- Feed EBM with a palada or spoon

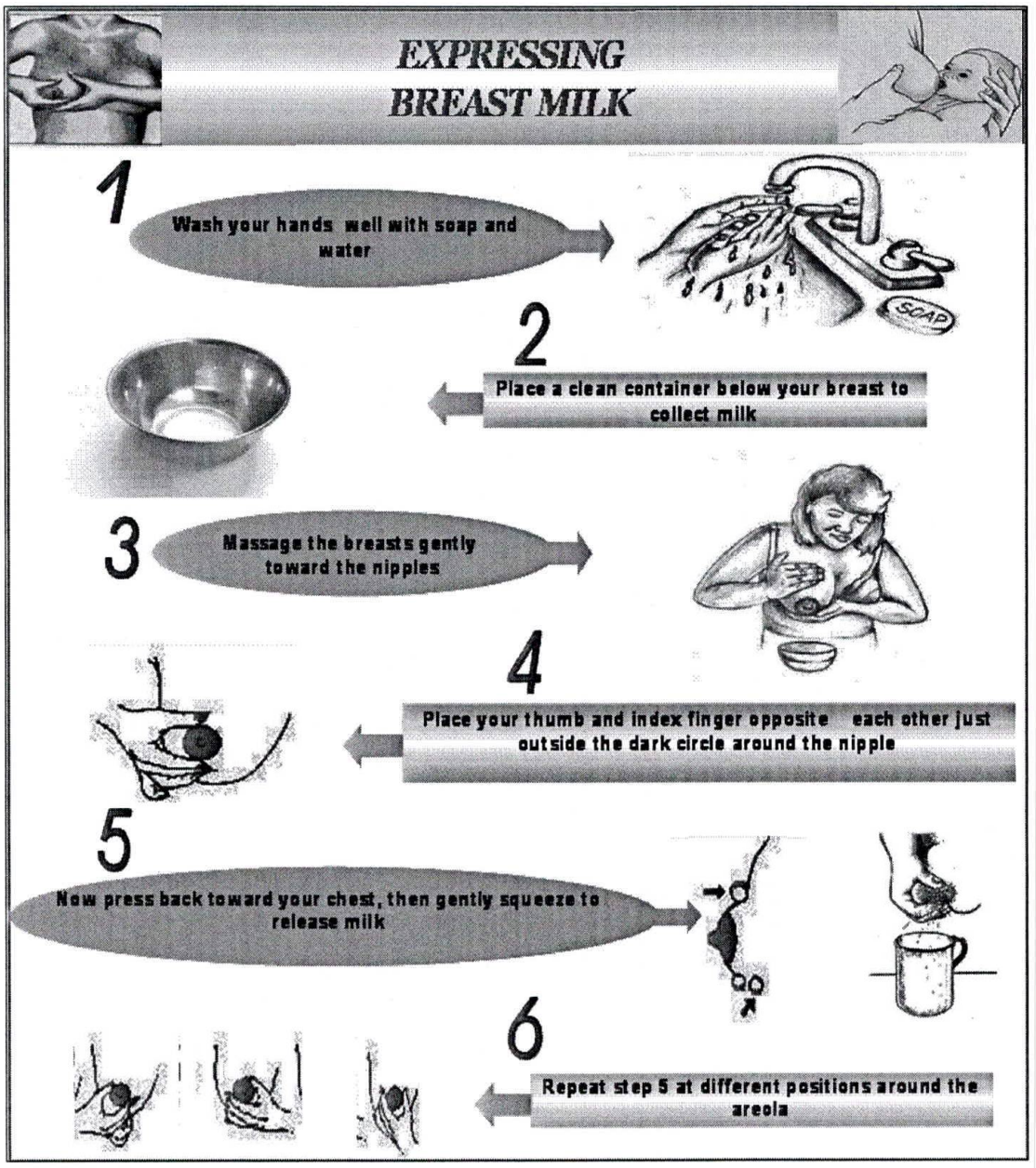


Figure 5.8 Steps for expressing breastmilk

How to Manage BREAST PROBLEMS PROMPTLY

1. Use information in Table 5.4 to manage breast problems
2. Refer if needed

Table 5.4: Manage BREAST PROBLEMS PROMPTLY

ASSESS		MANAGE
Problems	Causes	
Inverted or flat nipple		❖ Build mother's confidence ❖ Ensure that the newborn suckles breast not nipple ❖ Help mother position newborn early ❖ Try different position – e.g. underarm ❖ Help her to make her nipple stand out more ❖ Use pump, syringe ❖ If needed, express milk feed with cup
Newborn refuses to take breast milk	Sick, pain from bruise after instrumental delivery, blocked nose, sedation due to intrapartum sedation for mother,	❖ Check and observe a breastfeeding episode especially see if the mother is positioned well and attachment is good. ❖ Advise mother to help newborn feed on one breast completely and to alternate breast with each feed ❖ Teach to feed till newborn is satisfied ❖ Encourage to lie on the back to feed
Sore nipple	Incorrect attachment, nipple sucking Frequent use of soap and water Fungal infection of nipple	❖ Continue breastfeeding and change position ❖ Help newborn to attach correctly to the breast ❖ Apply hind milk to nipple after breast feed ❖ Expose nipple to air between feeds ❖ Do not wash breast each time before and after feed. Daily bath and change of clothes is enough ❖ If fungal infection apply medication on the nipple and inside mouth of newborn

ASSESS		MANAGE
Problems	Causes	
Breast engorgement	Delayed and infrequent feeds Poor attachment Ineffective suckling	❖ Help in establishing breastfeeding early ❖ Encourage frequent breast feeds ❖ Supervise for correct attachment ❖ Apply local warm water packs for 15 minutes ❖ Stimulate breast and nipple skin ❖ Massage back /neck ❖ Encourage a warm shower ❖ Administer Tab Paracetamol to relieve pain ❖ Gently express milk to soften breast and then help mother to correctly latch newborn to the breast ❖ Put a cold compress on breast to reduce edema if present
Breast abscess	Delay in treatment of breast engorgement, cracked nipples, blocked duct or mastitis	❖ Administer analgesic for fever and pain ❖ Administer antibiotic prescribed for infection ❖ Prepare mother for incision and drainage of abscess ❖ Advice mother to continue to breast feed from other breast ❖ Advice frequent feeds, gentle massage toward nipple and warm compress application ❖ Advice complete rest
Not enough milk	Not breastfeeding frequently Too short or hurried breast feeds Poor position Breast engorgement or mastitis	❖ Check if this is just mother's perception (how the mother feels). ❖ Advice mother that milk supply will increase after 4 days ❖ Assure mother if newborn is gaining weight adequately ❖ Encourage mother to feed frequently and during the night ❖ Ensure attachment is correct ❖ Administer medications for pain or infection as appropriate ❖ Give a balanced diet daily ❖ Encourage family support to mother

5.5 Mentoring Skills

Sample examples to use for mentoring episode

Sample mentoring – Case sheet audits

- On a particular day of mentoring visit make it a point to observe the case sheets (Section 3: Delivery Notes –part B) to determine
  - When breastfeeding was initiated for newborns
  - Any feeding difficulties and action taken
  - Whether counselling was given based on record of it
- Use this information to provide one to one or group mentoring based on availability of staff

Audit of breastfeeding practice within the system

Instructions for mentor

- During a regular visit to the PHC make a random check of the breastfeeding practice. This can be done by
  - Interviewing the mothers on what advise and help was given to them by nurses on breastfeeding using checklist given below
  - Interviewing staff nurses on their practice
  - Actually observing mothers breast feed their newborns (see breastfeeding observation form given below)
  - Reviewing the case sheet on how fast breastfeeding was initiated
  - After the observation tell the staff nurses about your observations starting and ending with good points. Also highlight the points for improvement.
  - Brief the staff nurses and other members on the importance of initiating breastfeeding early and helping a mother to breast feed her newborn successfully.
  - Summarise the findings of observation and help staff to find out areas of strength and areas for improvement. Help them to make a plan on what they would want to achieve by the next mentoring visit.

Breastfeeding observation form to use at PHC

Mother's Name: _____Date _____Age of newborn:_____Sex: _____

Signs that breastfeeding is going well		*Signs of possible difficulty*	
BODY POSITION			
• Mother relaxed and comfortable	☐	• Shoulders tense, leans over newborn	☐
• Newborn's body close, facing breast	☐	• Newborn's body away from mother's	☐
• Newborn's head and body straight	☐	• Newborn's neck twisted	☐
• Newborn's chin touching breast	☐	• Newborn's chin not touching breast	☐
• [Newborn's bottom supported]	☐	• [Only shoulder or head supported	☐
RESPONSES			
• Newborn reaches for breast if hungry	☐	• No response to breast	☐
• [Newborn roots for breast]	☐	• [No rooting observed]	☐
• Newborn explores breast with tongue	☐	• Newborn not interested in breast	☐
• Newborn calm and alert at breast	☐	• Newborn restless or crying	☐
• Newborn stays attached to breast	☐	• Newborn slips off breast	☐
• Signs of milk ejection [leaking, after pains]	☐	• No signs of milk ejection	☐
EMOTIONAL BONDING			
• Secure, confident hold	☐	• Nervous or limp hold	☐
• Face-to-face attention from mother	☐	• No mother/newborn eye contact	☐
• Much touching by mother	☐	• Little touching	☐
		• Shaking or poking newborn	☐
ANATOMY			
• Breasts soft after feed	☐	• Breasts engorged	☐
• Nipples stand out, protractile	☐	• Nipples flat or inverted	☐
• Skin appears healthy	☐	• Fissures or redness of skin	☐
• Breast looks round during feed	☐	• Breast looks stretched or pulled	☐
SUCKLING			
• Mouth wide open	☐	• Mouth not wide open, points forward	☐
• Lower lip turned outwards	☐	• Lower lip turned in	☐
• Tongue cupped around breast	☐	• Newborn's tongue not seen	☐
• Cheeks round	☐	• Cheeks tense or pulled in	☐
• More areola above newborn's mouth	☐	• More areola below newborn's mouth	☐
• Slow deep sucks, bursts with pauses	☐	• Rapid sucks only	☐
• Can see or hear swallowing		• Can hear smacking or clicking	☐
TIME SPENT SUCKLING			
• Newborn releases breast	☐	• Mother takes newborn off breast	☐
Newborn suckled for ___minutes			

5.6 Key Messages - Do's and Don'ts

Do's	***DO be prepared to assist a mother and newborn to initiate breastfeeding*** as soon as possible after birth, but definitely within half an hour. The best way would be to keep the newborn in skin-to-skin contact between mother's breasts.
	DO give colostrum to the newborn. It is rich in antibodies, has all the required nutrients and although little in amount, is sufficient to meet the needs of the newborn
	DO supervise breast feed to reassure the mother that position is good and attachment of newborn to breast is correct. This could help the mother to relax and prevent sore nipples.
	DO take time to help a mother, counsel her about breastfeeding.
	DO encourage mother to feed the newborn on demand, both night and day and give only breast milk (exclusive breastfeeding).
	DO check if the breastfeeding is adequate and mother knows how to check for adequacy of feed before discharge
	DO reassure a mother when she feels that milk is too little that the supply is enough for the newborn as long as the newborn suckles on demand and is satisfied, active and comfortable.
	DO express breast milk if the mother is away for a long time or if she has engorged breasts.
	Do refer all newborns who are not feeding adequately, having feeding difficulty such as choking, refusing feeds or not feeding at all or lethargic or very small (less than 1.8kgs/1800gm).
Don'ts	***DO NOT give prelacteal feeds.*** It will reduce the chance of establishing breastfeeding
	DO NOT discard colostrum. It is useful for the newborn and prepared to meet all the needs of the newborn.
	DO NOT restrict food or water for mother. A good nutrition and adequate fluid intake could help in adequate milk supply.
	DO NOT give honey, janamghutti, gripe water, bonnison etc. There is a high risk the newborn will pick up infections and it would reduce the chance of successful breastfeeding
	Do NOT give bottle feeding or pacifiers. For newborns who cannot suckle express breast milk and give it with the help of a palada or cup.

Chapter 6

Thermal Control and Kangaroo Mother Care (KMC)

Learning Objectives

At the end of this chapter you will be able to

- Recall factors which contribute to heat loss
- Demonstrate ways to prevent heat loss in a newborn
- Document the temperature accurately in the case sheet
- Demonstrate mentoring skills for KMC and thermal control

6.1 Introduction

A newborn's skin temperature will fall within seconds of being born. If the temperature continues to fall the newborn will become ill and may even die. Hence it is important to follow the warm chain protocol for the newborn before and soon after birth. Warmth is a basic need of the newborn. Maintaining warmth of a newborn is important for his / her survival and well being. Unlike adults, newborn newborns are often not able to keep themselves warm particularly if the environmental temperature is low. This results in low temperature or hypothermia.

Hypothermia is a significant problem in newborns at birth and beyond. It contributes to significant morbidities. Preterm newborns have higher risk for hypothermia that could lead to hypoglycaemia and ultimately death if not corrected soon enough. Mortality rate is twice in hypothermic newborns than newborns with normal temperature.

6.2 Components of Maintaining Thermal Control

Preparation before delivery

- Close doors and windows of the labour room
- Ensure that temperature ismore than 25^{0}c (comfortable enough for an adult)
- Make sure that radiant warmer, 200 watt bulb source or room heater are in working condition
- Ensure that two clean towels or soft clothes are ready

Maintaining the warm chain

- Place the newborn soon after birth on a towel or cloth that is kept over the mothers abdomen.
- Dry the newborn, keep in direct skin-to-skin contact with mother. Cover with a second dry towel.
- Assist mother to initiate breastfeeding
- Put clothes for the newborn, wrap with towel, place a cap on the head when the newborn is shifted to postnatal ward with mother

- ❖ Keep the newborn next to mother
- ❖ Monitor temperature, feeding and activity of the newborn

Kangaroo mother care

This is a method used to help maintain the newborn's temperature, by direct skin-to-skin contact.

6.3 Importance of Components

Preparation before delivery

- ❖ A fetus is nursed in the warm environment of the mother's uterus. At birth the newborn is suddenly exposed to a much cooler environment (from 37.2°C/98.6°F to more than 25°C /77°F). This can cause the newborn to lose heat very easily to the cooler environment either by radiation (loss of heat from warm body to cold objects in the environment) or convection (loss of heat through the circulating cooler air).

Maintaining the warm chain

- ❖ **A newborn newborn can loss heat easily due to**
  - Its large body surface area,
  - Lesser thermal insulation due to less subcutaneous fat. This is more for LBW newborns,
  - Decrease heat production due to less brown fat (fat present around the adrenal glands, kidneys, interscapular and axillary regions)
  - Immature central nervous system that helps in regulating body temperature
- ❖ Heat production of newborns occurs through break down of brown fat. When skin temperature is low 35-36°C (95-96.8°F), skin receptors feel this and the hypothalamus helps noradrenalin to stimulate the breakdown of brown fat. Blood that passes though this gets warmed and this helps raise the body temperature. LBW newborns lack this kind of heat production and thus can lose heat faster. When heat is lost rapidly the body does not function well. A newborn who is not warm enough is less active, feeds poorly, has a weak cry and might have respiratory distress. Thus if a newborn presents with any of these signs, soon after birth or in the neonatal period it is a flag for hypothermia. Take the needed action.
- ❖ A newborn's skin temperature can drop within seconds of being born. This can happen due to loss of heat by evaporation (when amniotic fluid is allowed to dry on the skin) or by conduction (if a newborn is placed on a cold towel or clean cloth, heat from the newborn's body can be transferred directly to the cold towel; or the newborn can lose heat to the cold surface of the weighing machine tray or warmer). Thus follow these steps.
  - Keep the newborn on a warm towel or clean cloth over the mother's abdomen
  - Dry the newborn immediately with a clean dry towel or clean cloth
  - Keep in direct skin-to-skin contact,
  - Replace the wet towel with a dry one to cover the newborn and maintain warmth.
- ❖ Checking the newborn's temperature by touch / observation is important after birth so that additional measures could be taken. When a newborn's feet and hands are blue, but body is pink, it is called acrocyanosis, this is a flag that the newborn is hypothermic (cold stress). Immediate measures must be

taken to prevent heat loss through evaporation (wipe the newborn dry), conduction (use a warm towel and keep in mother's abdomen / between mother's breast for skin-to-skin contact), convection (switch off fan, do not place in draft), and radiation (see that labour room temperature is warm enough (ideal more than 25°C).

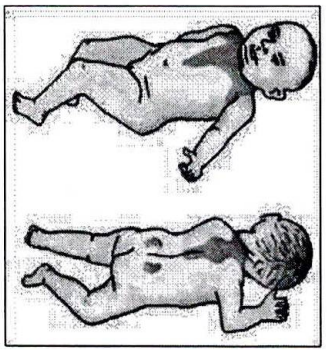


Figure 6.1: Brownfat

Brown Fat
Present around the adrenals, kidneys, inter scapular and axillary regions

3. Kangaroo mother care (KMC)

- KMC prevents heat loss through evaporation, conduction, convection and radiation. Loss of heat through conduction to a cold surface is prevented as the newborn is with skin-to-skin contact. Since the newborn's head is covered with a cap, and body is covered completely loss of heat through convection, evaporation and radiation is also limited.
- The big advantage of KMC is the mother acts like an incubator.
  - For every 10°C drop in newborn's temperature, the mother's temperature increases by 20°C;
  - If the newborn's temperature increases by 10°C, the mother's decreases by 10°C.
- The greatest advantage of KMC is that no incubator can give what the mother gives, love and comfort. In a newborn whose weight is less than 2500 gms / 2.5 kgs and who is not maintaining temperature, PHC staff must be alert to teach mothers how to give KMC before they leave the PHC.

6.4 Requirements to Provide Thermal Control for Newborn

Equipment/supplies

- Radiant warmer
- Clean cloth /sheet /towel to place on the mattress of radiant warmer
- 200 watt bulb heat source
- Soap and water solution to clean radiant warmer
- Thermometer to measure temperature
- Towel or long cloth to wrap around the newborn and mother for KMC
- Newborn clothes
- Cap and socks for the newborn

Clinical skills

Use of RADIANT WARMER

1. Clean the radiant warmer with soap solution and wipe dry
2. Switch the radiant warmer on 20 minutes before birth of newborn
3. Place a sheet over the mattress of the warmer
4. Place the newborn under the radiant warmer. Remove extra clothing and just keep the napkin alone
5. Connect the probe by placing it midway between the xiphoid sternum and the umbilicus once the newborn is placed under the warmer
6. Put the radiant warmer on manual mode so that the temperatures of all items that come in contact with the newborn are warm. Read the temperature on the display and adjust the heater output
   - If below 36°C –High (75%–100%)
   - If between 36 and 36.5°C –Medium (25%–75%)
   - If between 36.5 and 37.5°C – Low (25%–50%)
   - If more than 37.5°C–Remove newborn/Switch off warmer.
7. Once the radiant warmer is ready, switch to skin mode with desired setting. If servo set the skin temperature to be set between 36-37.5°C. If temperature is lower it will automatically increase
8. Keep the side walls fastened safely to prevent any falls
9. Check if the probes are connected and feet are warm
10. Respond to alarm: power failure, probe displacement, system failure or over or under heating
11. Check temperature half hourly for two hours and respond based on newborn's temperature.
12. Record the temperature in the case sheet

Checking TEMPERATURE BY TOUCH METHOD

1. Use dorsum of hand to measure temperature by touch. Place hand over abdomen then trunk and then the feet.
2. Interpret as follows
   - Trunk and extremities warm : temperature normal
   - Trunk warm and extremities cold : cold stress (mild hypothermia)
   - Trunk and extremities cold : hypothermia (moderate to severe)
3. Teach mother how to check temperature using touch method before going home.

Check TEMPERATURE USING THERMOMETER

1. Collect thermometer, dry cotton swab, spirit swab and kidney tray
2. Wash hands
3. Wipe the thermometer from bulb to stem end with dry cotton swab

4. Shake the thermometer so that mercury reading is below 35°C
5. Place the bulb of thermometer in the axilla of the newborn. Keep the stem parallel to the newborn's body. Hold the arm close to newborn's body.
6. Remove the thermometer after 3 minutes
7. Read the temperature holding the thermometer at eye level
8. Record the temperature in case sheet.
9. Take measures if needed to keep the newborn warm.
10. Clean the thermometer, with spirit swab from stem end to bulb end. Wipe dry with cotton swab. Replace in container.

Assist MOTHER TO GIVE KMC

1. Educate mother on the importance and benefit of KMC

- ❖ Temperature maintenance
- ❖ Better weight gain
- ❖ Able to tolerate pain better
- ❖ Increased breastfeeding rates
- ❖ Early discharge from the health facility
- ❖ Less morbidities such as apnea and infections
- ❖ Less stress
- ❖ Better mother infant bonding

2. Check if mother has the required dress – preferable a front open
3. Provide privacy based on cultural values
4. Put a napkin, cap and socks for the newborn
5. Place the newborn in direct skin-to-skin contact with mother. Help the mother place the newborn in frog like position against the chest between the breasts

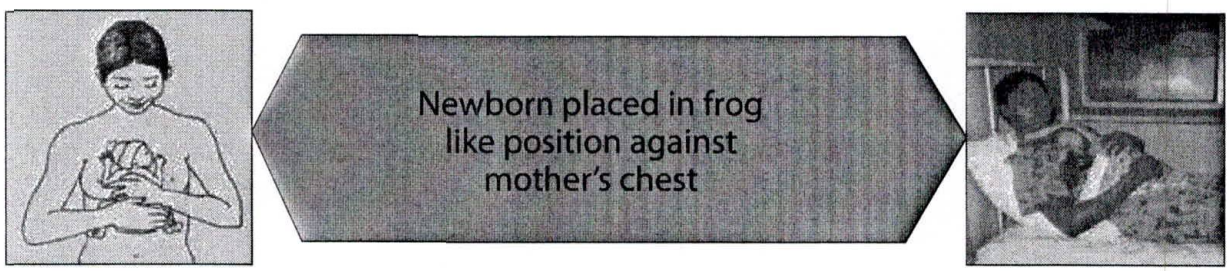


Figure 6.2: Position newborn for KMC

6. Turn the newborn's head to one side slightly extended to keep the airway open and permit eye to eye contact with the mother.
7. Place the newborn's abdomen at the level of the epigastrium of mother so that the mother's breathing could stimulate the newborn and thus prevent chance of apnea.

8. Support the newborn's buttocks with a long towel or cloth wrapped around the mother and the newborn.
9. Encourage the mother to give KMC at regular intervals of at least 2-3 hours duration and then extend to how long it is tolerated by the newborn and the mother up to even 24 hours.
10. Encourage the mother to breast feed, sleep or do routine work with newborn in KMC position
11. Caution mother to watch the newborn for any danger signs or to change the newborn's nappies if and when wet
12. Record the condition of the newborn; whether the newborn fed during KMC, whether the newborn and the mother were comfortable in the case sheet.
13. Teach other family members how to give KMC. Encourage any other member to provide KMC so that the mother can get needed rest periods when at home.

6.5 Mentoring Skills

Sample examples to use during a mentoring episode

Sample aid to mentor (one to one) about thermal protection of newborns

- During rounds with the PHC staff, observe whether newborns are at risk of losing temperature by evaporation, conduction, convection and radiation.
- Reinforce with PHC staff what they know and review methods of heat loss and gain in a newborn.
- Use the given information (Figure 6.3) or draw a similar picture on a chart to help the PHC staff understand the mechanism of heat loss and gain, and how simple steps can be used to prevent hypothermia.

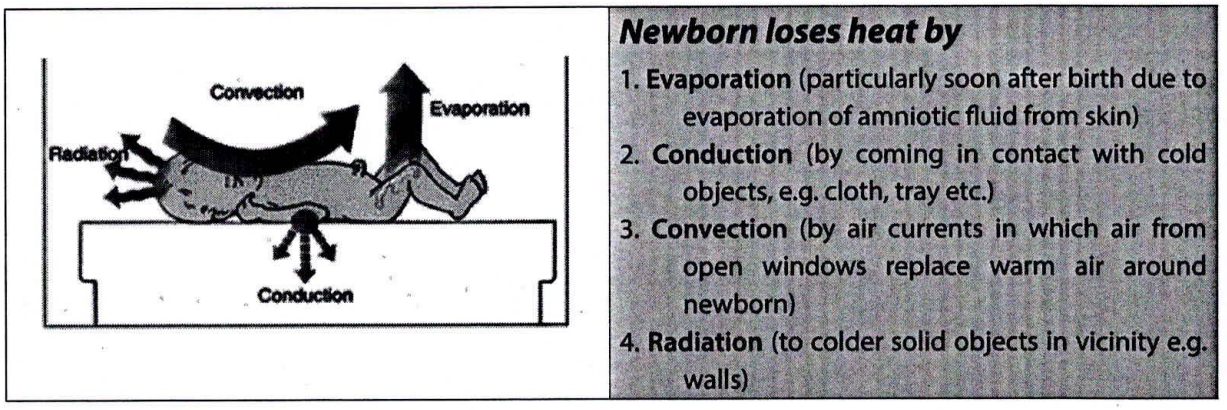
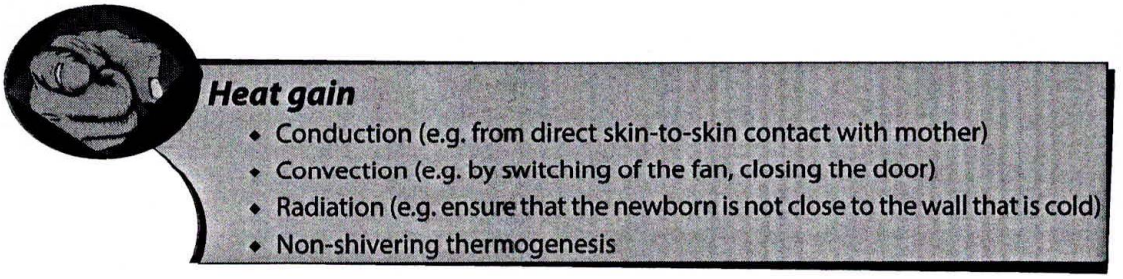


Figure 6.3: How a newborn loses heat



2. Sample example for mentoring – Observation (warm chain)

Instructions for Mentor

- During a regular visit to the PHC make a random check of the maintenance of warm chain. This can be done by actually observing. Observe for the following situations (See Table 6.1) and whether the correct steps are taken in the labour room / postnatal room to reduce heat loss in a newborn.
- After the observation tell the staff nurses about your observations starting and ending with good points. Also highlight the points for improvement
- Brief the staff nurses and other members on the importance of maintaining warm chain.
- Summarise the findings of observation and help staff to find out areas of strength and areas for improvement. Reinforce all the correct steps.
- Help them to make a plan on what they would want to achieve by the next mentoring visit.

Table 6.1: Common situation that could increase cold stress risk and steps to be taken to prevent heat loss in newborn

Common situations that could increase risk for cold stress	Check if the following steps to prevent heat loss in labour room / postnatal room are taken
• At birth • After bath • During changing clothes/ nappies • Malfunctioning heat source • Removing newborn from heat source • While transporting the newborn • No current	✓ Keep delivery room and postnatal room warm by closing door/ windows; seeing that labour room table is not at the doorway as every time the door is open cool air can enter inside. ✓ Keep newborn corner in a corner away from a window, not directly opposite the door. The temperature must be such that an adult would feel slightly uncomfortable without a fan ✓ Dry newborn immediately after birth with a pre-warmed towel/ cloth ✓ Replace wet towel/cloth with dry pre-warmed towel ✓ Encourage skin-to-skin contact between mother and newborn ✓ Assist mother to initiate and continue regular breastfeeding ✓ Cover newborn head with cap, feet with socks and wrap the newborn well ✓ Postpone bathing till the newborn is discharged or weight is more than 2500 gms / 2.5 kgs or the cord has fallen ✓ Take precautions while checking weight such as switching off the fan, completing the procedure quickly etc ✓ Use radiant warmer/extra light source when needed

Sample example for mentoring: One-to-one to manage hypothermia in newborns

❖ Use information Table 6.2 chart to teach the staff nurse

Table 6.2: How to assess and manage hypothermia

ASSESS				MANAGE
Category	Temperature	Feel by Touch	Clinical features	
Normal	36.5-37.5°C (97.7°F-99.5°F)	• Warm trunk • Warm extremities	• Normal newborn	✓ Wrap newborn with prewarmed cloth ✓ Keep newborn next to mother ✓ Encourage breastfeeding
Mild hypothermia (cold stress)	36-36.5°C (96.8°F-97.7°F)	• Warm trunk • Cold extremities	• Extremities bluish and cold • Poor weight gain if chronic cold stress	✓ Skin-to-skin contact ✓ Wrap newborn well ✓ Ensure room is warm ✓ Use radiant warmer ✓ Encourage breastfeeding
Moderate hypothermia	32-36°C (89.6°F-96.8°F)	• Cold trunk • Cold extremities	• Poor suckling • Lethargy • Weak cry • Fast breathing	✓ Cover mother and newborn with pre-warmed clothes ✓ Use radiant warmer ✓ Reassess after 15 minutes ✓ Provide additional heat if there is no improvement ✓ Encourage breastfeeding
Severe hypothermia	Less than 32°C (89.6°F)	• Cold trunk • Cold extremities	• Lethargic • Poor capillary refill time • Fast or slow breathing • Slow heart rate • Hardening of skin • Temperature with redness and edema • Bleeding • Low blood sugar	✓ Rapid re-warming till newborn's temperature is 34°C ✓ Then slow re-warming ✓ Give oxygen ✓ Administer IV fluids-warm dextrose ✓ Administer vitamin K ✓ Reassess every 15 minutes ✓ Provide additional heat if no improvement
Severe hyperthermia Pyrexia (>38°C)	more than 38°C	• Room is too hot • Newborn covered with too many layers of clothes • Newborn is dehydrated • Newborn has infection	• Dehydration • Convulsions • Shock • Coma and even death • Newborn irritable • Skin is hot and dry	✓ Place the newborn in a normal temperature environment (25 to 28°C), away from any source of heat ✓ Undress the newborn partially or fully, if necessary ✓ Give frequent breast feeds; give breast milk by cup if unable to suck ✓ If temperature more than 39°C, sponge the newborn with tap water; DO NOT use cold / ice water for sponge ✓ Measure the temperature hourly till it becomes normal

6.6 Key Messages - Do's and Don'ts

Do's	***DO see that the temperature of the labour room is warm enough*** i.e you are comfortable (ideal temperature is more than 250C and the newborn corner >300C). The best way you can ensure this, close the doors or windows so that wind does not come into the room.
	DO be prepared. Make sure all necessary equipment (radiant warmer/200 watt heat source/heater; thermometer) and supplies (towel/long cloth/cap and socks/soap and water) as well as uninterrupted power supply (electricity/solar/UPS) are available.
	DO place the newborn immediately on the mother's abdomen/chest and dry with a warm cloth.
	DO know the normal temperature for a newborn is 37.5°C (99.3°F). If the temperature falls below 36.5°C it is called cold stress and efforts must be made to increase the body temperature.
	Do remember that a newborn's temperature could be maintained by simple measures such as drying, skin-to-skin contact, wrapping and breastfeeding.
	Do keep in mind a newborn newborn who is between 1800 gms / 1.8 kgs and 2500 gms / 2.5 kgs can be managed in the PHC but the risk for hypothermia in such newborns is much higher.
	DO recommend KMC for all newborns, but definitely for LBW newborns
	DO give KMC for at least 2-3 hours. Remember that there is no contraindication for KMC if the newborn is stable, and that it can be given for as long as possible.
	DO give extra milk if the newborn is nursed under a radiant warmer since the newborn can lose more water.
	DO record the temperature of the newborn every 15 minutes for the first hour from birth and then once every fourth hour. When in doubt check the temperature more often using the touch method.
	DO teach all mothers how to assess temperature using the touch method before they are discharged and how to keep the newborn warm at home.
	Do refer those newborns who are consistently not maintaining temperature despite all measures taken. It could be a sign of sepsis.

	Do check to see if mother is eligible to be a beneficiary of the Madilu kit programme (based on social and economic status) of the Government of Karnataka (GoK); if so, ensure documents are obtained during antenatal period and the Madilu kit is opened at the time of delivery. This contains : i. Mosquito curtain ii. Medium sized carpet iii. Medium sized bed sheet iv. A thick blanket for mother v. Bathing Soap vi. Washing soap vii. Cloth to tie abdomen of mother viii. Sanitary pads ix. Comb and coconut oil x. Towel xi. Tooth paste and brush xii. bed spread over rubber sheet for the newborn xiii. Bed sheet for newborn xiv. Bathing soap for newborn xv. Rubber sheet for newborn xvi. Diaper xvii. Newborn vest xviii. Sweater, cap and socks for newborn xix. One plastic kit bag.
Don'ts	***DO NOT delay in drying*** and keeping the newborn in skin-to-skin contact soon after birth.
	DO NOT expose the newborn when checking the weight or making observations of physical characteristics for assessing the gestational age. This could lead to hypothermia in the newborn.
	DO NOT delay referral of a newborn who is constantly hypothermic. These newborns are at high risk for problems such as hypoglycemia, breathing difficulty, seizures and infection
	DO NOT leave the newborn unattended soon after birth
	DO NOT give KMC for less than half an hour at a stretch to reduce risk of over handling and thus loss of temperature
	DO NOT use air conditioner even in summer

Chapter 7 Care of the Newborn at Facility till Discharge

Learning Objectives

By the end of this chapter you will be able to

- Recall the components of care in the first 48 hours of life till discharge
- Demonstrate skill in counselling and assisting mothers in components of care in the first 48 hours of life
- Document components of care in the first 48 hours of life in the case sheet
- Demonstrate mentoring skills for care provided in first 48 hours of life

7.1 Introduction

All mothers' especially first time mothers would require support, advice and education on how to care for their newborn newborn. PHC staff must take every opportunity to teach mothers and help them to get to know their newborns, what care their newborns require, when to report and what to do if their newborns are not well. It is also important that they get the required rest soon after delivery.

7.2 Components of Care in the First 48 Hours of Life till Discharge

Every day's care for newborn

- Breastfeeding
- Warmth,
- Cord care and hygiene

Watch for danger signs

- Observe the newborn / teach mother to watch for danger signs

Monitor newborn's readiness for discharge

7.3 Importance of Components

Every day care for the newborn

- Newborns need special attention separate from that of their mothers to assure a healthy start of life. The immediate causes of newborn deaths include birth asphyxia, complications related to premature and or low birth weight newborns or birth anomalies. Simple cost effective interventions such as providing warmth, assisting the mother to initiate and continue breastfeeding, cord care and hygiene have been shown to reduce neonatal deaths.
- These interventions help reduce hypothermia and hypoglycaemia, both of which are closely linked with more serious complications if not managed on time. Provision of essential newborn care could

help reduce the risk of illness and enhance growth and development. For example breastfeeding has been reported to reduce the risk of infections. This coupled with keeping the newborn close to the mother has shown to cause reduction in hypothermia and hypoglycaemia. Hypothermia and or hypoglycaemia in a newborn is a flag to indicate lack of one of these components

Watch / teach mother to watch for danger signs

- A newborn can present with danger signs at any time before or after birth. The most number of deaths among newborns occur in the first day of life. The next crucial period is the first week of life. If PHC staff watch for / teach mothers to identify danger signs early, required initial management can be taken. This could reduce mortality rates.

Monitor newborn's readiness for discharge

- It is important to monitor breathing, temperature or warmth, activity and feeding of the newborn before discharge. If a newborn presents with any danger sign it is a flag for an underlying problem and the PHC must start initial management, stabilise the newborn before referral to a higher center.

7.4 Requirements for Care of Newborn at Facility

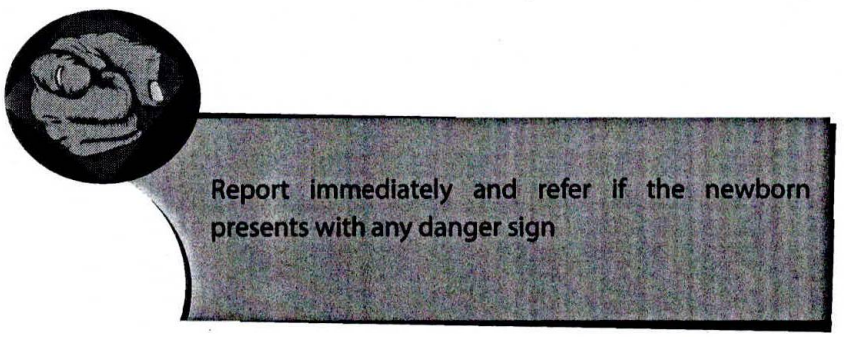
Equipment and supplies

- Case sheet to use as checklist for topics on counselling mothers before discharge

Clinical skills

Assessing READINESS FOR DISCHARGE: FEEDING WELL, NO DANGER SIGNS

1. Use information in Figure 7.1 to assess if the newborn is feeding well
2. Check if any danger signs are present by asking the mother or observing the newborn



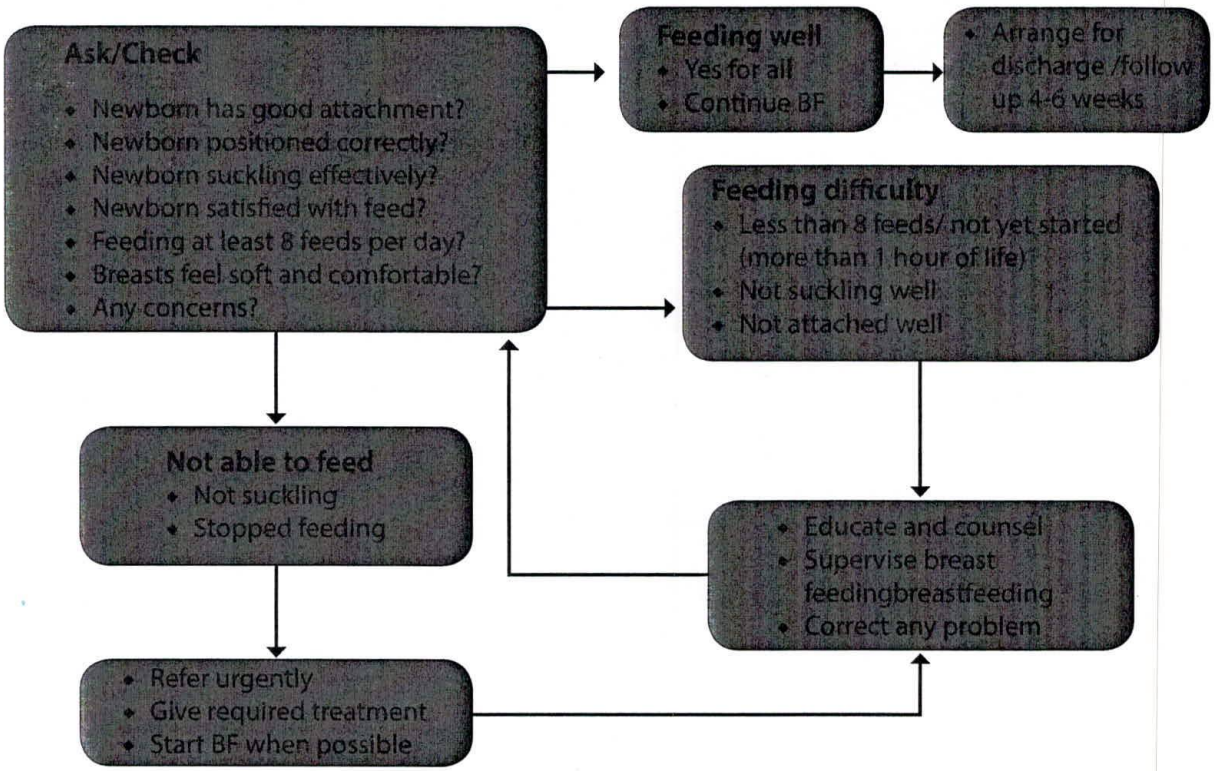


Figure 7.1: Is the newborn feelling well?

Are all danger signs absent

Assess for any danger signs (Ask / Look / Feel)

- Breathing difficulty?
  - breathing (more than 60/ min)
  - Moderate or severe chest in-drawing
  - Grunting
- Convulsions or jerky movements?
- Discharge or Erythema (redness) from umbilicus?
- Feeding difficulty?
- Gastrointestinal: vomiting or bleeding in stools
- Hypothermia (less than 35°C) or fever (more than 37.5°C)
- Icterus (yellow skin)
- Stiff or floppy newborn
- Irritability or lethargy
- Pustules in skin (more than 10) or one large boil

Counsel a mother on CARE OF NEWBORN AT HOME

1. Introduce self to the mother and greet the mother
2. Check how much she knows about maintaining warmth, breastfeeding, preventing infections and reporting danger signs
3. Reinforce information on the feeding, warmth, hygiene and prevention of infection
4. Check whether the mother has any doubts and clarify them
5. Make sure that the mother is confident about daily care of the newborn
6. Use the case sheet as a guide for counselling on all important aspects of mothers and newborns

7.5 Mentoring Skills

Sample examples for mentoring episode

Sample Case Study 7.1

A 20 year old delivered a term healthy newborn. The mother wishes to go home on the first postnatal day.

1 How would you know the newborn is ready for discharge?

Table 7.1: Key for case study 7.1
Signs of a healthy newborn ready for discharge

Feeding well	Weight gain	Absence of danger signs
❖ Takes at least 8 feeds per day ❖ Sucks well ❖ Is satisfied for 2-3 hours ❖ Sleeps well ❖ Feeds on demand ❖ Has no difficulties ❖ Passes urine 5-6 times a day / after each feed for next 3 months	❖ Loss of weight <10% in first week of life ❖ Average daily weight gain is around 10-15gm/day ❖ Newborn crosses birth weight by two weeks	❖ No danger sign present ❖ Alert, active, newborn that sleeps and feeds well, maintains body temperature and breaths normally.

Sample audit - breastfeeding practice

Instructions for mentor

- During a regular visit to the PHC make a random check of the breastfeeding practice. This can be done by
  - interviewing the mothers on what advise and help was given to them by nurses on breastfeeding using checklist given below
  - interviewing staff nurses on their practice
  - actually observing mothers breast feed their newborns
  - reviewing the case sheet on how fast breastfeeding was initiated
- After the observation tell the staff nurses about your observations starting and ending with good points. Also highlight the points for improvement
- Brief the staff nurses and other members on the importance of initiating breastfeeding early and helping a mother to breast feed her newborn successfully.
- Summarise the findings of observation and help staff to find out areas of strength and areas for improvement. Help them to make a plan on what they would want to achieve by the next mentoring visit.

Sample of exit interview questions to check readiness for discharge

Instructions to mentor

- Use questions given to assess how well staff nurses are preparing mothers for discharge during a planned mentoring visit
- Reinforce the positive points to staff nurses

Breastfeeding

- Is the newborn feeding well?
- How often is the newborn being fed?
- Are any feeds other than breast milk being given?
- Is the newborn fed on demand both day and night?
- Has one feeding episode been observed?
- Has the mother been told about breastfeeding

Warmth

- Is the newborn being kept warm?
- Is the newborn's temperature normal?
- Does the mother know how to check temperature by touch method
- Does the mother know how to give KMC?
- Has she given KMC by herself?
- Is there any other person in the family who will be able to assist the mother and also provide KMC?

Danger signs absent

- Is the newborn passing urine adequately (6 times in a 24 hour period)?
- Has the newborn passed stools?
- Are any of these problems present? Eye or umbilical discharge, jaundice, rash?
- Are there any other danger signs?
- Has the mother been told about danger signs that need immediate reporting?

Cord care and hygiene

- Does the mother know that nothing must be applied on the cord?
- Does the cord look clean?
- Is the napkin tied below the level of the umbilical cord?
- Is anything applied on the cord?
- Has bath been delayed till after the newborn reaches home?
- Does the mother know the precautions to be taken at bath to ensure the temperature of the newborn is maintained?
- Does the mother know what she must avoid to prevent infections

Immunization

- Has the newborn been given the BCG, oral polio and hepatitis B vaccine before discharge?
- Is the mother aware of the follow up routine of 3, 5, 7 14, 28 days for newborns born in the PHC; 1, 3, 5 days etc for home born newborns?
- Does the mother know the immunisation schedule?

7.6 Key Messages - Do's and Don'ts

Do's	***DO assess whether a newborn is feeding well*** by a direct observation of breastfeeding episode and finding out from the mother.
	DO know that a newborn who is feeding well will ❖ take at least 6-8 feeds per day, ❖ pass urine 3-4 times a day, ❖ sleep for a few hours, ❖ be active and satisfied.
	DO observe if the newborn has any danger signs before discharge.
	DO know that a newborn is ready to be discharged If the newborn is feeding well, has no danger signs and the mother is confident in the care of the newborn.
	Do remember that a newborn's temperature could be maintained at home by wrapping the newborn, keeping the newborn close to the mother, feeding the newborn on demand and practicing KMC.
	DO remember to teach mother's one topic at a time, so that they can understand and remember it well.
	DO complete the case sheet about counseling done for the mother before discharge and the condition of the newborn.
	DO ensure that if the Madilu kit (of the GoK) was not available/opened at time of delivery, it is obtained and given at least at the time of discharge
Don'ts	***DO NOT forget to observe the newborn carefully for any danger signs***
	DO NOT discharge a newborn who is not feeding well.
	DO NOT delay referral of a newborn who presents with a danger sign.
	DO NOT forget to tell mother to avoid the following practices ❖ Instilling oil in nose, mouth, ears ❖ Branding the newborn ❖ Applying anything to the umbilicus ❖ Applying kajal to eyes ❖ Giving any other feed

Chapter 8 Common Problems of Newborn Newborns and Referral

Learning Objectives

At the end of this chapter you will be able to

- Recall the causes and initial management of common neonatal problems
- Demonstrate skill in identification and initial management of common neonatal problems
- Mentor staff nurses on care of newborns with specific problems such as asphyxia, sepsis, hypothermia, hypoglycemia
- Identify records on which the details of care provided could be documented in the PHC

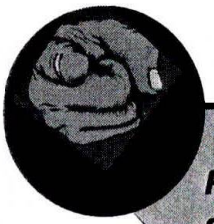
8.1 Introduction

The common causes of neonatal deaths are sepsis, asphyxia, and LBW that account for more than 70% of neonatal deaths. Respiratory distress, sepsis and LBW are special challenges in caring for newborns. Respiratory distress occurs in 4-6% of newborns. While neonatal sepsis is the single most important cause of neonatal deaths in the community. Other important problems include jaundice, hypoglycaemia, and hypothermia. respiratory distress, sepsis if identified early enough could help reduce major long term complications as well as neonatal mortality.

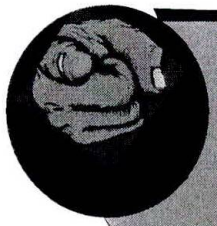
8.2 Components of Initial Management of Common Neonatal Problems

1. Identification of common neonatal problems

- Monitor the newborn every 15 minutes for the first one hour of birth for any danger signs
- Record the same in the postnatal section of the case sheet.



Remember to look for common problems or signs . These signs have been grouped so that you can remember them easily as "B-I, SIP"



- Breathing difficulty
- Convulsions
- Discharge (pus) or Erythema (redness) from umbilicus
- Feeding difficulty
- Gastrointestinal – vomiting or bleeding in stools
- Hypothermia or fever
- Icterus (yellow) or pallor
- Stiff or floppy newborn
- Irritability or lethargy
- Pustules in skin >10 or large boil

Initial management of common neonatal problems

- Start initial management before transfer of the newborn to higher facility

Referral and transport of newborns with common problems

- Decide which newborn requires urgent referral and which newborns need referral, but not urgently.
- Follow the principle of STABLE while transporting the newborn.
  - Sugar to prevent hypoglycaemia, either feed expressed breast milk or if not possible, 5% dextrose (5ml/kg every 2 hours)
  - Temperature to maintain warmth within normal limits
  - Airway, to ensure the airway is clear and newborn is breathing
  - Blood pressure and perfusion – checked by skin colour and capillary refill time (less than 3 seconds)
  - Lab reports need to be transported with the newborn to the higher center
  - Emotional support to the family

Documentation of initial management of common problems identified

All interventions must be recorded in the case sheet, and details in the referral form to be complication before the newborn is transferred to a higher center.

8.3 Importance of Components

Identification of common neonatal problems

- Newborns that are healthy will be pink, feed well, keep normal temperature, be active, pass urine and stool. The chance of death for a newborn is highest in the first week of life. Some simple signs, also called danger signs can direct or be a flag for a serious problem. Hence the PHC staff must be alert to look for these closely in the first hour till discharge. These problems can be identified by looking, asking or feeling for the specific symptoms
- Breathing difficulty could present as flaring of nares; respiratory rate of more than 60/minute; grunting; chest indrawing and or cyanosis. This is a flag for asphyxia or respiratory distress (typically seen in a preterm)

or infection or a cardiac problem. The PHC staff must anticipate asphyxia in the following situations

- obstructed labour
- hypertension
- prematurity
- growth retardation
- cord related problems such as cord around the neck, cord prolapsed
- abruption placenta
- placental insufficiency
- Breathing difficulty could also flag a trachea oesophageal fistula or diaphragmatic hernia. It could be accurately assessed using APGAR and the respiratory distress score.

Chest indrawing

Figure 8.1: Chest indrawing

- Convulsions could present very subtly in a newborn such as blinking of eyelids with a fixed stare; eye deviation; apnea (no breathing); cyclic movements of limbs (pedalling); tonic posture (stiff and extended limbs). The newborn might also be drowsy. It is flag to the PHC staff that there is something wrong such as hypoglycaemia, or infection
- Discharge (pus) or redness of umbilicus is a flag for possible sepsis and must be managed.

Normal umbilicus of a 4 day old newborn

Figure 8.2: Normal umblicus

- Feeding difficulty
- Gastrointestinal problems such as vomiting or diarrhea: this usually is not so common in the first week of life. If present it is important to watch the newborn for signs of dehydration such as a depressed anterior fontanel, decreased urine output, dry skin, dry /cracked lips etc. A newborn can present with blood in the stools. This is a flag for a more serious problem.
- Hypothermia or fever most newborns could become hypothermic if measures are not taken to maintain warmth. But hypothermia is also a flag for sepsis. Sepsis must be suspected in a newborn presenting with hypothermia or fever (rarely) especially in the following situations
  - LBW/preterm preterm newborn
  - history of prolonged rupture of membranes,
  - Infection in the mother.
- Typically the newborn with sepsis could also have additional signs such as feeding difficulty, breathing difficulty, jaundice or icterus and or irritability.
- Icterus or jaundice. Yellow skin must be identified early. Early management of it could help in getting

better health outcomes. Icterus or jaundice must be assessed in the natural light. The finger must be pressed on the newborn's skin preferably over the bony part, till it blanches. The underlying skin must be observed for yellow colour. If jaundice is only present in the face it might indicate physiologic jaundice that usually appears between 24-72 hours. But if the soles and feet are also yellow it indicates a more severe form, occurring within the first day of life/after 72 hours and would require immediate management. This type of jaundice is a flag sign that the newborn would require further management

- Within 24 hours: indicate ABO /Rh incompatibility, intrauterine infections
- After 72 hours: indicate sepsis, biliary atresia, metabolic disorder

❖ Stiff or floppy: this could be a flag sign for asphyxia or respiratory distress, hypogylcemia, and or lack of oxygen to the brain.

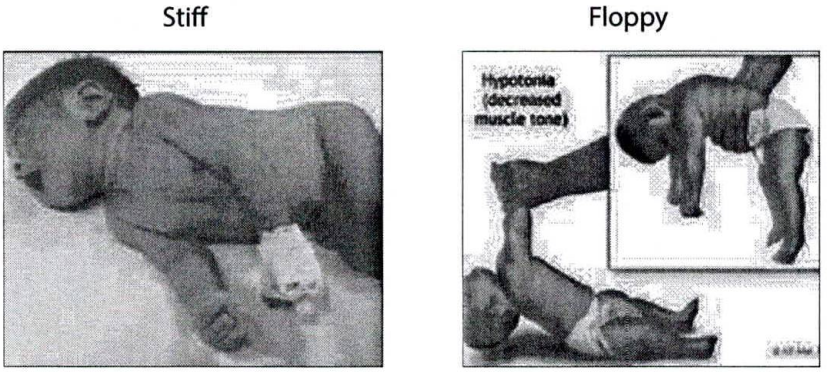


Figure 8.3: Stiff and floppy newborn

❖ Irritability or lethargy: a newborn who is healthy is satisfied, sleeps at least 20-22 hours. However if a newborn is crying constantly /easily one must check whether the newborn has other problems such as fever, feeding difficulty etc. A newborn who is weak or lethargic is a flag for possible sepsis.

❖ Pustules more than 0: is a flag for infection. Sometimes a newborn might have one large boil. This could also indicate infection.

Initial management of common neonatal problems

❖ The principles of the initial management of common neonatal problems are similar. To maintain temperature, ascertain newborn is breathing, feeding well are important early interventions. In addition it is important to give the newborn an initial feed if not taking direct breast feed, and starting the initial dose of antibiotics before transporting the newborn.

- ***Keeping the newborn warm*** is important to prevent hypothermia and thus prevent other complications.
- ***Clearing the airway*** so that the newborn breathes normally or assisting the newborn with the bag and mask for ventilation. Oxygen could be given to those newborn whose skin colour is not pink, and with respiratory rate of more than 60/minute.
- ***Maintaining sugar levels*** by feeding the newborn or giving 5% dextrose to the newborn. This is important so that the newborn does not become hypoglycemic (low blood glucose level). Hypoglycemia could worsen the condition of the newborn.

❖ The first dose of antibiotics could be administered based on the order of the medical officer.

- Injection ampicillin or cloxacillin and gentamycin for pneumonia or sepsis
- Injections ampicillin or cefotaxim and gentamycin or amikacin for meningitis
- Chloramphenicol eye drops for those with conjunctivitis
- Puncture and clean pustules and boils and apply local microbial ointment.

❖ Counsel on prevention of infection since this is an opportunity for the mother and family to learn what measures could be taken to reduce the risk of infection. These could include

- Breastfeeding
- Washing hands before handling the newborn
- Keeping the cord dry
- Maintaining hygiene of newborn
- To avoid any traditional practices

Referral and transport of newborns with common neonatal problems

❖ Before referral all attempts to stabilise the newborn first must be taken such as maintaining the temperature, breathing and feeding (by mouth or orogastric tube).

❖ It is important to identify those newborns that require immediate attention and intervention (within hours of birth). These include those newborns with suspected

- Diaphragmatic hernia: breathing difficulty, abdomen will be saucer shaped (scaphoid) and chest bulging, cyanosis
- Tracheoesophageal fistula:(Figure 8.5) frothing from the mouth, cyanosis, choking on feeding
- Respiratory distress or prolonged ventilation with bag and mask

Figure 8.4: Diaphragmatic hernia (abdomen saucer shaped)

Figure 8.5: Tracheoesophageal fistula

- Convulsions

❖ Conditions that would need referral but not urgent / immediate attention (within 24 hours transfer preferable) include

❖ Other danger signs where the newborn would require further investigations and interventions

such as discharge from umbilicus, feeding difficulty, gastrointestinal problems (diarrhea, vomiting), hypothermia or fever, icterus and palor, stiff or floppy newborn, irritability and lethargy, pustules in the skin

- Follow the principle of STABLE during the transfer.
- The mother or support person and health care personnel must be with the newborn during transport especially if the newborn requires ventilation support.

Documentation of details in the case sheet

- Documenting details of danger signs identified and measures taken to manage them initially is important for continuity of care when a referral is made. The details must be recorded in the respective part of the case sheet.
- Documentation is like a legal record and thus must be done carefully.

8.4 Requirements to manage common neonatal problems

Equipment/Supplies

- Oxygen canula
- Oxygen cylinder
- Ambu bag and mask
- Radiant warmer
- Towels or cloth to wrap the newborn
- Injection ampicillin
- Injection gentamycin
- Injection cloxacillin
- Case sheet
- Syringe and needles
- Scalp vein or jelco needle for intravenous
- Cotton swabs
- Spirit
- Kidney tray
- Puncture proof container to discard the needles

Clinical skills

Assessment of RESPIRATORY DISTRESS

This is done by checking the respiratory rate, presence of grunting, cyanosis, retractions and air entry(See table 8.4).

Assessment of JAUNDICE

1. Do assessment in natural light.
2. Wash hands
3. Press finger on the newborn's skin, preferably over a bony part till it blanches (becomes white).
4. Note the underlying skin for yellow colour.
5. Interpret the extent of jaundice using the clinical criteria given below. Remember this is an approximate estimate of jaundice and the best way to get an accurate value is by doing a blood test.

Table 8.1: Assesment for Jaundice

Area of body	Range of bilirubin (mg/100ml)
Face	4-8
Upper trunk	5-12
Lower trunk and thighs	8-16
Arms and lower legs	11-18
Palms and soles	>15

6. Refer all newborns with jaundice in the first day of life.

Assessment of DEHYDRATION

Table 8.2: Assesment and action for dehydration

Assess for signs of dehydration to choose the appropriate plan of action.

Type of dehydration	Signs	Action to be taken
Severe dehydration (lots)	Two of the following signs • Lethargy or unconscious • Sunken eyes • Skin pinch very slow	Will need IV line Refer after giving first amount of feed/fluid through orogastric tube if the newborn is too sick to take orally
Moderate dehydration (some)	Two of the following signs • Restless, irritable • Sunken eyes • Skin pinch slow	Same as above
Mild dehydration (little)	Not enough signs to classify as moderate or severe dehydration	Advise mother to continue breastfeeding Advise mother to return of the newborn seems to worsen Follow up in 5 days if no improvement

Assessment of TEMPERATURE

Assessment of CAPILLARY REFILL TIME (CRT)

1. Wash and dry hands
2. Press the forehead or sternum using index finger / thumb for 5 seconds.

3. Release and look at the blanched area (whitish/pale part) to check how fast it will return to the normal colour
4. Note the time taken for return of the colour. The colour should return within 3 seconds.
5. If the colour does not return within three seconds and is beyond three minutes, this indicates poor tissue perfusion. Remember that this finding might be wrong if the newborn is hypothermic.

Giving an OROGASTRIC FEED IF THE Newborn IS TOO SICK

1. Wash hands
2. Take either size 6 or 8 F size feeding tube
3. Measure from tip of nose to tip of ear, from ear tip to midway between xiphoid sternum and umbilicus
4. Extend the head slightly
5. Lubricate the tube with sterile water
6. Insert the tube gently through the mouth to the stomach
7. Check if tube is in place. If it is in place
   - ❖ Use a 5cc syringe, aspirate and check for gastric content
   - ❖ Push 0.5ml of air and auscultate over epigastric region. You must hear the sound of air entering
   - ❖ Place the end of the tune into water, no bubbles must come out.
8. Give the required amount of feed to the newborn using a syringe
   - ❖ 60ml/kg/day for a term
   - ❖ 80ml/kg/day for a preterm)
9. When feeding, avoid pushing the fluid with force allow it to flow with gravity
10. Document the amount of fluid given in the case sheet
11. Administer feed every 2-3 hourly
12. Check for adequacy of feeding: newborn passing urine, warm, no abdominal distension, not vomiting feed.

Administering OXYGEN THROUGH CANULA OR MASK

1. Select oxygen canula
2. Insert the canula. Tape the canula to the cheek or apply the mask, see that both mouth and nose are covered.
3. Check if the oxygen is humidified.
4. Adjust the flow meter of oxygen to the required amount of oxygen
5. Administer 2-5L of oxygen as free flow oxygen to the newborn
6. DO NOT give 100% oxygen to a preterm newborn
7. Observe the newborn's respiratory distress score
8. Record the details in the case sheet

Provide SUPPORTIVE CARE

1. Keep the newborn warm both before and during transport
2. Get assistance to start an IV line if needed and for administration of first dose of antibiotics
3. Give the needed feed (Expressed breast milk) through the orogastric tube

4. Explain the condition of the newborn, the plan for the newborn to the parents and the advantages as well as challenges that they would face, so that they could make an informed decision on care of the newborn.
5. Find out from the parents and support person their preference on management of the newborn
6. Refer for further management

How to manage a REFERRAL AND TRANSPORT OF A NEWBORN

1. Identify the need for referral
2. Counsel parents regarding need for referral and transport
   - ❖ What is the condition of the newborn?
   - ❖ What is the prognosis without and with treatment?
   - ❖ What transport is needed and risks of it?
   - ❖ What arrangements are made/need to be made?
   - ❖ What is the preference of the family?
   - ❖ What their role is if accompanying the newborn?
3. Inform referral doctor/ hospital
4. Fill in referral form:
   - ❖ Condition and reason for transport
   - ❖ Name of mother, time of birth, sex and date
   - ❖ Problem
   - ❖ Name of facility, doctor
   - ❖ Signature of person referring
5. Record all vital information in the case sheet
   - ❖ Just as given above
   - ❖ Any action taken and response of newborn to it
   - ❖ Whether newborn has been stabilised
   - ❖ Medications given as per doctors order (normal saline, dextrose, vitamin K, antibiotics, phenobarbitone, epinephrine)
6. Provide safe transport:
   - ❖ One health care personnel to be with the family during transport to monitor and resuscitate newborn if needed
   - ❖ Continue bag and mask ventilation if needed
   - ❖ See that oxygen in available in the trolley/ambulance; equipment for resuscitation bag, mucus suction catheter, nasal canula, thermometer)
   - ❖ Ensure newborn is kept warm (thermocol box, well wrapped and in closed vehicle prior to transport

Table 8.3: Safe transport during referral

Prevent complications during transport	Essential communication to family member and doctor/nurse accompanying the newborn
1. Hypothermia – maintain warm chain 2. Hypoglycemia – maintain temperature and feeding schedule 3. Hypoxia – maintain airway	❖ Need for transport ❖ Positioning of newborn ❖ Clearing secretions ❖ Gentle stimulation ❖ Feeding newborn if needed ❖ Keeping newborn warm

How to PREVENT INFECTION IN A NEWBORN

1. Perform thorough hand washing before handling the newborn
2. Give /advise to mother exclusive breastfeeding
3. Keep cord dry. Avoid any application on the cord
4. Teach mother how to maintain hygiene of newborn
5. AVOID unnecessary invasive interventions such intravenous lines
6. Disinfect equipment and maintain cleanliness of the environment – resuscitation equipment, feeding articles, etc

8.5 Mentoring Skills

Sample Examples for Mentoring Episode

Sample example of mentoring using direct observation

You visit the PHC and staff nurse tells you that she is unsure whether a newborn is having respiratory distress or not. You go to the bedside of the mother and the newborn.

You ask the staff nurse what she has observed. She tells you, "I have counted the respiratory rate and it is 70/minute, the newborn is pink but the mother tells me that the newborn is not breastfeeding well". You check with the staff nurse about the details of the newborn (whether term or not, Whether born by normal vaginal delivery, whether the newborn cried soon after birth, what the APGAR was at 1 minute and 5 minutes).

The staff nurse tells you, "This is a term male newborn, 2.8kgs, born by normal delivery, cried at birth, APGAR at 1 minute was 9 and at 5 minutes was 9".

Appreciate the staff nurse for the right things she has done and said so far

- Respiratory rate
- Newborn pink
- Newborn not feeding well
- Details of the newborn

Reinforce that she is right in thinking the newborn is having respiratory distress since the respiratory rate is more than 60/minute and the newborn is also having feeding difficulty. Tell her that it is important to be mindful of the following

- When the breathing became more rapid?
- What is the gestational age of the newborn?
- Was the mother on steroids?
- Did the mother have premature rupture of membranes, fever?
- Was there meconium stained amniotic fluid?
- Was there any birth asphyxia?

In this situation, only the first question is relevant as everything is normal.

Then the severity of the respiratory distress must be assessed. Teach the staff nurse how to assess respiratory status (Table 8.4).

Table 8.4: Safe transport during referral

Score	0	1	2
Respiratory rate/minute	less than 60	60-80	more than 80
Central cyanosis	None	None with 40% oxygen	Needs more than 40% oxygen
Retractions	None	Mild	Severe
Grunting	None	Minimal	Obvious
Air entry	Good	Decreased	Very poor

Then tell the staff nurse given that the newborn's respiratory rate is 70/minute but there is no grunting, cyanosis, retractions and good air entry it indicates a score of 1. This means the newborn does not have distress.

But if the newborn has breathing difficulty, difficulty in feeding then she must ask/look for other features such as hypothermia or fever; any other danger signs and refer accordingly. Since this could indicate a possible sepsis or other problems.

Sample: Audit of working condition of equipment needed

1. Plan to do an audit at a regular time (once in three months).
2. Check the register that is to be maintained. If there is no register show the staff how to start and maintain a register. A sample register could be formatted as given in table 8.5

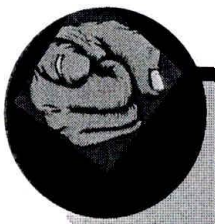
Table 8.5: Safe transport during referral

Date	Equipment	Working condition (Y/N)	Checked by	Next due date

3. Take a walk around the set up and check the equipment required if clean and in working condition. Some examples of equipment that would need to be maintained are given:
   - ❖ Radiant warmer
   - ❖ Suction apparatus
   - ❖ Oxygen cylinder
   - ❖ Bag and mask
   - ❖ Flow meter of the oxygen cylinder
   - ❖ Weighing machine
4. Appreciate the staff if all equipment in working condition and maintained clean. If not still give positive reinforcement on equipment that has been maintained.
5. Tell staff about the importance of maintaining equipment in working condition always, since no one can anticipate when they would be needed.

Sample format: Audit of transport of newborns to higher center

❖ Use the following format / checklist to assess whether transport of a sick newborn is done safely



Checklist for safe transport

- Has referral doctor/hospital been contacted? Y/N
- Has referral note been written? Are lab reports available? Y/N
- Has condition of newborn been noted just before transport? Y/N
- Does the newborn require ventilation support (bag and mask)? Y/N
- Have the parents been counselled? Y/N
- What arrangements have been made for transport for newborn? (warmth/feed/oxygen/resuscitation equipment) Y/N
- Which doctor /nurse will accompany the newborn and mother? Y/N

8.6 Key messages for mentors - Do's and don'ts

Do's	DO check if the temperature of the postnatal room is comfortable, (Ideal >250C).
	DO be prepared. Make sure all necessary equipment (radiant warmer/200 watt heat source/heater; thermometer, resuscitation equipment) and supplies (towel/long cloth/cap and socks/soap solution) are available for the birth of a newborn.
	DO watch all newborns in the facility carefully for any danger signs and assess the vitals such as temperature, breathing, colour and heart rate every 15 minutes for the first hour of life, then if stable every 4th hourly till discharge.
	DO be aware that appearance of danger signs is highest in the first day of life. The newborn must be assessed carefully to note for other associated problems.
	DO teach all mothers what danger signs to look for in the newborn before they are discharged and when to report to the health facility.
	Do refer those newborns who present with danger signs based on urgent / Immediate needs to a delayed referral within 24 to 48 hours.
Don'ts	DO NOT delay referral of a newborn who presents with a danger sign.
	DO NOT forget to explain about the don'ts such as ❖ Giving oil if the newborn has not passed stool ❖ Branding the newborn for respiratory distress, diarrhea, abdominal distension, seizures ❖ Applying something on the umbilicus ❖ Giving the newborn any home remedies

Chapter 9 Feeding a Low Birth Weight Newborn

Learning Objectives

At the end of this chapter you will be able to

- Describe the dietary requirements of a LBW newborn and how they can be met with by use of expressed breast milk.
- Describe the method of feeding for different categories of LBW newborns.
- Demonstrate how to feed a LBW with a palada
- Demonstrate mentor skills in meeting the nutritional need of LBW newborns in the PHC

9.1 Introduction

LBW newborns have special challenges (Table 9.1). They are either born term or preterm (before 37 weeks). They require more calories and protein than normal weight newborns, and might have difficulty sucking at the breast directly. They also may require more help and frequent monitoring.

Table 9.1: Types of LBW Newborn and Method of feeds

Problems of LBW	Types of feed	Indications for type of feed
Inability to suckle effectively Inability to coordinate swallowing and breathing Inability to coordinate swallowing and sucking	Gavage feeding ❖ Orogastric tube feed ❖ Spoon feed ❖ Cup or palada Depends on factors: ❖ Behaviour of newborn ❖ Observe response of newborn to feed	Less than 1500gm ❖ Spoon ❖ Paladai Some tube feed 1500-2000gm ❖ Breastfeeding ❖ Paladai 2000gm ❖ Breast feed

9.2 Components of Care of LBW

Identifying and Classifying LBW

- Follow methods described in Chapter 2 to classify the newborn newborn at birth

Screening for common problems

- Screen all LBW newborns for common danger signs as given in Chapter 8

Maintaining warmth

- Teach mother KMC before she leaves the facility
- Show mother other ways such as extra clothing, keeping room warm. Refer to Chapter 5 on Thermal control and KMC

Figure 9.1 LBW newborn

Feeding a LBW

- Teach mothers that LBW newborns require extra feeds and nutrients to maintain their growth requirements.
- Reinforce the need to feed LBW newborns only breast milk (see Table 9.2).

Table 9.2: How to feed a LBW newborn

Type of feed	Breast milk or expressed breast milk
Method of feeding	Direct feeding: Paladai / katori / spoon/ feeding tube
Frequency	Initial feed within half an hour, then 2 hourly
Volume of feeds	60-80 ml/kg on day 1
Increments	15 ml/kg upto a maximum of 150ml/kg/day by day 7

- Teach mother or other significant family member how to feed the newborn, if LBW but is stable, and more than 1800 gms / 1.8 kgs as given in the Table 9.3/9.4

Table 9.3: Types of LBW Newborn and Method of feeds

Gestational Age/ birth Weight	Day 1	5-7 days	10-15 days	2-3 weeks
2000 gms more than 35 weeks	Direct breastfeeding (DBF)			
1800 gms more than 34 weeks	Try direct breast feeds	If not taking give palada feeds Shift quickly to DBF		
1500 gms more than 32 weeks **Refer**	Try palada	If not taking give tube feeds and shift quickly to palada feeds	Progress to DBF	
1200 gm more than 30 weeks **Refer**	Tube feeds	Paladai feeds		DBF

Table 9.4: Feed volumes recommended based on the weight of the LBW newborn

	ml/kg/day	
Day 1	60	80
Day 2	80	95
Day 3	100	110
Day 4	120	120
Day 5	140	130
Day 6	150	140
Day 7	160	150

9.3 Importance of Components

Identifying and classifying LBW

- Prematurity, small for gestational age and intrauterine growth retardation (IUGR) are the commonest reasons for a newborn being LBW. Common causes of prematurity include low maternal weight, teenage or multiple pregnancies, previous history of preterm newborn, cervical incompetence, antepartum hemorrhage, acute systemic infection, and induced premature delivery. But in majority of cases, cause is unknown.
- Common causes for SGA and IUGR newborns include poor nutritional status of the mother, hypotension, pre eclampsia, anemia, multiple pregnancy, post maturity, chronic malaria, chronic illness and tobacco use. Thus if the PHC staff is aware of these causes in the mother it is a flag for her to be alert for the birth of a LBW newborn.
- Identification of and classification of newborns at birth itself could help to determine if additional interventions must be done for the newborn.
- A LBW newborn has a greater risk to present with danger signs such as asphyxia, breathing difficulty, convulsions, discharge or erythema from the umbilical cord, feeding difficulty, hypothermia or hypoglycemia, icterus, stiff or floppy newborn, irritability or lethargy and pustules
- Thus a newborn who either is less than 34 weeks or if the weight is less than 1800 gms must be referred immediately if this was not anticipated before birth.

Screening for common problems

- Anticipation of any danger sign or identification of them at birth could help in being prepared to provide initial steps of management before referral. This could help in initiating management early and could result in better health outcomes. The common problems include
  - Birth asphyxia and breathing difficulty is typically higher in LBW and premature newborns especially since their lungs are not developed enough,
  - Convulsions, could occur either since the newborn is at higher risk for intraventricular hemorrhage or infections. A newborn with severe infections could present with any of these danger signs such as convulsions, discharge or erythema (redness) from the umbilicus, feeding difficulty, stiffness or floppy, irritability or lethargy, pustules. Thus if any of these danger signs are present the newborn must be referred to a higher center for further management
  - Hypothermia risk is higher among newborns who are premature or LBW due to less amount of

brown fat. Thus it is important to maintain their temperature within normal levels. A newborn with hypothermia has greater risk for hypoglycaemia. In addition such newborns could lose more fluids due to their large head surface area, thin skin and greater metabolic rate. Hence their need is greater for calories and fluids than term newborns.

- Icterus could occur due to several reasons. In premature newborn the chance of jaundice is higher due to polycythemia (increased amount of RBCs). Thus if a preterm newborn's birth is anticipated it is ideal to refer the mother to a higher center. But if not possible to refer, then the newborn's umbilical cord must be clamped without delay to facilitate resuscitative measures and reduce the chance of polycythemia.

❖ Any danger sign if present in a preterm or LBW newborn must be immediately reported to the medical officer and such newborns must be referred since the risk for them developing serious infections are higher.

❖ All newborn less than 1800 gms, less than 34 weeks, unable to feed or sick must be referred to a higher center for further management.

Maintaining warmth

❖ A LBW newborn has decreased thermal insulation due to less subcutaneous fat and reduced amount of brown fat. Prevention and management of hypothermia is considered a key intervention in reducing neonatal mortality and morbidity. Specifically in LBW newborn, plastic caps, plastic wraps, skin-to-skin contact have been reported to be effective low cost interventions in reducing risk of hypothermia

❖ Acrocyanosis, apnea, bradycardia (low HR), cool and mottled extremities, distress, feeding poorly, hypoglycaemia, lethargy are flags for hypothermia.

Feeding a LBW newborn

❖ A LBW or a preterm newborn must be assessed for ability to feed before oral feeds are started. If these newborns are stable (respiratory rate less than 60/minute, no breathing difficulty, convulsions, hypothermia, alert and have a soft abdomen) they could be given oral feeds provided this ability has been assessed.

❖ Newborn who are less than 34 weeks do not have mature suckling patterns or good suck swallowing coordination and thus these newborns must be referred immediately to a higher center for further management.

❖ Transportation to a higher center can take time. The newborn must thus be fed by an orogastric tube or by spoon/palada to prevent hypoglycaemia. LBW newborn have less glucose stores and thus require more frequent feeding.

❖ Feeding must be progressed to oral feeds and then direct breast feeds based on the newborn's ability to suckle effectively and to coordinate suckling and swallowing of breast milk.

❖ The best milk for the newborn is still breast milk. It is known to reduce the risk of necrotising enterocolitis (NEC) a common problem among premature newborns where the intestines become infected. These newborns present with abdominal distension, vomiting that is bile stained (greenish in colour) or blood tinged fluid, black or blood stained stools, edema and will be lethargic and weak.

- A newborn must be observed for adequacy of feeding. The following are flags for inadequate feeding in a LBW or premature newborn
  - feeding less than 8 times in a day
  - poor attachment and suckling,

- gets tired easily
- mother has sore nipples or breast engorgement

❖ A LBW and SGA newborn usually will not lose weight as term newborns do, in the first week of life. The newborn must gain approximately 1-1.5% of its birth weight (15-30 gms/day). If a LBW or SGA newborn is not gaining adequate weight it is a flag sign for poor or inadequate feed intake.

9.4 Requirements to Feed LBW Newborn

Equipment and supplies

❖ 10 ml syringe
❖ Infant feeding tube 6 or 8F size
❖ Micropore to fix the tube
❖ Feeding cup
❖ Paladai
❖ Spoon to feed the newborn
❖ Katori
❖ Steriliser to boil the feeding cup / palada / katori or spoon

Clinical skills

Identification and CLASSIFICATION OF NEWBORN

1. Keep articles ready such as Infant weighing machine; clean towel/cloth; cleaning solution – 0.5% chlorine solution to wipe tray and clean cloth to wipe the wet tray.
2. Wash hands thoroughly before handling the newborn.
3. Explain the procedure to the mother and ensure that the newborn's weight is checked before the mother is transferred out of the labour room.
4. Place the newborn on the towel. Wait till the weight stops fluctuating to the nearest 10gms /0.01 kgs.
5. Cover the newborn immediately and hand over to mother or rewarm by asking the mother to provide kangaroo mother care (KMC) or keep under radiant warmer if needed
6. Record the weight in the newborn's case sheet.
7. Refer a newborn with birth weight "less than 1800 gms" for further management

Assessment of METHOD OF FEEDING FOR LBW OR PRETERM NEWBORN

1. Assess the newborn at birth for prematurity or being LBW
2. Check if the newborn is able to suckle, breathe and swallow
3. Check for any danger signs in the newborn
4. Check if the newborn is physiologically stable
   - ❖ No breathing difficulty
   - ❖ No chest in drawing
   - ❖ No hypothermia
   - ❖ No convulsions
   - ❖ No lethargy or drowsiness
   - ❖ No feeding difficulty

5. Explain to mother and support person the method of feeding the newborn
6 .Reinforce the importance of giving only breast feed to the newborn

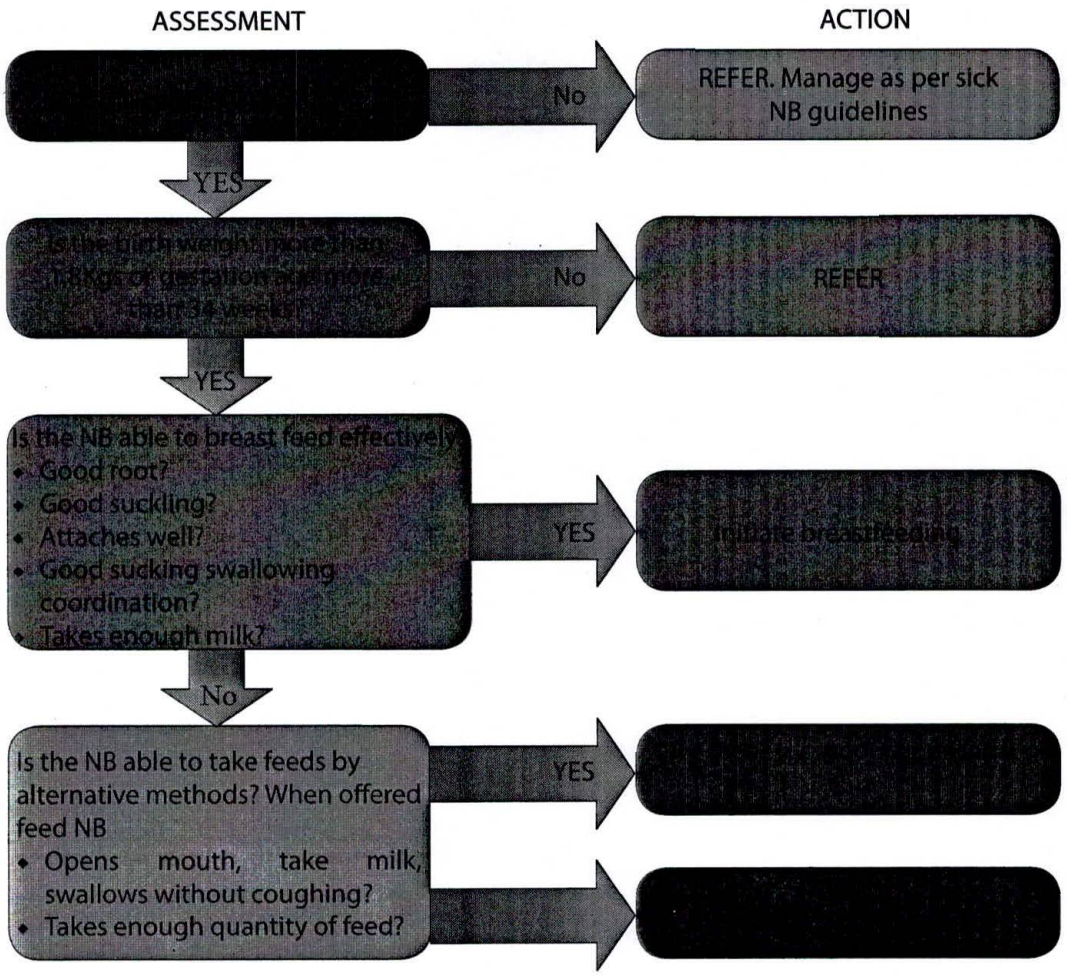


Figure 9.2 Guideline for feeding of LBW

Feeding by PALLADA

Feeding by Cup

- DO NOT allow the head of the newborn to hyperextend

Steps of the procedure

1. Wash hands
2. Check if the newborn is awake
3. Check if the cup/katori was cleaned, boiled
4. Place a measured amount of feed in the cup
5. Place the newborn on the lap
6. Support the newborn's head and back to a semi- sitting position with one hand
7. Touch the edge of the cup / katori to the outer parts of the upper lip
8. Tip the cup / katori so that the milk reaches the newborn's lips

❖ DO NOT force feed the newborn ❖ DO NOT pour the feed in the newborn's mouth	9. Allow the newborn to take the milk by her/himself (when the newborn smells the breast milk, /he /she becomes alert, opens its mouth and puts the tongue into the milk to start the feed) 10. See that the newborn takes it at a speed that is comfortable. The newborn will close the mouth and will not take the milk once satisfied. 11. Record the amount of feed given 12. Wash the cup / Katori, boil, dry and store in a covered clean container

5.Feeding by SPOON

	Steps of the procedure
❖ DO NOT force feed the newborn ❖ DO NOT feed a newborn whose suckling and swallowing is not coordinated ❖ DO NOT stop giving the recommended amount of feed because it is a slow method of feeding	1. Wash hands 2. Check if the newborn is awake 3. Check if the spoon has a smooth edge, is cleaned and boiled before use 4. Place a measured amount of feed in the katori 5. Place the newborn on the lap 6. Support the newborn's head and back to a semi- sitting position with one hand 7. Take a little feed on to the spoon 8. Touch the edge of the spoon to outer parts of the upper lip 9. Tip the spoon gently so that the milk reaches the newborn's lips 10. Allow the newborn to take the milk by her/himself (when the newborn smells the breast milk, he/she becomes alert, opens its mouth and puts the tongue into the milk to start the feed) 11. See that the newborn takes it at a speed that is comfortable. The newborn will close the mouth and will not take the milk once satisfied. 12. Record the amount of feed given 13. Wash the spoon, boil, dry and store in a covered clean container

Feeding by OROGASTRIC tube

Steps of the procedure

1. Wash hands
2. Take either size 6 or 8 size feeding tube
3. Measure from tip of nose to tip of ear, from ear tip to midway between xiphoid sternum and umbilicus
4. Extend the head slightly
5. Lubricate the tube with sterile water
6. Insert the tube gently through the mouth to the stomach
7. Check if tube is in place. If it is in place
   - ❖ Use a 5cc syringe, aspirate and check for gastric content
   - ❖ Push 0.5ml of air and auscultate over epigastric region. You must hear the sound of air entering
   - ❖ Place the end of the tune into water, no bubbles must come out.
8. Give the required amount of feed to the newborn using a syringe
   - ❖ 60ml/kg/day for a term
   - ❖ 80ml/kg/day for a preterm
9. When feeding, avoid pushing the fluid with force allow it to flow with gravity
10. Document the amount of fluid given in the case sheet
11. Administer feed every 2-3 hourly
12. Check for adequacy of feeding: newborn passing urine, warm, no abdominal distension, not vomiting feed.

Ensure ADEQUACY OF FEED

1. Assess: Ask

- ❖ How many feeds the newborn takes in 24 hours?
- ❖ What is the volume of each feed given?
- ❖ By which method is feed given?
- ❖ Does the NB have any feeding difficulty?

2. Observe

- ❖ Is the newborn sputtering or spitting out the milk?
- ❖ is the newborn tiring or takes too long to take the required amount?
- ❖ Check weight daily

3. Features indicating inadequate feed

- ❖ If each feed volume is less than that indicated
- ❖ Feeding the newborn less frequently than recommended
- ❖ If there is excessive spilling during feeds
- ❖ Takes too long to finish the required amount

- ❖ Refer THE Newborn FOR FURTHER MANAGEMENT if inadequately fed

4. REMEMBER: Adequate feed is assured when the newborn

- ❖ Passes urine 6-8 times in 24 hours
- ❖ Goes to sleep for 2-3 hours after the feeds
- ❖ Gains weight

9.5 Mentoring Skills

Sample examples for mentoring episode

Sample format for one-to- one mentoring a staff nurse to assess adequacy of feeding either direct breast feeds or spoon / katori / palada feeds

- ❖ Ask the staff nurse how she would assess if a LBW newborn is getting adequate feed
- ❖ Based on the response check if the staff nurse mentioned the following points
  - Asks the mother how many times the newborn is taking feeds in a day
  - If breastfeeding
    - ✓ Checks if the newborn's attachment is correct
    - ✓ Checks if the newborn is suckling well
    - ✓ Checks if the newborn is getting tired before the feed is complete
    - ✓ Checks if the mother has sore nipple / breast engorgement
    - If on katori / palada / spoon feeding
    - ✓ Asks mother how much of feed is given
    - ✓ Checks if there is spitting or spluttering of milk
    - ✓ Checks if the newborn is taking too long to take the required amount
    - ✓ Checks if the newborn is getting tired before the feed is complete
  - Informs that
    - ✓ If the newborn is getting less than 8 feeds/day, not attaching or suckling well, tires before completing the feed or if the mother has sore nipple or breast engorgement it indicates inadequate breastfeeding.
    - ✓ If the newborn is getting less than the indicated volume, feeding less frequently, is spitting out milk, is tiring before the feed is complete or is taking too long to feed, it indicates inadequate spoon / katori / palada feeding
    - ✓ If the newborn is not gaining weight as expected then it indicates poor feeding
- ❖ Start with all the correct points that the staff nurse mentioned, highlight other points that could be mentioned and complete with what the nurse could do to ensure that the LBW newborn has adequate feed.
- ❖ Reinforce to the staff nurse why it is important to check if the newborn is getting adequate feed.

Sample format for clinical skills demonstration of pallada feeds

- ❖ Observe the procedure while the PHC staff is demonstrating to the mother how to give pallada feed
- ❖ Check if the PHC staff did the following steps

Table 9.5: How to give pallada feeding

DO NOT force feed the newborn

Steps of palada feeding
1. Wash hands just before feeding the newborn
2. See that the newborn is awake and wrapped well
3. Hold in sitting semi upright position on the lap or bed
4. Put a measured amount of expressed breast milk in the palada
5. Hold the palada so that the pointed end rests on the infants lower lip
6. Tip the palada to pour out a small amount of milk into the newborn's mouth
7. Feed slowly or allow the newborn to suck as it wants
8. Make sure the newborn has swallowed the milk already taken before giving any more
9. Check if the newborn refuses any more feed, this indicates that newborn is satisfied.
10. Record the amount of feed given (amount left subtracted from original amount)
11. Wash the palada with soap and water, then boiled water and air dry it before and after use or boil and store in covered clean container till next use.

- ❖ Appreciate the PHC staff for the correct steps preformed
- ❖ Highlight the importance of adequate feeds for the preterm or LBW newborn
- ❖ Inform of how the PHC staff could ensure that the newborn is getting adequate feeds
- ❖ Demonstrate if possible the next feed to the PHC staff
- ❖ Ask PHC staff to recount the steps of palada feeding after you have completed it
- ❖ Give feedback to the staff nurses starting and ending with good points

9.6 Key messages - Do's and don'ts

Do's	***DO maintain the temperature*** of the postnatal room
	DO be prepared. Make sure all necessary equipment (radiant warmer/200 watt heat source/heater; thermometer, resuscitation equipment) and supplies (towel/long cloth/cap and socks/soap solution) are available for the immediate care of the LBW or premature newborn.
	DO watch the newborn carefully for any danger signs and assess the vitals such as temperature, breathing, colour and heart rate every 15 minutes for the first hour of life, then if stable every fourth hourly till discharge.
	DO be aware that appearance of danger signs is highest in the first day of life. The newborn must be assessed carefully to note for other associated problems
	DO assess LBW or premature newborn's if physiologically stable and whether able to feed
	DO give all stable LBW and premature newborns only breast milk
	Do refer those newborns who are less than 1800 gms (1.8 kgs) or 34 weeks of gestation or if present with danger signs based on urgent / immediate needs to a delayed referral within 24 to 48 hours.
	Do assess all LBW or premature newborns in the facility for adequacy of feeding and warmth at regular intervals
	DO give LBW or premature newborns more than 34 weeks direct breast feeds and additional feeds with either a katori or palada or spoon as they will tire easily.
	DO remember that LBW or premature newborns have more fluid requirement than term newborns (80ml/kg/day)
	DO watch a newborn on spoon / palada / katori feeds and check whether newborn is spitting, taking too long to finish the required feed, taking lesser than recommended amount as this indicates inadequate feeding. Refer urgently

Don'ts	***DO NOT forget to observe the newborn carefully for any danger signs*** during the stay at the facility.
	DO NOT delay referral of a LBW or premature newborn who presents with a danger sign.
	DO NOT feed a LBW or premature newborn with breathing difficulty (respiratory rate more than 60), severe chest in drawing, convulsions, hypothermia, drowsy or lethargic, abdominal distension. These newborns are not physiologically stable and would require care in a higher center
	DO NOT give direct breastfeeding to a newborn with poor suckling and poor suckling swallowing coordination.
	DO NOT forget to wash hands before feeding the newborn
	DO NOT forget to keep the LBW newborn warm during feeding
	DO NOT use formula feed unless advised by the doctor
	DO NOT force feed the LBW newborn particularly if lethargic

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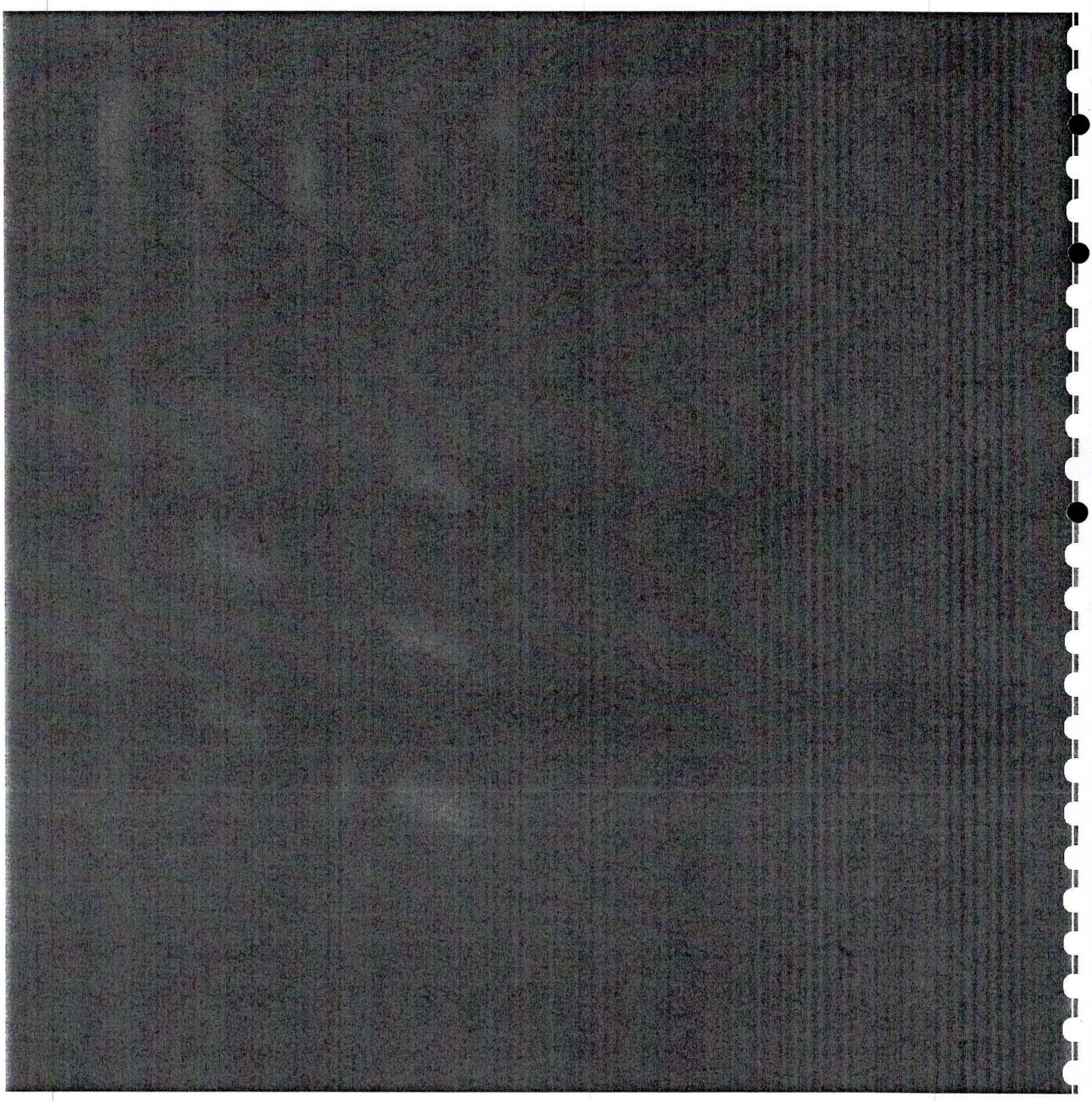

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