Indira Gandhi National Open University
SCHOOL OF HEALTH SCIENCE

CHO-0003

Public Health and Primary Health Care Skills

NATIONAL HEALTH MISSION
राष्ट्रीय स्वास्थ्य मिशन
राजस्थान



Newborn and Child Health Skills 6

Indira Gandhi National Open University
SCHOOL OF HEALTH SCIENCE

CHO-0003

Public Health and Primary Health Care Skills

राष्ट्रीय स्वास्थ्य मिशन
राजस्थान

Newborn and Child Health Skills 6

ignou
THE PEOPLE'S
UNIVERSITY

Indira Gandhi
National Open University
School of Health Sciences

CHO-0003
Public Health and Primary Health Care Skills

Block

6

NEWBORN AND CHILD HEALTH SKILLS

UNIT 1
Newborn Resuscitation 5

UNIT 2
Assessment of the Newborn 25

UNIT 3
Kangaroo Mother Care 44

UNIT 4
Infant and Young Child Feeding and Counselling 55

UNIT 5
Promoting and Monitoring Growth and Development and Use of Growth Chart 84

UNIT 6
Immunisation and Safe Injection Practices 119

UNIT 7
Use of Equipments 142

UNIT 8
National Child Health Programmes 174

Appreciation of Collaborative Efforts

The development of this Training Module for Community Health Officers (CHOs) is the result of a collaborative effort led by the Department of Medical, Health & Family Welfare, Government of Rajasthan, with valuable technical support from development partners. We sincerely thank all Directors, Project Directors, State Nodal Officers, and technical partners including Jhpiego, WHO, UNICEF, UNFPA, UNDP, IPE Global, IPAS, Evidence Action, JSI and others for their contributions. Their expertise, evidence-based inputs, and field insights have ensured the relevance and quality of this resource. This module aims to strengthen CHOs' capacity to deliver comprehensive, people-centered care at the community level, advancing our shared goal of improved health outcomes for all.

Acknowledging Contributors

The table below highlights the key contributors who played a critical role in the module's development, coordination, technical review, and partner support:

Coordination Committee

Dr. Rommel Singh (AD-Plan)	Ms. Shibumi Prem (Regional PO, Jhpiego)
Ms. Rachana (District Program Officer-NHM)	Dr. Manoj Sharma (Nursing Tutor)

OICs

Dr. Mushtaq Khan (SNO-MNJY)	Dr. Tarun Chaudhary (PD-MH)
Dr. Praveen Aswal (AD-RH)	Dr. Surendra Singh Shekhawat (PD-FW)
Dr. Pradeep Kr. Choudhary (PD- CH)	Dr. Mukesh Digarwal (PD-RKSK/RBSK & AD Ayush)
Dr. S.M. Swami (SNO-NMHP)	Dr. Raghraj Singh (PD-Immunization)
Dr. Nirmala Sharma (Deputy Director Malaria)	Sh. Rajendra Bhakher (Demographer, NHM)

Responsible Partner Coordinators

Mr. Arun Vashisht (NHM, Jaipur)	Ms. Karuna Singh (IPAS)
Dr. Zakariya Chouhan (WHO)	Mr. Devi Prasad Verma (IPAS)
Dr. Rashi Gupta (Jhpiego)	Ms. Manjri Singh (UNICEF)
Ms. Dande Venkata Sireesha (Jhpiego)	Dr. Kapil Agarwal (UNICEF)
Dr. Eshvita Bhadoo (Jhpiego)	Mr. Krishan Gopal Soni (UNFPA)
Dr. Pradeep Chaudhary (NIPI)	Mr Siyaram Sharma (UNFPA)
Ms. Pricella Bassin (IPE Global)	Dr. Abhay Bora (JSI)
Ms. Molshree Rathore (Evidence Action)	Mr. Mudit (UNDP)

CURRICULUM DESIGN COMMITTEE AND EXPERT COMMITTEE

Prof. (Dr.) Pity Koul
Director and Programme Coordinator

Dr. R.S Salhan
Additional DGHS (Retd.) Advisor, NHSRC, New Delhi

Dr. R.K Srivastava
Former DGHS, Govt. of India New Delhi

Dr. Suneela Garg
Sub Dean & Head Dept. of Community Medicine, MAMC , New Delhi

Dr. Amarjeet Singh
Professor, Dept. of Community Medicine PGIMER, Chandigarh

Dr. Subodh. S. Gupta
Professor, Dept. of Community Medicine, MGIMS, Sevagram, Wardha

Mrs. Santosh Mehta
Principal, RAK College of Nursing, Lajpat Nagar, New Delhi

Dr. Prakasamma
Former Director, National Academy of Nursing Studies and Woman Empowerment (ANSWER) Hyderabad

Dr. Sushma Kumari Saini
National Institute of Nursing Education (NINE) PGIMER, Chandigarh. (U.T)

Dr. Sanjay Rai
Associate Professor Department of Community Medicine, AIIMS, New Delhi

Dr. Himanshu Bhushan
Advisor, NHSRC, New Delhi

Dr. Rajni Ved
Advisor, NHSRC, New Delhi

Dr. Dilip Singh
Advisor, NHSRC, New Delhi

Dr. Vinay Bothra
Sr, Consultant, NHSRC

Dr. Sumitha Chalil
NHM, MoHFW, New Delhi

Dr. Reeta Devi
Assist. Prof. (Sr. Scale) & programme Coordinator

Mrs. Rohini Bhardwaj Sharma
Assist. Prof. IGNOU

BLOCK PREPARATION TEAM

Writers

Unit-1 **Dr. Poonam Joshi**
Assistant Prof.CON, AIIMS, New Delhi.

Prof. Pity Koul
Director & Prog. Coordinator School of Health Sciences, IGNOU, New Delhi

Unit-2 and 3 **Prof. (Lt.Col). Rekha Gupta**
Ex-Principal C/O Sunsign Aptt. Gwalior, M.P

Prof. Pity Koul
Director & Prog. Coordinator School of Health Sciences, IGNOU, New Delhi

Unit-4 **Dr. H.C.Rawat**
Principal, College of Nursing (CON), Baba Farid University, Fardikot, Punjab

Prof. (Dr.) Pity Koul
Director & Prog. Coordinator School of Health Sciences, IGNOU, New Delhi

Unit- 5 **Dr. Sushma Kumari Saini**
Lecturer, National Institute of Nursing Education (NINE), PGIMER Chandigarh

Prof. Pity Koul
Director & Prog. Coordinator School of Health Sciences, IGNOU, New Delhi

Unit-6 **Dr. Kamlesh Sharma**
Associate Professor, AIIMS, New Delhi

Prof. Pity Koul
Director & Prog. Coordinator School of Health Sciences, IGNOU, New Delhi

Unit-7 **Dr. Raman Kataria**
General surgeon and Public Health Specialist JSS, Chattisgarh

Prof. Pity Koul
Director & Prog. Coordinator School of Health Sciences, IGNOU, New Delhi

Editors

Dr. Manju Vatsa
Principal
Pediatric Nursing. AIIMS
New Delhi

Prof. (Dr.) Pity Koul
Director and Programme Coordinator

Unit Transformation and format editing

Prof. (Dr.) Pity Koul
Director and Programme Coordinator

Dr. Reeta Devi
Assist. Prof. (Sr. Scale) & Programme Coordinator

COURSE REVIEW COMMITTEE

Dr. Rajesh Kumar
Prof. & Head, Dept. of Community Medicine, PGIMER, Chandigarh

Dr. Suneela Garg
Sub Dean & Head
MAMC, Departmant of Community medicine, New Delhi

Dr. Himanshu Bhushan
Advisor, NHSRC, New Delhi

Dr. A.K. Sood
Prof. & Dean of Educations & Training, NIHFW, New Delhi

Dr. Prabir Chatterjee

SHRC, Chattisgarh

Dr. S.B Sinha
Advisor HCT, NHSRC

Dr. M.M.Singh
Director & Professor MAMC, Community Medicine, New Delhi

Dr. Jugal Kishore
Director Professor VMMC, Safdarjung Hospital, New Delhi

Dr. Najam Khalique
Department of Community Medicine AMU, Uttar Pradesh

Dr. Dilip Singh Mairembam
Advisor, NHSRC, New Delhi

Dr. Manju Rani

WHO

Dr. Radhika Gupta
Consultant, NHSRC

Dr. Vinay Bothra
Sr, Consultant, NHSRC

Faculty SOHS, IGNOU

Prof. (Dr.) Pity Koul
Director and Programme Coordinator

Dr. Reeta Devi
Assist. Prof. (Sr. Scale) & programme Coordinator

Mrs. Rohini Bhardwaj Sharma
Assist. Prof.

Brig.(Dr) Kanchan Sharma (Retd.)
Senior Consultant, IGNOU
R.K. Puram, New Delhi

CO-ORDINATION

Prof. (Dr.) Pity Koul
Director & Programme Coordinator
School of Health Sciences, IGNOU, New Delhi

Dr. Reeta Devi
Asstt. Professor. (Sr. Scale) & Programme Coordinator
School of Health Sciences, IGNOU, New Delhi

PRODUCTION

Mr. T.R. Manoj
Assistant Registrar (P)
SOHS, IGNOU, New Delhi

May, 2017
© Indira Gandhi National Open University, 2016
ISBN :
All rights reserved. No part of this work may be reproduced in any form, by mimeograph or any other means, without permission in writing from the Indira Gandhi National Open University.
Further information about the School of Health Sciences and the Indira Gandhi National Open University courses may be obtained from the University's office at Maidan Garhi, New Delhi-110 068.
Printed and published on behalf of the Indira Gandhi National Open University, New Delhi by **Prof. Pity Koul, Director**, School of Health Sciences.
We acknowledge the reference of material and figures from various sources like NNF, AIIMS, WHO, UNICEF, IGNOU, Govt. of India etc.
Laser Typesetting and Printed at : **Rajasthan State Cooperative Press Ltd., Jaipur**

BLOCK INTRODUCTION

Significant progress has been made in new born and child health care in recent decades. However infant and child mortality and morbidity continues to be very high so you need to take appropriate preventive and promotive measures to reduce mortality and morbidity by providing skilled care to newborn and child at subcentre level.

This block has been developed in such a manner so that you will be able to develop the skills based on the knowledge gained during the study of theory course material and contact session which will enable you to carry out specific practical activities such as, resuscitation of newborn, perform CPR in older child, assessment and examination of a newborn, identify birth defects, make appropriate referral, ensure kangaroo mother care and provide follow up care at home, educate family members about home care, demonstrate correct positioning, attachment and technique of breastfeeding, counsel the mother on infant and young child feeding. You will also be able to improve your skills in measuring the growth as well as monitoring developmental mile stones in children so that you can recognize any deviation in growth and development and educate the family and community accordingly for preventive measure.. Focus on safe immunization sessions and safe disposal of waste generated at the sub center will enable you to ensure 100% immunization at subcentre and prevent infections. Emphasis is on various equipments will enable you to make appropriate use of equipment for care of the newborn and child and identify of errors/faults in the functioning of equipment so that necessary action can be taken to check and rectify the error.

This block consists of the following seven units as given below

Unit 1 focuses on New Born Resuscitation

Unit 2 relates to Assessment of Newborn

Unit 3 deals with Kangaroo Mother Care

Unit 4 focuses on Infant and Young Child Feeding and Counseling

Unit 5 relates to Promoting And Monitoring Growth And Development And Plotting of Growth Chart

Unit 6 deals with Immunization and Safe Injection Practices

Unit 7 focuses on Use of Equipment

We hope the information given in this Block may help you in improving your knowledge and skills, so as to provide effective care to the newborn and child.

UNIT 1 NEWBORN RESUSCITATION

Structure

1.0 Introduction

1.1 Objectives

1.2 Purpose, Indications and Preparation for Resuscitation

1.3 Equipments Used in Resuscitation

1.4 Steps of Resuscitation Procedure

- 1.4.1 Routine Care
- 1.4.2 Initial Steps
- 1.4.3 Positive Pressure Ventilation
- 1.4.4 Chest Compressions
- 1.4.5 Drugs Used in Neonatal Resuscitation

1.5 Let Us Sum Up

1.6 Activity and Guidelines

1.7 References

1.0 INTRODUCTION

The vast majority of newborn babies require no resuscitation except maintenance of temperature and cleaning of airways. Approximately 5–10 % of newborns require some assistance to begin breathing at birth and about 1% needs extensive resuscitation to survive. Nearly 1 million newborn die because of asphyxia (difficulty in breathing due to lack of oxygen) so these babies can survive with resuscitation.

In this unit we shall discuss about various steps of neonatal resuscitation in newborns. Which includes routine care initial steps of resuscitation, Positive pressure ventilation, Chest compression, Drugs used in neonatal resuscitation.

1.1 OBJECTIVES

After completing this practical, you should be able to:

- identify neonates who need routine care after birth;
- prepare the equipments and environment for resuscitation;
- perform the steps of resuscitation correctly and effectively;
- demonstrate use of bag and mask ventilation on the manikin;
- perform chest compressions; and
- record appropriate information about resuscitation procedure;

1.2 PURPOSE, INDICATIONS AND PREPARATION FOR RESUSCITATION

Resuscitation involves series of steps taken to ensure the stabilisation of newborn to life outside the uterus. We shall begin with purpose and indication of resuscitation as given below.

Purposes

Purposes of neonatal resuscitation are to:

- Prevent heat loss
- Clear airways by suction
- Establish effective circulation
- Stabilise the newborn and avoid complications e.g. brain damage etc.

Indications

Conditions in Mother and baby, predisposing babies to asphyxia that need resuscitation are given below:

Mother: Pregnancy induced hypertension, bleeding (placenta previa) prolonged or obstructed labour, fever in labour, post-term pregnancy

Umbilical cord: Cord around the baby's neck, short cord, knot in the cord, prolapsed cord etc.

During or after births: Premature baby (before 37 weeks pregnancy), difficult delivery (breech multiple birth, forceps etc.), congenital or genetic anomalies, meconium in the amniotic fluid baby has too much fluid in its mouth and throat, emergency LSCS, prolonged labour>24 hrs.

Preparation for Resuscitation

Preparation for newborn resuscitation includes – **personnel, equipments and environment**. Let us begin with personnel

Personnel

- skilled person for performing resuscitation
- a team of 3 or more persons with designated role
- a separate team should be present for each newborn. Each team should have a leader and team member.

Equipments

A complete set of resuscitation equipment should be available in fully operational conditions at the delivery site. The equipments should be checked for functioning in each shift (see Section 1.3).

Environment

Resuscitation should be carried out in warm environment.

Keep the equipments warm to prevent heat loss. Cold stress can increase oxygen consumption and impede effective resuscitation.

Provide Warmth

Keeping a newborn baby warm saves the baby's energy for breathing.

Maintain Room Temperature: By keeping room warm (at least 25°C)

Dry the baby: Dry immediately after birth with clean dry sheet and cover newborn by warm dry sheet.

Let us discuss about Essential resuscitation equipments in following section.

1.3 EQUIPMENTS USED IN RESUSCITATION

Neonatal Resuscitation Supplies and Equipment are given below.

Suction equipment

- De lee trap or Mucus sucker.
- Mechanical suction
- Suction catheters, No. 12 FG, 14 FG (oral suction), 5 or 6 F for pre-term and 8 F for term baby for E.T. suction
- Feeding tube 6F and 20 ml syringe

Bag and mask equipment

- Neonatal resuscitation bag (250–750 ml) with oxygen reservoir
- Face masks, term (1) and pre-term (0) sizes
- Oxygen with flow meter and tubing

Intubation equipment

- Laryngoscope with straight blades, No. 1 (term), No. 0 (preterm) and 00 for extremely pre-term baby
- Extra bulbs and batteries for laryngoscope
- Endotracheal tubes: 2.5, 3.0, 3.5, 4.0 mm internal diameter
- Endotracheal tube stylet (optional)

Medications

- Epinephrine
- Normal saline and Ringer's Lactate
- Sterile water

Miscellaneous

- Watch with seconds hand
- Warm linen, shoulder roll
- Radiant warmer
- Stethoscope
- Adhesive tape
- Syringes 1, 2, 10, 20, 50 ml
- Gauze pieces
- Umbilical catheters 3.5 FG, 5 FG
- Three-way stopcock
- Sterile gloves

Refer Unit 7 of this block 'Use of Equipment'.

1.4 STEPS OF RESUSCITATION PROCEDURE

The steps involved in neonatal resuscitation have been described in depth in Fig. 1.1. Approximately 60 seconds (*the golden minute*) are allotted for completing the initial steps, re-evaluating the condition of the newborn and beginning ventilation and chest compression if required

The decision to progress beyond the initial steps is determined by simultaneous assessment of 2 vital characteristics: **respirations** (apnea, gasping, or laboured or unlaboured breathing) and **heart rate** (whether greater than or less than 100 beats per minute). Assessment of heart rate should be done by intermittently auscultating the precordial pulse. Palpation of the umbilical pulse at stump can provide a rapid estimate of the pulse and is more accurate than palpation at other sites.

Once positive pressure ventilation or supplementary oxygen administration is begun, assessment should consist of simultaneous evaluation of 3 vital characteristics: **heart rate, respirations**, and the **state of oxygenation**, the latter optimally determined by a pulse oximeter. The most sensitive indicator of a successful response to each step is an increase in heart rate.

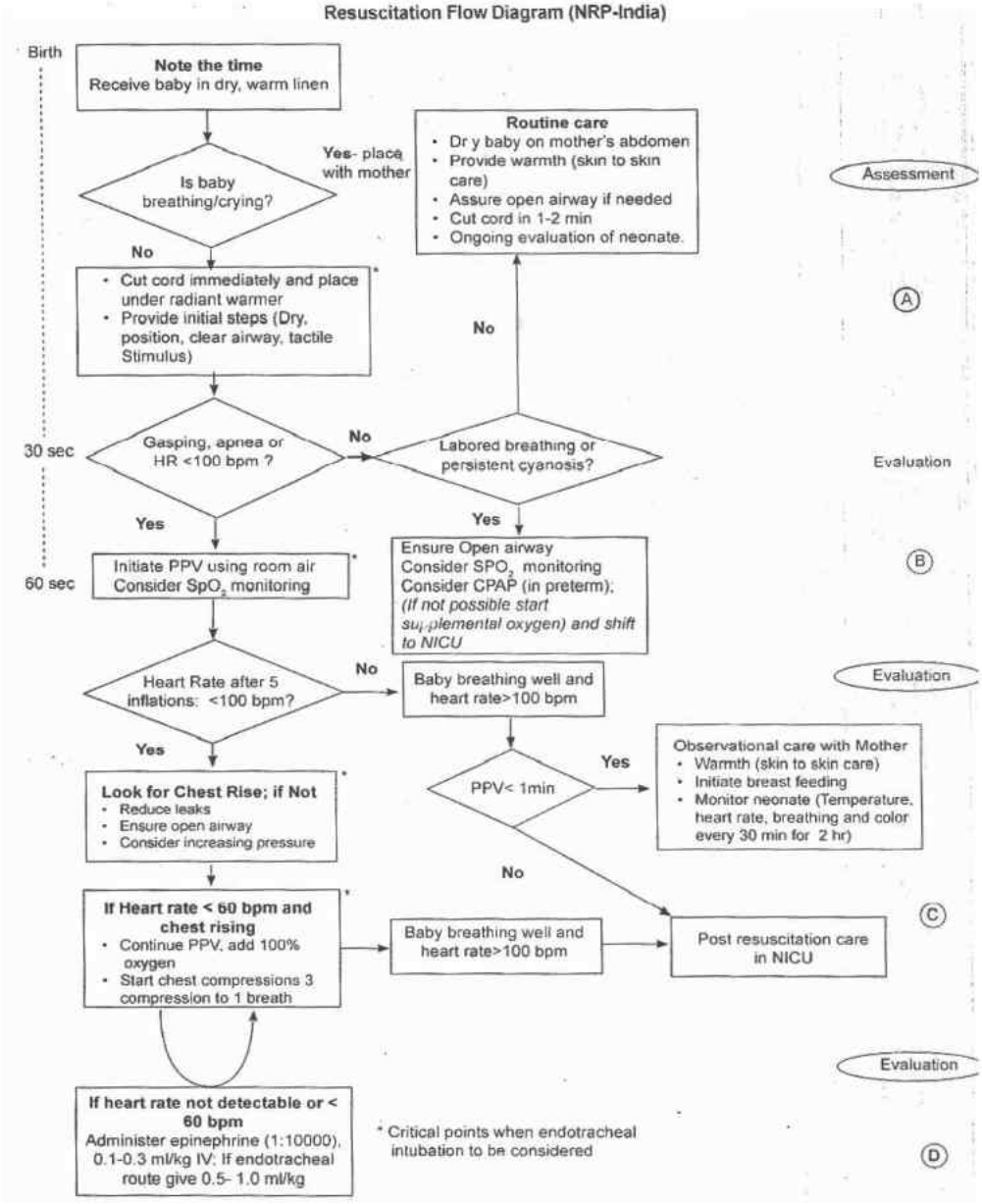


Fig. 1.1: Neonatal of Resuscitation Flow Diagram (NRP- India)

Let us further explain each of the above steps given in algorithm.

1.4.1 Routine Care

Nearly 90% of newborns are vigorous term babies with no risk factors and clear amniotic fluid. In such babies you need to maintain warmth by direct skin to skin contact and clear the airway by wiping the baby's nose and mouth with sterile cloth. Assess whether baby needs routine care or initial steps of resuscitation. Follow the steps as given below. (Fig. 1.2)

- Note the time of birth

⇩

- Receive baby in dry warm linen

⇩

- Is baby breathing or crying?

⇩

- If yes provide routine care.

If answer is YES to question i.e. Is baby breathing or crying-then provide routine care and if the answer is "No" to the above question, begin initial steps of resuscitation (dry, position, clear airway and tactile stimulus) as explained below Fig. 1.2.

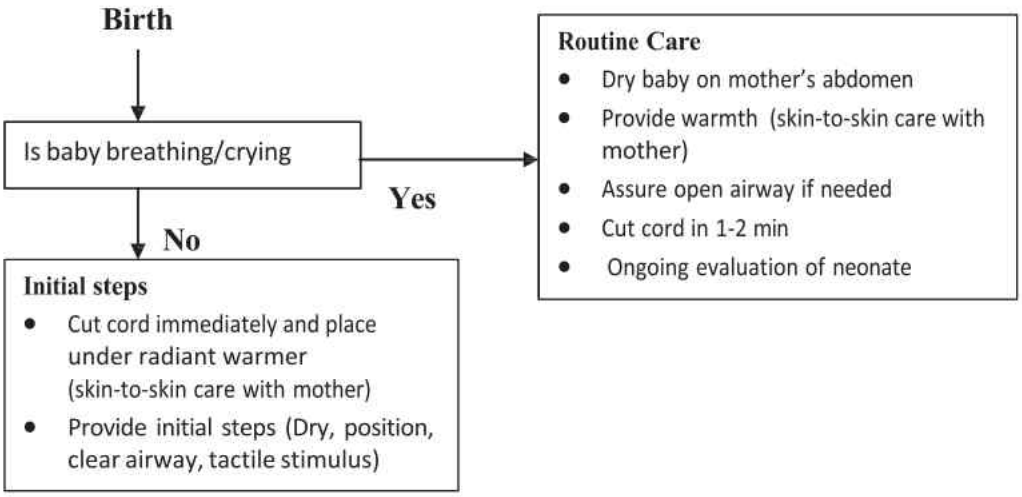


Fig. 1.2: Routine care and initial steps

1.4.2 Initial Steps

If baby requires initial steps based on assessment, you should cut cord immediately and place baby under radiant warmer (skin to skin care with mother) Fig. 1.3.



Fig. 1.3: Placing the baby under radiant warmer

The initial steps include following:

- Drying the baby
- Positioning
- Clear airway
- Tactile Stimulation

Let us briefly explain each step.

Drying the baby

The baby should be immediately dried with dry, pre-warmed towel.

Positioning

- Positioned the baby on the back with the neck slightly extended in the "sniffing position." The goal is to move the nose of the baby as far as anterior as possible.
- Care should be taken to prevent hyper-extension or flexion of the neck, since either may restrict air entry.
- To attain a correct posture, a rolled piece of cloth/gauze piece (shoulder roll) may be placed under the shoulder of the baby (Fig. 1.4).

This is particularly useful when there is a large occiput (back of head) resulting from molding or oedema.

- Place the baby in correct position Fig. 1.5.

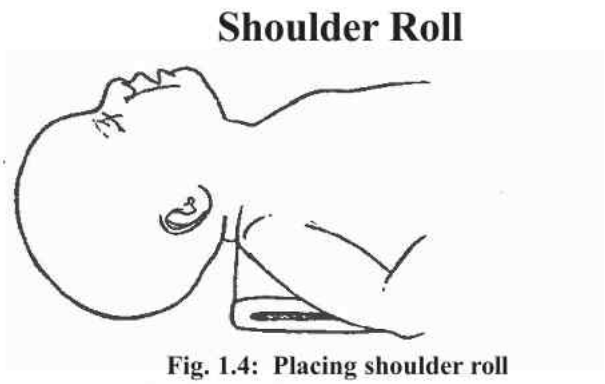


Fig. 1.4: Placing shoulder roll

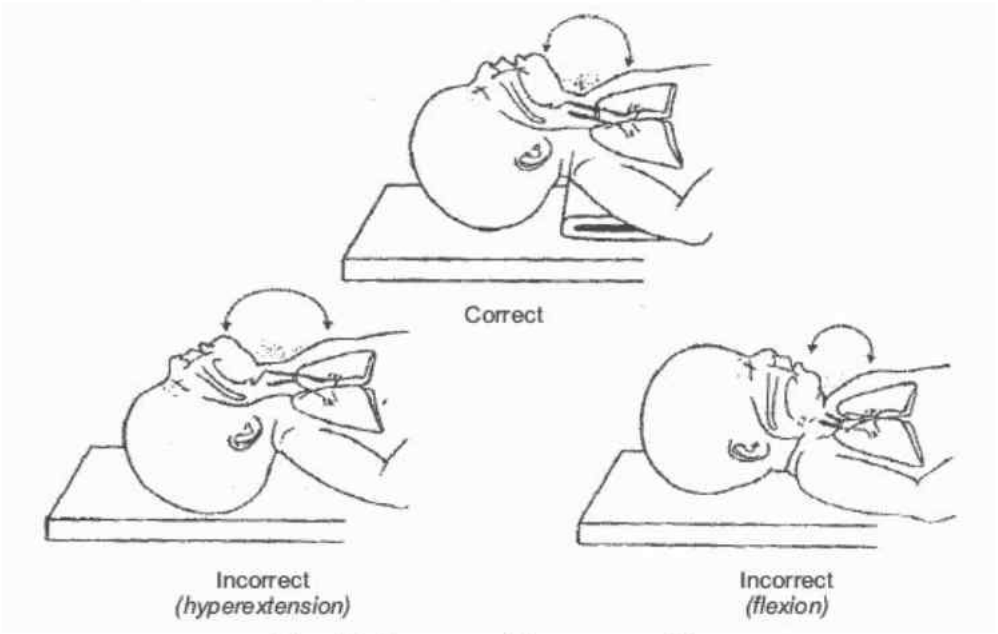


Fig. 1.5: Correct and incorrect positions

An appropriate position as described facilitates an un-restricted air entry, by bringing the posterior pharynx, larynx and trachea in line. This alignment in the supine position is also the best position for assisted ventilation with mask or the placement of endotracheal tube.

Clear airway

Once the newborn has been positioned, the clearing of the airway if required should immediately follow.

Method of clearing airway depends upon

- Presence of meconium stained amniotic fluid at the time of delivery.
- The level of activity of the baby (is the baby depressed or vigorous at birth).

Vigorous baby is a baby with strong respiratory efforts, good muscle tone and a heart rate greater than 100 bpm.

Clearing the airway when amniotic fluid is free of meconium

- Remove secretions by wiping the nose and mouth with a towel or by suctioning with a mucous extractor or suction catheter attached to mechanical suction device.
    - Turn the head to one side. It will allow the secretions to collect in the cheek where they can be removed easily.
    - Suction mouth before nose to avoid aspiration. An easy way to remember the same is that M comes before N in the alphabet.

Remember:

The suction should not be done as a routine ritual in all cases. When there are copious secretions, we need to use suction from the wall or from an electric suction machine at a pressure not more than 100 mm of Hg.

Caution: One should be careful while using the catheter. Stimulation of the posterior pharynx during the first few minutes after birth can produce a vagal response, causing severe bradycardia or apnoea.

Clearing the airway, when meconium is present and baby is vigorous

In a baby born with meconium stained fluid, who is vigorous, the airway is cleared simply by use of mucous extractor or large bore suction catheter (12 or 14 F). The steps of clearance are similar to the baby born without meconium stained liquor.This is performed by skilled and trained staff at higher facility.

Tactile stimulation

Drying and suctioning stimulates a baby to breathe. For most of the newborns, these are sufficient to initiate respiration. If the baby does not have vigorous breathing, tactile stimulation may be briefly provided.

The safe and appropriate methods of providing tactile stimulation is given below. (Fig. 1.6)

- Gently flicking or slapping the soles
- Gently rubbing the back, trunk and the extremities of the baby.

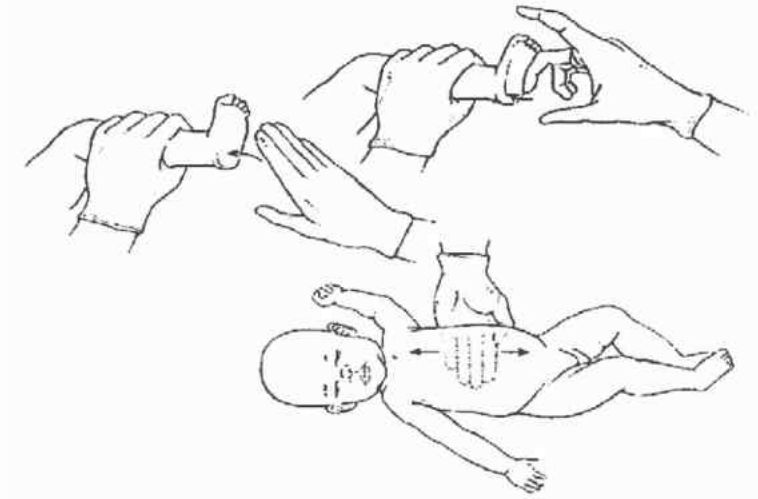


Fig. 1.6: Tactile stimulation

Provide 1 or 2 flicks or slaps to the sole or gently rubbing the back once or twice to provide stimulation.

Avoid vigorous stimulation like shaking baby or holding baby upside down, slapping in back, squeezing the rib cage, forcing thigh on abdomen or using hot or cold compress as they are very harmful to the baby.

If baby remains apneic despite tactile stimulation, positive pressure ventilation should be immediately see Fig. 1.7.

Evaluation

- Evaluate the baby to assess if further resuscitation is needed.
- Assess the baby for good respiration.
- Check whether there are good chest movements or not.
- The rate and depth of respiration increases after few seconds of tactile stimulation.
- In some babies especially the pre-term, the respiration may be laboured. Such breathing should be noted. These babies may require additional respiratory support and monitoring.
- Check the Heart rate by auscultating the heart or by palpating the umbilical pulsations for 6 seconds.
- Whatever the number of beats/pulsations, it is multiplied by 10 to obtain the heart rate per minute (e.g. a count of 12 in 6 seconds is a HR of 120/min). The heart rate should be more than 100 bpm.
- The entire process of resuscitation should not take more than 30 seconds.

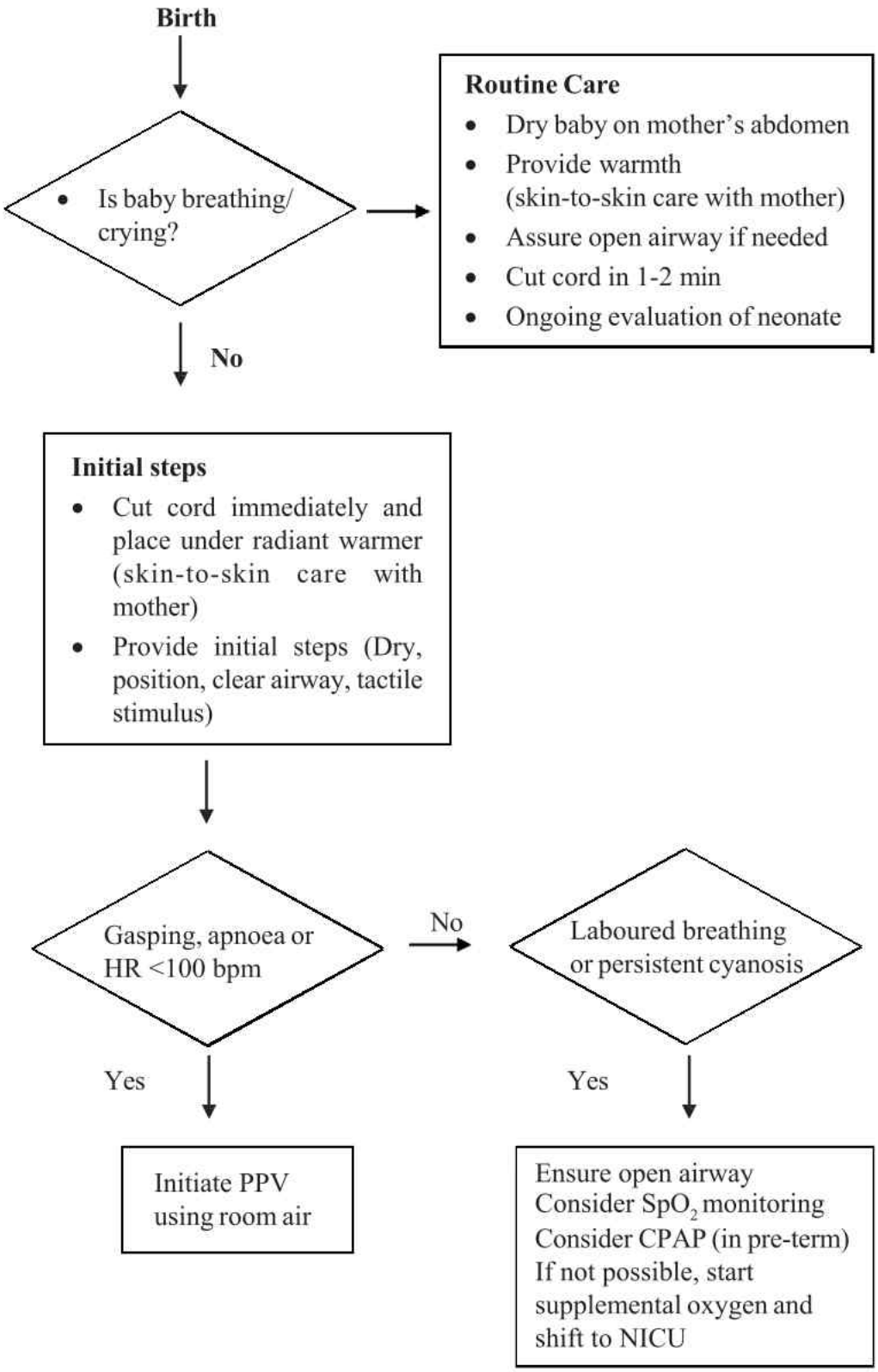


Fig. 1.7: Steps to be followed in case of gasping, apnoea, and HR< 100 bpm

As shown in Fig. 1.7 if on Evaluation.

On evaluation of breathing and heart rate after initial steps, if baby is apneic or has gasping respiration or heart rate less than 100, one should proceed to provide positive pressure ventilation (PPV).

If baby is breathing well and heart rate is above 100 but respirations are laboured or you think that the baby is persistently cyanotic, such baby needs additional respiratory support (especially if pre-term) and tailored optimal oxygen delivery. If the CPAP machine for respiratory

support and the blender with pulse oximeter for optimal oxygen delivery are not available, one can consider starting supplemental oxygen and shifting baby immediately to NICU (Fig. 1.7).

Free-flow Oxygen

Free flow of oxygen can be provided by:

- Oxygen mask held over the baby's face
- Flow inflating bag and mask
- Oxygen tubing cupped closely over the baby's mouth and nose
- T piece resuscitator
- If the central cyanosis persists, it would be ideal to attach a pulse oximetry probe to determine if the baby's oxygenation is in the abnormal range.
- If the levels are below the saturation targets established for a normal baby during transition and are not increasing, we may have to think providing supplemental oxygen. (Fig. 1.8)

2 min: 65-70%

3 min: 70-75%

4 min: 75-80%

5 min: 80-85%

10 min: 85-90%

Fig. 1.8: Acceptable Pre-ductal SpO_2

- **The normal intra-uterine saturation is 60%, which increases gradually to 90% only by 10 minutes of birth. Because of the normal transition pattern and the possibility of oxygen toxicity, it is best to give oxygen to maintain the saturation of the baby in the acceptable ranges (Fig. 1.9).**
- **The saturation of the baby should be used to decide the duration of oxygen delivery. In case the same is to be given for a longer time then oxygen should be heated and humidified. Avoid flow rates that are more than 5 liters per minute, as this may cause significant convective heat losses.**
- **When central cyanosis improves and the saturations of the baby are above 85-90%, supplemental oxygen is gradually decreased. If cyanosis or low oxygen saturation (<85%) persists in spite of giving free flow oxygen, the baby may have a significant lung disease and a trial of positive pressure ventilation (PPV) is justified. However, if ventilation is adequate and the baby still remains cyanotic, then a diagnosis of the congenital cyanotic heart disease or persistent pulmonary hypertension of the newborn should be considered.**

1.4.3 Positive Pressure Ventilation (PPV)

Positive pressure ventilation is indicated in following situation:

- Baby is apneic or gasping or
- Heart rate is less than 100 bpm even with breathing, and/or
- Has persistent cyanosis or low oxygen saturation, despite free flow oxygen increased to 100%.

Equipments available for PPV in newborns

There are three types of equipments available for providing PPV in the newborns:

1) The self inflating bag (Fig. 1.9)
2) The flow inflating bag (Fig. 1.10)
3) The T piece resuscitator (Fig. 1.11)



Fig. 1.9: Self inflating bag



Fig. 1.10: Flow inflating bag



Fig. 1.11: T Piece Resuscitator

Assembling equipment

The bag should be assembled and connected to oxygen so that it will provide the necessary 90% to 100%. If a self-inflating bag is used, be sure the oxygen reservoir is attached. Connect the mask to the bag.

Testing equipment

To check a self-inflating bag, block the mask or patient outlet by making an airtight seal with the palm of your hand (Fig. 1.12). Then squeeze the bag:

- Do you feel pressure against your hand?
- Can you force the pressure release valve open?
- Is the valve assembly present and moving as it should

If not:

- Is there a crack or leak in the bag?

- Is the pressure-release valve missing or stuck or closed?
- Is the patient outlet completely blocked?

If your bag generates adequate pressure and the safety features are working, while the mask patient outlet is blocked check to see:

Does the bag re-inflate quickly when you release your grip?

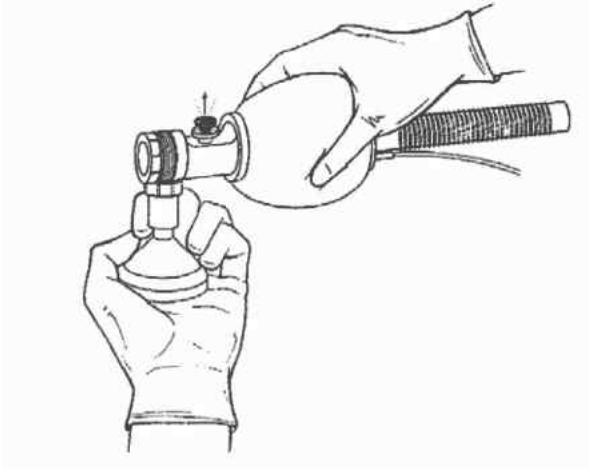


Fig. 1.12: Testing equipment

Select equipment

Select the appropriate equipment:

- Obtain a resuscitation bag with oxygen reservoir and connect it to any oxygen source
- Select a mask of the proper size
- Quickly check the bag to be sure if it functions properly (if you did not do so previously)

Position mask and obtain seal

The infant's neck should be slightly extended to ensure an open airway.

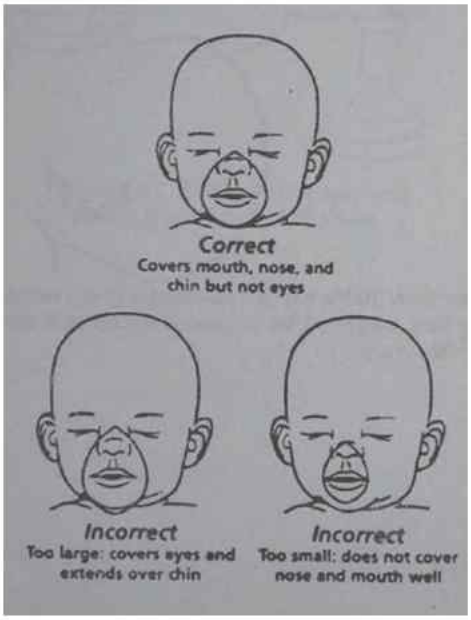


Fig. 1.13: Position of mask on the face of newborn

Place the mask in correct position Fig 1.13 and check the seal by ventilating two or three times. Observe for an appropriate rise of the chest. (Fig. 1.14)

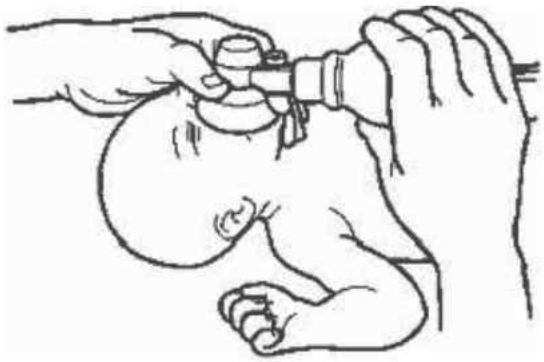


Fig. 1.14: Bag and mask ventilation

Ventilate the newborn at the Rate of 40 to 60 breaths per minute

40–60 breaths per minute

Breath —— two ——three —— Breath

Usual pressure required for the first breath is 30–40 cm of water. For subsequent breaths, pressures of 15–20 cm of water are adequate. The best guide to adequate pressure during bag and mask ventilation is an easy rise and fall of the chest with each breath.

For babies born at term, it is best to begin PPV with room air rather than 100% oxygen.

Assessing effectiveness of ventilation

- Provide up to 5–10 manual breaths looking for chest rise.
- Ask assistant to check for heart rate

If there is no chest rise or no increase in heart rate and take ventilation corrective measures. (Table 1.1)

Table 1.1: Corrective measures

	Problem	Remedial Steps
M	Inadequate seal	**M**ask adjusted to ensure airtight seal
R	Inappropriate position	**R**epostion the head in sniffing position
SO	Blocked airway	**S**uction the airway **O**pen baby's mouth and ventilate
P	Inadequate pressure	Increase **P**ressure by squeezing the bag with more pressure till a chest rise is visible
T	No improvement with above steps	Consider endo**T**racheal intubation

Provide uninterrupted effective ventilation for 30 seconds and assess for spontaneous breathing and heart rate. If spontaneous breathing is present and heart rate is 100 or more, then gradually discontinue PPV.

Effective ventilation will promote increase in heart rate and spontaneous breathing, improvement in color and muscle tone.

What to do if baby is not improving (heart rate is > 60 but less than 100 bpm)?

- Ensure effective ventilation.
- Reassess respiratory effort, heart rate every 30 seconds (oxygen saturation may be monitored continuously if available)
- If PPV is prolonged over several minutes place an oro-gastric tube to prevent distention of abdomen which may interfere with ventilation.

When to stop PPV?

PPV is discontinued when the heart rate is above 100 bpm.

There is sustained spontaneous breathing.

Observational care

Newborns that have required PPV for less than 1 minute should be provided.

Observational care

- Provide warmth
- Initiate breastfeeding
- Monitor newborn (temperature, heart rate, breathing, and colour every 30 minutes for 2 hours).

If after 30 seconds of effective positive pressure ventilation heart rate is less than 60 bpm chest compression is given.

1.4.4 Chest Compressions

What is Chest Compression?

Chest compression is also referred as external cardiac massage (Fig. 1.15). It is a rhythmic compression of the sternum that

1) Compress the heart against the spine
2) Increase the intrathoracic pressure
3) Circulate blood to the vital organs of the body.

Indications

Heart rate of baby less than 60 bpm despite atleast 30 seconds of effective positive pressure ventilation.

Chest compressions provide an artificial heartbeat, thus restoring circulation to life-sustaining level. Positive pressure ventilation with 100% oxygen must accompany chest compression to oxygenate circulating blood.

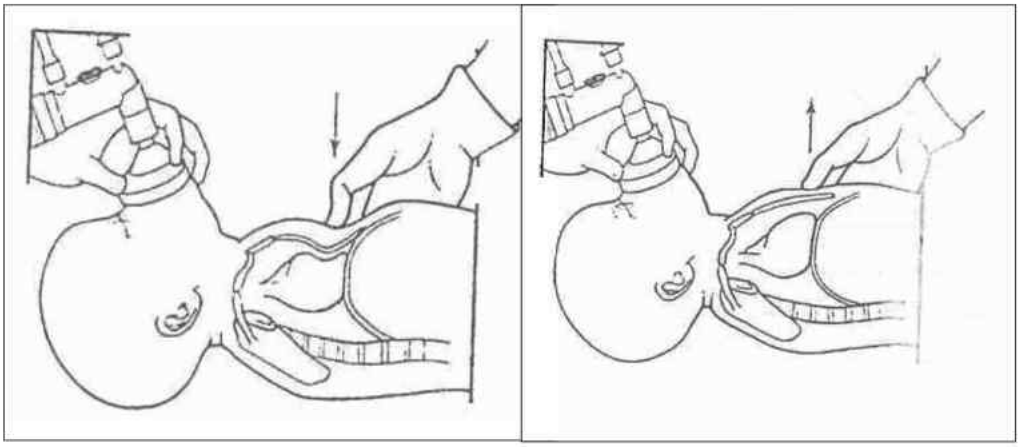


Fig. 1.15: Phases of chest compression

Positioning for Chest Compression

By now, the baby is already positioned for PPV and is being ventilated with 100% oxygen. A person performing chest compression must gain access to the chest and two persons should position in such a way that each one can do an effective job without interfering with the other. (Fig. 1.16)



Fig. 1.16: Position for chest compression

> Endotracheal intubation at this time may help to ensure adequate ventilation and facilitate the coordination of ventilation and chest compression.

Techniques of Chest Compression:

Two techniques are used

- **Two thumb technique** (Fig. 1.17) two thumbs are used to depress the sternum while the hands encircle the chest and fingers support the spine.
- **Two finger technique** (Fig. 1.18) Tips of the middle finger and index or ring figure are used to compress the sternum. The spine is supported with other hand or by placing the baby on a hard surface.

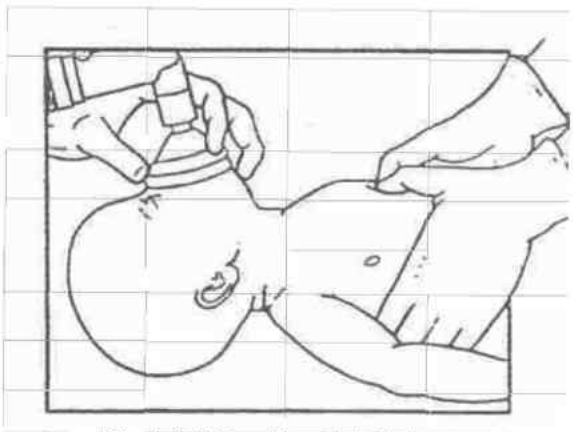


Fig. 1.17: Two thumb technique

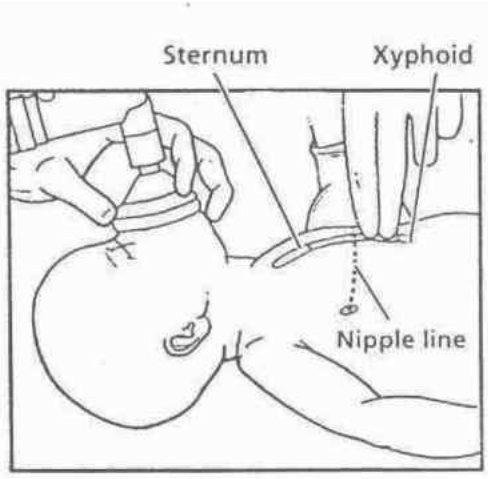


Fig. 1.18: Two fingers technique

Location of Compression

Pressure is applied to the lower third of sternum strictly avoiding applying pressure on the xiphoid. The lower third of sternum is just below the line joining the two nipples (Fig. 1.19).

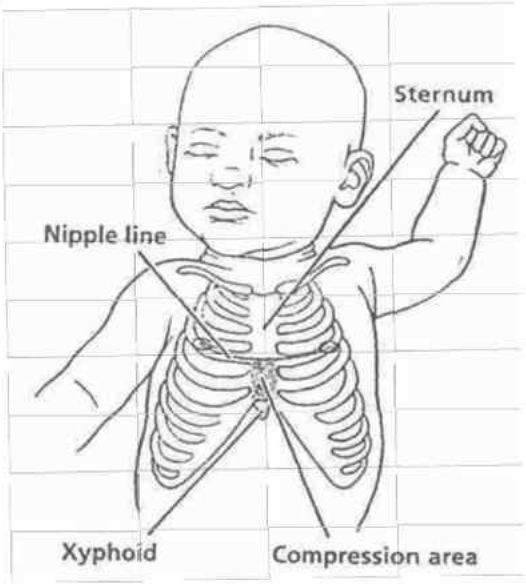


Fig. 1.19: Landmarks for chest compression

Depth of Compression

Enough pressure should be used to compress the sternum to approximately 1/3 of the antero-posterior diameter of the chest to generate a palpable impulse (Fig. 1.20). One compression consists of the downward stroke plus the release. Shorter compression phase than the relaxation phase has been proved to be more effective.

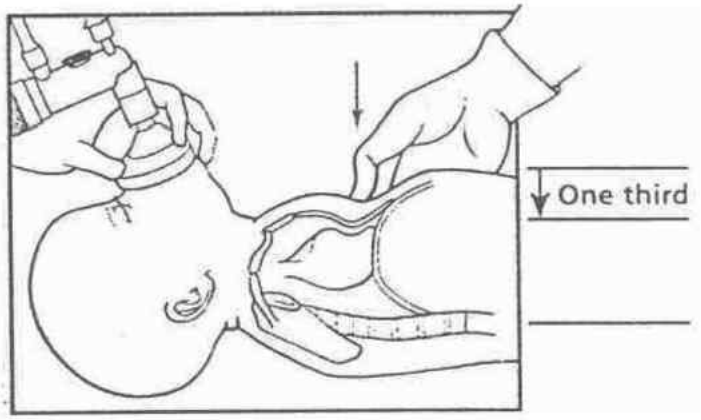


Fig. 1.20: Depth of compression

Rate of Compression

Compression / release action should be repeated 90 times per minute and ventilation 30 times per minute making the ratio as 3:1. This will be done by counting 1-2-3 for three compressions and 4 for the PPV (interposed ventilation) which together should take 2 seconds (½ second for each event) (Fig. 1.21).

Coordinating ventilation and chest compression

Chest compression should be accompanied by PPV. Avoid giving compressions and ventilation simultaneously, hence they require coordination. For every 3 compressions 1 breath is delivered (in a minute 90 compressions and 30 breaths are given)

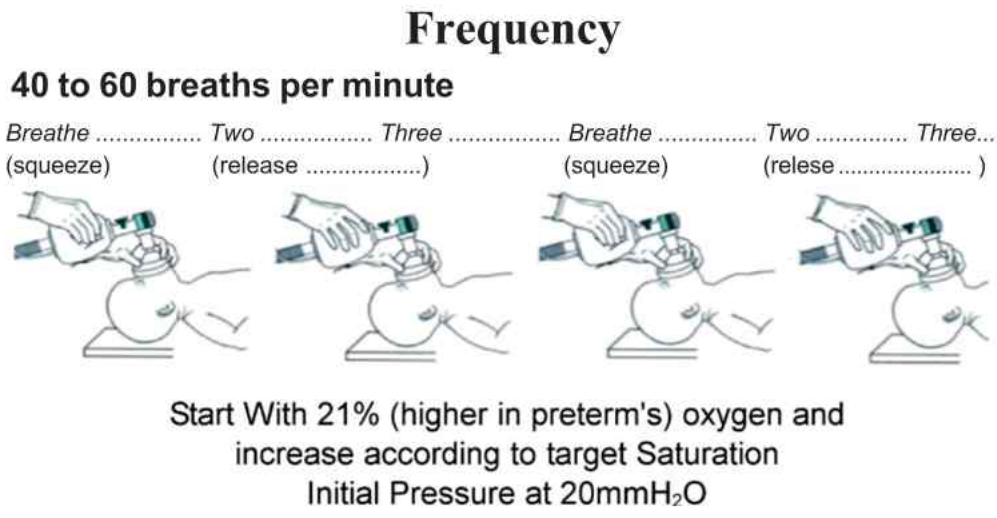


Fig. 1.21: Coordinating ventilation and chest compression

Dangers of Chest Compressions

Chest compression can cause trauma to the baby. Improper placement of fingers or thumb can cause:

- Damage to xiphoid
- Injury to internal organs like liver, spleen or lungs
- Fracture of ribs

Precautions

- Do not remove the finger or thumb in between compressions
- Feel the pulse for effectiveness of compression
- Do not squeeze the chest
- Continue positive pressure ventilation. If using bag and mask, interpose a ventilation every third compression.

Checking effectiveness of Compressions

Heart rate should be checked every 30 seconds. It should be checked for no longer than 6 seconds (this cause minimal interruption in chest compressions).

Ventilation should be discontinued while the heart rate is being checked so that breath sounds do not obscure the heart sounds. It is important to know whether the blood is being circulated effectively as a result of chest compressions. The

pulse should be checked periodically if at all possible. This can be done at carotid, brachial and femoral.

When to stop chest compressions?

After approx. 30 seconds of chest compression and positive pressure ventilation (PPV)

- Count heart rate
- If >60 bpm, stop chest compressions
- Continue PPV if heart rate 40–60 bpm baby is breathing spontaneously, heart rate >100 and baby begins to breathe spontaneously.

If child is not improving?

1) Check if PPV is effective; if baby is not intubated till now, consider intubating the baby. Assist in the procedure of intubation and collect all the articles required for intubation mentioned in preparation section (This is done at higher facility).
2) Make sure that oxygen concentration is increased to 100%.
3) Check if depth of compression is adequate.
4) Ensure that chest compression and ventilation are well coordinated.

Medications should be administered when in spite of adequate ventilation and cardiac compression, together for more than 30 seconds, the heart rate remains < 60/min and is not improving or if there is initial asystole after 30 sec of BMV. Do not 'wait', to take 'weight', use approximation – 1, 2 or 3 kg?

1.4.5 Drugs Used in Neonatal Resuscitation

Neonatal resuscitation, as any other resuscitation procedure, is a team effort and before any medication is administered to a newborn, the team leader has to ensure that effective ventilation and compressions are being given to the baby. This drugs are given by skilled/ trained person at higher facility.

What drugs may be required for the neonate?

- Epinephrine
- Volume expanders
- Epinephrine

It is the most effective medicine used during resuscitation. Babies who have a heart rate of less than 60 bpm despite adequate resuscitation for 90 seconds are likely to have low cardiac output to meet the oxygen requirement of vital organs. Epinephrine improves cardiac contractility thus the cardiac output which improves blood supply and oxygen to these organs.

Epinephrine is not indicated before you have established adequate ventilation.

Epinephrine increases workload and oxygen consumption of the heart muscles, which, in the absence of available oxygen, may cause unnecessary myocardial damage.

How to prepare epinephrine?

Epinephrine is available as 1ml ampoule of 1:1,000 concentration, however for neonate take 1 ml of 1:1,000 solution and add 9 ml of normal saline. This makes 10 ml of 1: 10,000 concentrations.

How to administer epinephrine?

Epinephrine should be given intravenously. If administration is delayed due to placement of intravenous access, endotracheal route may be used to administer the drug. But the endotracheal route has unpredictable blood levels that may not effective.

Dose of epinephrine

The recommended intravenous dose in newborns is 0.1 to 0.3 ml/kg of a 1:10,000 solution (equal to 0.01 to 0.03 mg/kg). When giving epinephrine by endotracheal tube, be sure to give the drug directly into the tube, being careful not to leave it deposited in the endotracheal tube connector or along the walls of the tube.

Check the baby's heart rate 30 seconds after administering epinephrine. Continue giving positive pressure ventilation and chest compressions. The heart rate should increase to more than 60 bpm within 30 seconds after the administration of epinephrine. If this does not happen repeat the dose every 3 to 5 minutes.

- **Volume expander**

Volume expander refers to saline or ringer lactate, indicated if the baby is in shock and is not responding to resuscitation. The baby appears pale, has weak pulse. O Rh negative packed red blood cells are also considered as part of the volume replacement when severe fetal anaemia is expected.

Dose of volume expander

10 ml/kg is the initial dose if baby shows minimal improvement after the first dose, another dose of 10 ml/kg can be given.

Volume expander is given through intravenous route. The umbilical vein is the most accessible vein in a newborn, therefore more commonly used.

What to do in case no improvement?

If the baby is severely compromised but all resuscitation efforts have gone smoothly. Baby's heart rate continues to remain below 60 bpm, you may consider mechanical causes of poor response such as air way malformation, pneumothorax, diaphragmatic hernia or congenital heart disease.

Remember:

You are not advise to administer drugs.

1.5 LET US SUM UP

In this practical on resuscitation you have learnt about the definition, indications, purposes of resuscitation, preparation (personnel, equipment, environment)When included routine care initial steps of resuscitation bag and high ventilation free flow oxygen and chest compression. At the end we have also discussed drugs used in resuscitation for your knowledge and information only.

1.6 ACTIVITY AND GUIDELINES

Activity – Carrying out procedure of resuscitation

a) Observe/practice the procedure of resuscitation of newborn on a manikin and record the steps follows in resuscitation procedure
   - Initial steps
   - Bags mask ventilation
   - Chest compression

b) Select a case of normal delivery in 1st stage of labour
   - Receive the baby and maintain patency of airway at birth
   - Provide routine care to the newborn baby

c) Select two neonates in delivery room observe/practice routine care and initial steps of resuscitation and record the procedure

Record in your log book

Name of the Newborn _____

Date of Birth _____

Birth Weight _____

Type of Delivery _____

Method adopted to keep patient airway _____

Steps of initial resuscitation _____

1.7 REFERENCES

1) Neonatal Resuscitation :Second Edition , publication of National Neonatology Forum of India, 2014. on www.nnfi.org.

2) Deorari, AK & Paul, VK. Neonatal Equipment: Everything you would like to know. 4th Edition, New Delhi, Sagar Publication; 2010.

3) Raju, TNK. History of neonatal resuscitation. Tales of heroism and desperation. Clinic Perinatology. 1999;26:629–640.

4) Faridy, EE. Instinctive resuscitation of the newborn rat. Respiroatary Physiology. 1983;51:1–19. Crossref | PubMed | Scopus (10)

5) Sharma, M, Madhulika, Kabra, SK, and Vani, SN. A review of traditional practices in neonatal care in Southeast Asia with special reference to India: 1969–1991. in: SN Vani (Ed.) National Workshop on traditional practices of neontal care in India, National Neontaology Forum. ; 1991:47–64.

UNIT 2 ASSESSMENT OF THE NEWBORN

Structure

2.0 Introduction

2.1 Objectives

2.2 Steps in Assessment of Newborn

- 2.2.1 Initial Assessment
- 2.2.2 Assessment of Gestational Age
- 2.2.3 Assessment within First 24 Hours
- 2.2.4 Examination for Birth Defects

2.3 Records and Reports

2.4 Let Us Sum Up

2.5 Activities and Guidelines

2.6 References

2.0 INTRODUCTION

Newborn period is a very crucial period. About half of the infant deaths take place in the newborn period with most of death taking place in 1st week of life. Therefore, as a midlevel health provider you have to take special care of the newborn to prevent mortality and morbidity. Assessment of newborn at the time of birth and subsequently will help you to identify any deviation and make appropriate referral. The first 24 hours being more crucial.

In this practical you will learn about m initial examination of the newborn, gestational assessment and head to toe examination including examination of birth defects during first 24 hours and at discharge.

2.1 OBJECTIVES

After completing this practical, you should be able to:

- perform initial assessment of a newborn;
- assess gestational age of a newborn;
- carry out first day and subsequent examination;
- detect birth defects and make appropriate referral; and
- maintain records.

2.2 STEPS IN ASSESSMENT OF NEWBORN

We shall begin with overview of initial assessment.

2.2.1 Initial Assessment

One of the basic purpose of assessment is to observe for adjustment of newborn to extra uterine life and identify the normal expected deviation which may at times hinder smooth progress towards early postnatal period.

Quick but thorough clinical screening is essential to identify any life threatening congenital anomalies at birth and birth injuries. You should quickly observe following:

- The cut end of the umbilical cord should be inspected for the number of vessels. Normally there are two umbilical arteries and one umbilical vein. The presence of a single umbilical artery is associated with internal congenital malformations in 15 to 20 per cent of cases.
- Single palmar crease (Simian crease) has increased association with additional anomalies including Down Syndrome.
- The face and head should be closely observed for any asymmetry and dysmorphic features.
- While crying, if the angle of the mouth and the mandible are pulled down and the infant has asymmetric crying it is indicative of hypoplasia of the depressor angularis oris muscle.
- This is a useful marker of associated cardiovascular anomalies and congenital dislocation of hips. The infant should be examined for location and patency of all the orifices because anomalies are frequently encountered around the orifices.

2.2.2 Assessment of Gestational Age

The gestational age and birth weight of newborn are important indicators not only to determine the morbidity and mortality status in the first week of life but also provide guidelines for management. (Normally babies weigh more than 2500 gms)

Before assessing gestational age you should check weight of the baby.

Check whether **Pre-term** (< 37 completed wks,), **Term** (37 to 41wks + 6 days) and **Post-term** (> 42 completed wks).

Identification of a preterm baby

The gestational age of a baby can be estimated by Last Menstruation Period (LMP), however accurate estimation is possible by doing a detailed physical and a neuromuscular examination. The following are some of the parameters used in gestational assessment:

A) Physical maturity

Skin

The skin of preterm neonate is thin, transparent and gelatinous whereas that of a term neonate is thick non-gelatinous and keratinized.

Hair and Lanuge

Hair and wooly and fuzzy. The back of the preterm babies has abundant growth of fine hair called lanugo. The hairy area turns bald as the gestation matures.

Ear Cartilage

The external ear or the pinna is soft and devoid of cartilage in pretern neonated and hence, it does not recil back promptly on being folded. In a term baby there is instant recoil (Fig. 2.1).



Fig. 2.1: Ear Cartilage

Breast Nodule

Breast nodule measures less than 5 mm in preterm neonates and 5 mm or more in term babies (Fig. 2.2).



Fig. 2.2: Breast Nodule

Sole Creases

Anterior one third of the sole reveals a transverse skin crease in preterm neonates and in term neonates they are present over the anterior two-third area. (Fig. 2.3).

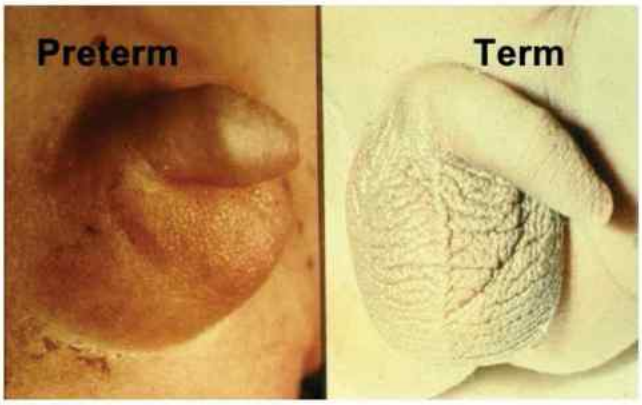


Fig. 2.3: Sole Creases

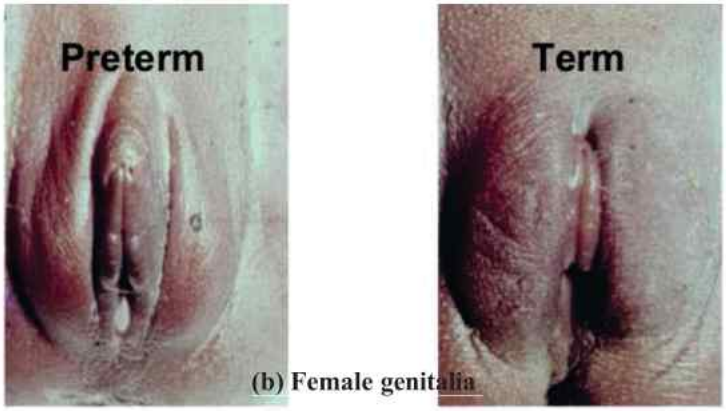
External Genitalia

In preterm males, the scrotum does not have rugae and testes are not descended into the scrotum. In female infants, the labia are widely separated, not covering

the labia minora, resulting in the prominent appearance of the clitoris. (Fig. 2.4).



(a) Male genitalia



(b) Female genitalia

Fig. 2.4: (a), (b) External genitalia–male and female

Assessment of maturity of the neonate is fairly reliable on the basis of physical characteristics. But they are of limited value to assess the gestational age in less than 36 weeks of maturity.

B) The neurological characteristics are more reliable for the precise assessment of maturity. The neurological assessment is performed based on four fundamental observations, i.e. muscle tone, joint mobility, certain automatic reflexes and fundus examination.

Muscle tone of the newborn baby is assessed by three parameters, i.e. posture or attitude, passive tone (popliteal angle and scarf sign) and active tone (recoil).

Joint mobility is less in preterm babies. A term baby has more flexed and relaxed joint. The degree of flexion at ankle and wrist (square - window) is limited due to stiffness of joint in early gestation.

Automatic reflexes like Moro reflex, pupillary response to light, blink response to glabellar tap, grasp response, rooting reflex with coordinated sucking efforts are assessed to detect the specific age of gestational maturity based on appearance of these reflexes.

The **fundus examination** for disappearance of anterior vascular capsule of the lens is done to assess the gestational age.

2.2.3 Assessment within First 24 Hours

The purpose is to assess vital signs, record various physical measurements such as height, weight, head and chest circumference detect any additional anomaly,

inquire about feeding behaviour, passage of first meconium and urine etc. and conduct head to toe examination.

Let us begin with vital signs.

A) Vital Signs

Vital signs are recorded when baby is quiet. Record temperature to detect cold stress and hypothermia. Temperature is measured by axillary method. The axillary temperature is slightly lower than core temperature i.e. 0.2ºF. The core temperature is usually between 36.5 to 37.5ºC.

Both heart rate and respiratory rate should be counted for full one minute to detect physiological status. Heart rate is around 120-140 beats per minute. Respiratory rate is 40-60 breaths per minute. Breathing is periodic and irregular. Average blood pressure in a term baby is around 60/40 mmHg.

B) Physical Measurements

For procedure of physical measurements is discussed in Block 1, Unit 2 and Block 6, Unit 5 of this course (BNSL-043). Let us begin with the measurements of length.

Length:

Take length using tape measure to assess crown heel length. Average length at birth is 47–50 cm. (Refer Block 1 Unit 2 and Unit 5 of this course for details).

Weight:

Measure weight using beam balance/spring balance. The normal birth weight varies between 2800–3200 gms. The first weight should be taken soon after birth and if not taken then within first 12 hours of birth.

Head Circumference:

The average head circumference is between 33–35.5 cm (13–14 inches) and is measured with measuring tape. Soon after birth the measurement may be less than the average due to moulding process in vaginal delivery. By second and third day the head contour and size becomes normal.

In small hydrocephalic babies head circumference is more than 3 cm bigger than the chest.

Chest Circumference:

The average chest circumference is 30.5–33 cms (12–13 inches). The head circumference is usually about 2–3 cm (1 inch) greater than chest. At birth because of moulding both the circumference may appear equal.

C) Head to Toe Assessment

Let us begin with general behaviour of the newborn.

General behaviour:

Posture, colour, activity and general alertness, sleep patterns, crying etc. should be assessed carefully.

In general the neonate appears drowsy, calm, quiet and sleepy most of the day and night time. Note signs of irritability and degree of alertness. Assess the level of satisfaction after feeding, newborn feels comfortable with rocking and cuddling, it is awakened by loud noise and disturbed by any stimuli.

Posture:

Most of the full term neonates are born in a vertex presentation with head flexed, chin resting on the upper chest, arms flexed, hands clenched, legs flexed at knees and hips and feet dorsiflexed. The vertebral column is also flexed (Fig. 2.5).



Fig. 2.5: Flexed posture

Cry:

Record and report if newborn cried immediately after birth. Listen whether cry is loud and strong (normal baby), weak or whiny (low birth weight baby) or absent (asphyxiated baby) (Fig. 2.6).



Fig. 2.6: Cry and activity at birth

Activity:

Observe whether baby is active (normal baby), less active or in active (low birth weight/asphyxiated).

Colour:

The colour of the skin is usually pink to red, by second to third day it turns to natural tone and is dry and flaky. The colour of the skin however, depends on the racial and familial background.

Skin:

- Texture of the skin i.e. velvety, smooth and good turgor indicates healthy skin.

- Babies born by breech presentation, assisted deliveries may have ecochymosis or petechea caused by birth trauma.
- Lanugo is the presence of fine hair on the body and is present in term infant.
- Check for **"vernix"** is distributed to all over the body and in skin folds. As baby comes to term it decreases.

Some normal variations observed in newborn that do not require any treatment are discussed in Unit 2 of theory Course BNS-042, Block 4, Unit 2.

Head:

Inspect the head for following:

i) **Hair**

Whether present or not and if present, note the colour and texture of hair.

Hair are silky and black in appearance in term infant and woolly and fuzzy in preterm infant.

ii) **Shape**

Whether round (normal), oval (slight moulding or a small caput formation in normal labour), long (excessive moulding or a large caput formation in prolong labour) or asymmetrical.

iii) **Size**

Whether small (microcephaly), medium (normal), large (hydrocephaly or prematurity) or unusual (anencephaly).

Palpate the skull for sutures and fontanels, noting size, moulding or any abnormal closure. The sutures feel like cracks in between the skull bones whereas, fontanels feel like wide spots at the junction of the sutures. The anterior fontanel is diamond shaped and posterior is triangular.

Observe for caput succedaneum and cephalhematoma (Fig.2.7 a-b). The fontanels feel flat, firm and well demarcated, at times pulsation can be felt at the anterior fontanel.

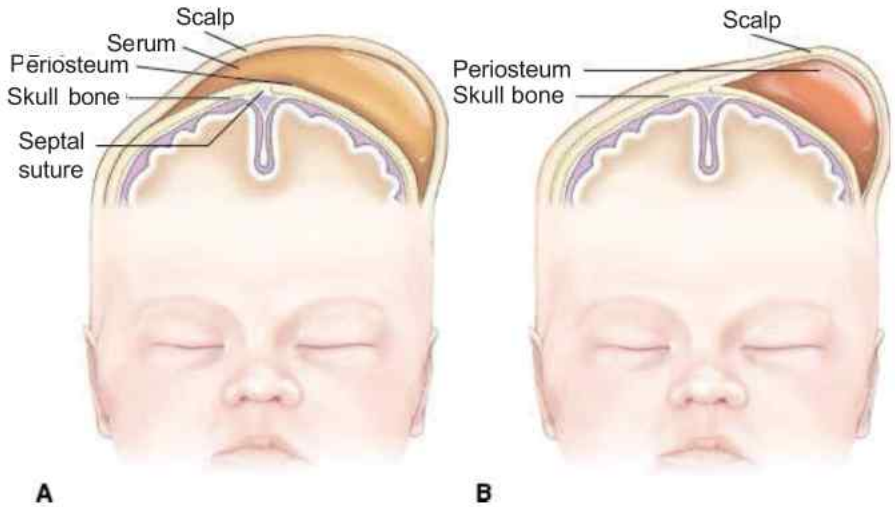


Fig. 2.7: a) Caput Succedaneum , b): Cephalhematoma

Assess the degree of head control, the head lag is a normal finding in the newborn, but has ability to control the head in certain positions. In ventral suspension,

head is held in straight line with the spinal column. When put on abdomen can lift the head slightly and turn it from side to side.

Face

Observe **the face** whether triangular (normal), round being swollen (prolonged labour or haemolytic disease) or asymmetrical and observe eye brows and eyelashes present (normal baby) or not (low birth weight). While crying, if the angle of the mouth and the mandible are pulled down and the infant has asymmetric crying, it is indicative of hypoplasia of the depressor angularis oris muscle. This is a useful marker of associated cardiovascular anomalies and congenital dislocation of hips.

Eyes

Observe the eyes, whether, normal or slanting, normally spaced or not (chromosomal abnormality), opened or closed.

Observe for any squint (normal) and subconjunctival bleeding (in the form of red patch or ring) or any purulent discharge.

- **Eyes appear edematous for the first two days after delivery. Infant keeps eyes tightly closed.**
- **Tears may be present at birth. Any purulent discharge is a sign of infection (Opthalmia neonatorum). Assess the colour of sclera that appears whitish, bluish and clear. Cornea is examined for any haziness. Nystagmus or strabismus is normally seen at birth.**

Ears

Ears should be examined for formation, size, shape, sufficient cartilage, position Skin tag and periauricular sinus etc. (low set ears indicate chromosomal anomaly),Pinna is firm, cartilage felt along with edges.

The top of pinna lies in the horizontal plane to the outer canthus of the eye. The pinna is seen flat against the side of the head due to well formed cartilage. Draw an imaginary line backward from outer corner of eye towards the pinna. If more than 90 % of the ear is below this line, it is said to be a low set ear. Instant recoil of ear pinna is present in term baby (Fig. 2.8).

The auditory ability of the neonate can be assessed by eliciting startle reflex. Absence of startle reflex in response to solid noise may indicate loss of hearing and should be reported.



Fig.2.8: Ear cartilage in preterm and term neonate

Nose

The nose appears flat after birth. Observe the nose for shape and size. Normally it is flat except at the tip which is prominent. Nasal passage is patent at birth.

Mouth and Throat

The anomalies are commonly seen around orifices. Any gross anomaly would be evident like cleft lip and palate.

Some abnormalities seen in mouth and throat include presence of cleft lip, cleft palate (either single or in combination, unilaterally or bilaterally) (Fig. 2.9), posterior (backward) displacement of tongue (glossoptosis), abnormal smallness of the jaw (micrognathia), indicative of Pierre-Robin syndrome.

Presence of white adherent patches on tongue, palate and buccal surfaces means presence of candidiasis (oral thrush).

Excessive salivation, drooling, inability to pass nasogastric tube, respiratory distress and choking with cyanosis are suggestive of oesophageal artesia with tracheoesophageal fistula.

Sucking and rooting reflexes are explained along with neurological assessment.



Fig. 2.9: Cleft Lip and Cleft Palate

Neck

Neck should be examined for mobility, fracture clavicle, stiffness, hyperextention, torticollis (spasmodic, unilateral contraction of neck muscle resulting in head tilted to one side), any cyst or mass (thyroglossal cyst, cystic hygroma) and webbing. Palpate lymph nodes in the neck and postauricular area. Also check for range of motion of the neck.

Chest

A look at the chest of the neonate shows circular shape because of equal anteroposterior and lateral diameter.

Development of nipple and breast tissue should be checked to assess gestational age. Inspect nipples whether well formed (normal baby), poorly formed or absent (pre term baby). Palpate around one nipple to feel for small nodule of breast tissues whether present (normal baby) or absent (pre term baby). Measure the diameter of areola, it is 5–10 mm in term baby (Fig. 2.10).

Auscultate the chest for equal air entry in both the lungs.

Check for the heart sounds, if there is extra murmur or extra beat. Observe the infant for cyanosis when cries.



Fig. 2.10: Breast nodule in pre term and term neonate

Abdomen

Abdomen is soft, symmetrical, slightly round and moves synchronously with chest in movement. In premature neonates abdomen is distended due to poor muscle tone. If the abdomen is concave, it is indicative of diaphragmatic hernia. Check for exomphalos or omphalocele which is protrusion of the intestinal organs outside the abdomenas shown in Fig. 2.11. Inspect the umbilical cord for two arteries and one vein.



Fig. 2.11: Exomphalos or Omphalocele

Palpate the abdomen for liver, spleen or any lump. Liver edge is normally palpable, 2 cm below costal margins. Check for the pulsation of the femoral artery on both the legs.

Genitalia

Let us begin with assessment of Female Genitalia.

Female Genitalia

The labia majora covers the labia minora completely in full term babies. The vernix caseosa is present between labial folds (Fig. 2.12). A hymen tag is visible

from the posterior opening of the vagina and disappears in several weeks. In the first week of life vaginal discharge is seen (Pseudomenstruation) that disappears by 2–4 weeks. Presence of any faecal discharge from vaginal orfice may be due to rectovaginal fistula.



Fig. 2.12: Female genitalia in term neonate

Male Genitalia - The urethral opening is located at the tip of the penis, covered by prepuce. The scrotum is large, pendulous with dark pigmentation of the overlying skin. The testis can be palpated bilaterally in the scrotal sac.

Presence of urethral opening on ventral surface of penis (hypospadias), on dorsal surface of penis (epispadias), unpalpable testis in scrotum (true undescended testis), absence of testis masses in the scrotum, fluid in the scrotum (hydrocele), meconium from scrotum, ambiguous genitalia are some of the abnormal findings needing further assessment.

Anus

Check for anal opening (imperforate anus and passage of meconium). Absence of anal opening is serious anomaly.

Back

Inspect the back for any mass, dimple, tuft of hair indicating spina bifida occulta. Congenital defect like spina bifida, meningocele, meningomyelocele, anencephaly are usually detected during initial assessment (Fig. 2.13). Back to be checked for abnormal curvature of the spine.

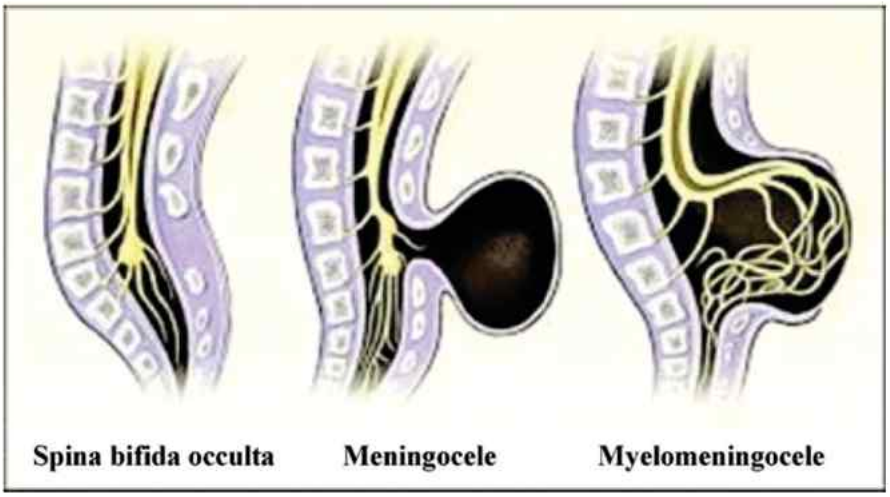


Fig. 213: Meningocele and myelomeningocele

Hips

Examination of hips to be done to detect congenital hip dislocation. Positive Ortolani's sign and symmetrical gluteal folds are indicative of the condition.

Extremities

Examine extremities for fractures, paralysis, range of motion and irregular position. Fingers and toes to be checked for missing digits, extra digits (polydactyly)or fused digits (syndactyly). Feet to be looked for structural or positional abnormalities mainly club foot (talipes equinovarus) (Fig. 2.14).



Fig. 2.14: Club foot

Observe the foot for sole crease whether deep, faint or absent (pre term) and presence over the entire sole (term) (Fig. 2.15).



Fig. 2.15: Sole crease

D) Neurological Assessment

Neurological assessment is the most critical part of the newborn assessment. Most of the reflexes are examined while doing the head-to-toe assessment. Some general reflexes are assessed at the end as they disturb the infant and interfere with the examination.

Blinking or corneal reflex

Blinking/closing of the eyes on appearance of sudden bright light. It persists throughout life.

Pupillary reflex

It is constriction of pupil in response to bright light and dilation upon removal of light. It persists throughout life.

Doll's eye

Inability of eyes to adjust immediately to the right or left turning of head. It disappears when fixation of eyes develops. If persists it indicates neurologic damage.

Glabellar reflex

Tapping at glabella (bridge of nose) results in closing of eyes tightly.

Sneezing reflex

It is spontaneous response of nasal passages to any irritation or obstruction. It persists throughout life.

Sucking reflex

Sucking movements of circumoral area in response to stimulation or even without stimulation as during sleep. It is seen in infants.

Rooting reflex

Turning of head by infant to the side of stimulation made on circumoral area, or cheek. It disappears by 3–4 months of age, but may appear throughout infancy.

Gag reflex

Stimulation of posterior pharyx by food, tube (while doing suction, passing nasogatric tube) causes infant to gag. It persists throughout life.

Yawn reflex

Attempt to inspire air in spontaneous response to decreased oxygen. It persists throughout life.

Grasping reflex

It is flexion of hands and feet whenever the base of the digits is touched. Place your one finger in the baby's hand, it holds the finger momentarily. This is the grasping reflex response (Fig. 2.16).



Fig. 2.16: Grasp reflex

Babinski reflex

It is hyper extension of toes and dorisflexion of hallux (great toe) when outer of foot is stroked upward from heel across ball. It disappears by first year of life.

Moros reflex

Sudden movement or change in equilibrium of the neonate causes sudden extension and abduction of extremities and fanning of fingers. The index finger and thumb form 'C' shape. The movements are followed by flexion and adduction of extremities. Legs may weakly flex. Infant may cry. It disappears after 3–4 months of age (Fig. 2.17).



Fig. 2.17: Moros reflex

Startle reflex

Sudden loud noise causes abduction of the arms with flexion of elbows. Hands are clenched. It disappears by four months of age.

Tonic neck Reflex

Position the baby on its back with head turned to one side and observe for partial or complete extension of the arm and leg on the side it is facing and flexion of arm and leg on the opposite side. This is the tonic neck reflex response.

Dance or Step reflex

Reciprocal flexion and extension of the legs when infant is held with soles touching the hard surface. It appears like walking movements. It disappears by 3–4 weeks, and is replaced by deliberate movements (Fig. 2.18).



Fig. 2.18: Dance reflex

2.2.4 Examination for Birth Defects

Birth defects include **structural** (e.g. cleft lip, cleft palate, neural tube defect), **functional** (e.g. congenital deafness or cataract), **metabolic** (e.g. G-6PD deficiency, in-born errors of metabolism) or **chromosomal** (e.g. Down's syndrome) abnormalities which is present at the time of birth. However, these abnormalities may not necessarily manifest at birth; some of them may show symptoms after a few weeks to months.

It is important that each newborn baby is examined comprehensively for presence of birth defects soon after birth (maximum within the first 48 hours). For this purpose, a full physical examination need to be conducted from head to toe as discussed in Table 2.1.

A manual developed under Rashtriya Bal Swasthya Karyakram (RBSK), Ministry of Health and Family Welfare enlists the birth defects which need to be looked for during the comprehensive examination for birth defects (See Table 2.1). The students should read the full document, 'Comprehensive newborn screening handbook for screening visible birth defects at all delivery points' available at website of National Rural Health Mission - URL: http://nrhm.gov.in/images/pdf/programmes/RBSK/Resource_Documents/Birth_Defects_Handbook.pdf

Table 2.1: Comprehensive physical examination (head to toe) for birth defects

Check for Vital signs before you perform the examination for Birth Defects. If the vital signs are abnormal, refer urgently.

Normal	Heart Rate(rates/min) Awake100-180 Sleeping 80-160	Respiratory Rate (breaths/min):30-60
Abnormal	Tachycardia: if more than 160 during sleeping	Tachypnea: if persistently more than 60 per minute
Physical Examination		
Aspect	**Clinical Assessment**	**Indications for Further Examination and Urgent referral**
General appearance	Examine the Newborn when quiet, alert, not hungry or crying State of alertness/ responsiveness to stimulus, Activity, spontaneous movement, predominant posture	• The child looks ill, or lethargic or has an abnormal cry or abnormal movements
Head	Shape and symmetry • Scalp swelling/deformity • Anterior and posterior • fontanelle • Head circumference	Absence of cranial vault • Herniation of the brain • through a defect in the skull Closed fontanelles and • fused suturesr

	• Scalpla cerations/lesions	• Enlarged, bulging or sunken fontanelle • Microcephaly/macrocephaly • Hydrocephalous
Spine	• Spinal column • Scapulae and buttocks for symmetry • Skin over the spine	• Abnormal swelling of the spine • Non-intact bony spine • Abnormal curvature of spine • Tufts of hair or dimple along in tactspine
Face	Facial expression Dysmorphic appearance Symmetry of structure	Asymmetry on crying • Dysmorphic features
Eyes See pictorial tool for eye defects	1. Eyelid 2. Facial marks near the eye 3. Eyeball 4. Position in relation to the nasal bridge 5. Cornea 6. Pupil 7. Lens 8. Opacity with excessive tearing 9. Conjunctiva 10. White eye reflexes	1. Swelling, drooping or gap in the eyelid 2. Port wine stain or haemangioma 3. Abnormally small eye or absent eye 4. Upward slant/downward slant/epicanthicfold 5. Hazy, dull cornea, opacity 6. Pupils unequal, dilated or constricted or gap in the pupil 7. Congenital cataract 8. Congenital glaucoma 9. Purulent conjunctivitis
Ears	1. Family history or deafness 2. Position of ear 3. Shape of ear 4. Patency of the external auditory meatus	1. History positive 2. Abnormal placement of ear 3. Abnormal shape or absence
Mouth	1. Lips 2. Palate (hard/soft)	1. Cleft lip /cyanosis 2. Cleft palate
Chin, Neck and Clavicles	1. Chin 2. Neck 3. Clavicles (collarbone)	1. Small receding chin/ micrognathia 2. Neck webbing/Masses/ swelling 3. Absence of clavicles

Heart, Chest	**1. Chest:** • Chest size, shape and symmetry • Number and position of nipples **2. Respiratory:** • Chest movement and effort with respiration • Respiratory rate • Breath sounds **3. Cardiac:** • Pulses–femoral • Position of apex beat • Pulse oximetry (optional)	• Signs of respiratory distress • Apnoeicepisodes • Weak or absent pulses • Positive pulse oximetry screen (if performed)
Abdomen and Anus	**1. Abdomen** • Shape and symmetry • Defect in the abdominal wall • Umbilicus including number of arteries • Any abdominal mass **2. Anus** • Position • Patency	• Abdominal swelling: intestinal obstruction • Abdominal scaphoid with respiratory distress • Defect in the abdominal wall: Gastroschisis/exomphalos • Less than 3 umbilical vessels • Abnormal abdominal mass • Abnormal position of anus • Absence, imperforate anus • Nomeconiumpassed with in 24 hours
Genitalia	**1. Male genitalia** • Penis including fore skinl Testes (confirm present bilaterally and position of testes) including any discolouration • Scrotal size and colour • Other masses such ashydrocele **2. Female genitalia** • Clitoris • Labia • Hymen • Urethral opening	**1. Male genitalia** • Micropenis (stretched-length less than 2.5 cm) • Bilateral undescended testes • Testicular torsion • Unequal scrotal size or scrotaldis-colouration **2. Female genitalia** • Absence of vaginal opening • Pseudomenses **3. Either male/female** • Inguinal hernia/swelling • Ambiguous genitalia

Urinary tract	Bladder wall Has the Newborn pass edurine? Urethral opening: look from where the urine comes out Check for urinary stream in a male child	• Bladder wall no tintact-bladder exstrophy • Nourine passed within 24 hours • Posterior urethral valve-disrupted flow • Hypospadias/epispadias
Limbs	**1. Upper limbs** • Arm • Forearm • Hand, digits and palm **2. Lower limbs** • Thigh • Leg • Foot and toes	• Absence of the whole or a part of the upper limb (arm/fore arm, hand) • Extra digits/webbing of fingers • Single transverse crease • Absence of the whole or apart of the lower limb • Clubfoot
Hip	• Check symmetry of the legs • Skin folds over the buttocks • Risk factors for hip dysplasia: a. breech b. females c. family history	Hip dysplasia
Chromosomal	Look for any dysmorphic feature. Look at the face for upward slanting eyes, epicanthic fold, flat nose, small ears, small mouth, single palmar crease and increase gap between the first and second toe.	• Presence of chromosomal disorder

2.3 RECORDS AND REPORTS

Observations and action taken are recorded in the given format as per the policy. Vital parameters i.e. axillary temperature, apical heart rate, respiration and oxygen saturation are recorded. Other findings like colour, nature of cry, body posture and sucking reflex are also noted.

Any specific condition like-AIDS,TORCH group of infections, Hepatitisetc must also be recorded and highlighted.

Any drug administered including Oxygen is also mentioned in the records.

Reporting

Unusual findings must be informed to the PHC or Dist. hospital and baby also

should be referred accordingly. Any doubt or unsatisfactory observation **must not be kept for wait and watch.**

Conditions like congenital anomalies, jaundice, apnea and instability of physiological parameters must be reported.

Making clear and timely entries in the master birth register is also one type of reporting.

2.4 LET US SUM UP

In this practical you have learnt about examination of baby from head to toe. You also learnt about assessment during first 24 hours and at the discharge. Hope you will use this information in performing assessment of baby.

2.5 ACTIVITIES AND GUIDELINES

Activity 1

Observe the first day examination of Newborn.

Select a normal newborn and practice the first day examination. Record your findings.

Activity 2

Select a newborn weighing 1800–2000 gm. Assess the gestational age and record your finding.

2.6 REFERENCES

1) Toolkit for setting up of special care newborn units, stabilization units and newborn corners. New Delhi: United Nations Children's Fund; 2008. p. 9. (http://www.unicef.org/india/SCNU_book1_April_6.pdf, accessed on 20 August 2009).

2) Managing new born problems: A guide for doctor, nurses and midwives. WHO Publication, 2007.

3) Setting up a special care newborn unit in a district hospital . Toolkit for setting up of special care newborn units, stabilization units and newborn corners. New Delthi: United Nations Children's Fund; 2008. (http:// www.unicef.org/india/SCNU_book1_April_6.pdf, accessed on 20 August 2009).

4) Indian Council of Medical Research . NNPD network. National neonatal perinatal database, New Delhi. 2002–03. New Delhi: Indian Council of Medical Research; 2005. pp. 24–37. (www.newbornwhocc.org, accessed on 20 February 2011).

UNIT 3 KANGAROO MOTHER CARE

Structure

3.0 Introduction

3.1 Objectives

3.2 Kangaroo Mother Care

- 3.2.1 Definition, Components and Pre-requisites
- 3.2.2 Benefits
- 3.2.3 Requirement for Implementation
- 3.2.4 Criteria
- 3.2.5 Preparing for Kangaroo Mother Care
- 3.2.6 Steps or Procedure
- 3.2.7 Initiation and Duration of KMC
- 3.2.8 Criteria to Transferring the Baby and Discharge
- 3.2.9 Follow Up Plan

3.3 Let Us Sum Up

3.4 Model Answers

3.5 Activity

3.6 References

3.0 INTRODUCTION

Kangaroo mother care is one of the most important aspect of Thermal Protection. Giving newborn infants plenty of skin to skin contact with their mothers shortly after birth may ease the stressful transition from womb to world. Researchers say that the transition from the womb to the real world is one of the most hazardous and stressful events in the human life cycle. Therefore, interventions that can help a newborn feel more secure and facilitate adaptation to their new surroundings would be helpful. In this unit you will learn about Kangaroo Mother Care and its component, benefits, requirement, criteria, procedure, duration, criteria to transferring and discharge and follow up plan.

3.1 OBJECTIVES

After completing this practical, you should be able to:

- recognise criteria for providing Kangaroo Mother Care;
- demonstrate the KMC procedure to mother and care giver;
- prepare the mother, father and or care giver for providing Kangaroo Mother Care;
- identify the criteria for discontinuation of Kangaroo Mother Care;
- provide follow up to mother;
- ensure Kangaroo Mother Care is practiced properly; and
- ensure Kangaroo Mother Care is continued at home after discharge of mother.

3.2 KANGAROO MOTHER CARE

We shall begin with definition, components and prerequisites.

3.2.1 Definition, Components and Pre-requisites

Kangaroo mother care (KMC) is a special way of caring of low birth weight babies. This includes early prolonged continuous skin to skin contact with mother (or care giver) and exclusive breastfeeding. It stabilises body temperature promotes breastfeeding and prevents infection. KMC must not be confused with routine early skin to skin contact with mother that is recommended by WHO for all newborn.

Components

The two components of KMC are as follows:

Skin-to-skin contact:

Early, continuous and prolonged skin to skin contact between the mother and her baby is the basic component of KMC. The infant is placed on her mothers' chest between the breasts in her blouse. For comfort a small nappy is fine, and for warmth a cap may be used. Skin-to-skin contact should ideally start at birth, but is helpful at any time. It should ideally be continuous day and night, but even shorter periods (partial KMC) are also helpful.

Exclusive breastfeeding:

The baby on KMC is breast fed exclusively. Skin to skin contact promotes lactation and facilitates the feeding interaction.

Pre-requisites of KMC

Pre-requisites of KMC are as follows:

Support to the mother in hospital and at home:

A mother cannot successfully provide KMC all alone. She would require counselling along with supervision from care providers, and assistance and cooperation from her family members.

Post Discharge follow up:

KMC is continued at home after early discharge from the hospital. A regular follow up and access to health providers for solving problems is crucial to ensure safe and successful KMC at home.

3.2.2 Benefits

KMC has following benefits.

Breastfeeding

Studies have revealed that KMC results in increased breastfeeding rates as well as increased duration of breastfeeding. Even when initiated late and for a limited time during day and night, KMC has been shown to exert a beneficial effect on breastfeeding. KMC stabilises baby's physiology and improves weight gain.

Thermal control

Prolonged skin-to-skin contact between the mother and her preterm/ LBW infant provides effective thermal control with a reduced risk of hypothermia. For stable babies, KMC is atleast equivalent to conventional care with incubators in terms of safety and thermal protection.

Early discharge

Studies have shown that KMC cared LBW infants could be discharged from the hospital earlier than the conventionally managed babies. The babies gain more weight on KMC than on conventional care.

Less morbidity

Babies receiving KMC have more regular breathing and less predisposition to apnea. KMC protects against nosocomial infections. Even after discharge from the hospital, the morbidity amongst babies managed by KMC is less. KMC is associated with reduced incidence of severe illness including pneumonia during infancy. Studies have shown that KMC leads to a significant reduction of neonatal mortality when compared to conventionally cared babies.

Other effects

KMC helps both infants and parents. Newborn feels more secure, mothers are less stressed as compared with a baby kept in incubator. Mothers prefer skin-to-skin contact to conventional care. They report a stronger bonding with the baby, increased confidence, and a deep satisfaction that they were able to do something special for their babies.

3.2.3 Requirement for Implementation

Requirement of KMC implementation includes the following:

- Training of nurses, physicians and other staff involved in the care of the mother and the baby.
- Educational material such as information sheets, posters, and video films on KMC in local language should be available to the mothers, families and community.
- If it is possible then, reclining chairs in the nursery and post-natal ward, beds with adjustable back rest should be arranged. Mother can provide KMC sitting on an ordinary chair or in a semi-reclining posture on a bed with the help of pillows.
- Once KMC is implemented, all health providers and other staff appreciate KMC because of the health benefits to the babies and the satisfaction expressed by the mothers.
- KMC does not require extra staff.

3.2.4 Criteria

We shall discuss criteria of KMC for mother and baby separately.

For Baby

All stable babies are eligible for KMC. However, very sick babies needing special care may preferably be cared under radiant warmer initially and KMC should be

started after the baby has become hemo dynamically stable. Some guidelines for practicing KMC include following:

i) **Birth weight less than 1800 gm:** If stable, can be started on KMC soon afterbirth.

ii) **Birth weight 1200–1799 gm:** Many babies of this group have significant problems in neonatal period, it might take a few days before KMC can be initiated. If such a baby is born in such a place where neonatal care services are inadequate the baby should be transferred to a proper facility soon after birth, preferably with the mother. One of the best ways of transporting small babies after stabilisation is keeping them in continuous skin-to-skin contact with the mother.

ii) **Birth weight <1200 gm:** These babies benefit most from in utero transfer before birth to a hospital with neonatal intensive care facilities. It may take days to weeks before baby's condition allows initiation of KMC.

KMC can be initiated in a baby who is otherwise stable but still on Intravenous fluids, tube feeding and/ or oxygen.

Mother

All mothers can provide KMC, irrespective of age, parity, education, culture and religion. The following aspects must be taken into consideration when counselling for KMC:

i) **Willingness:** The mother must be willing to provide KMC. Health care professionals should counsel her adequately regarding different aspects of KMC. Once mother knows about KMC, she will be willing to provide KMC to her baby.

ii) **General health and nutrition:** If the mother has suffered from complications during pregnancy or delivery or is otherwise ill, she should recover reasonably well before she can initiate KMC.

iii) **Hygiene:** The mother should maintain good hygiene i.e. daily bath / sponge, change of clothes, hand washing, short and clean finger nails.

iv) **Supportive family:** She needs family support and cooperation to deal with other responsibilities at home. The other family members e.g. **father or grandmother should also be encouraged to provide kangaroo care to the LBW baby when she wishes to take rest or she is sick to provide KMC.**

v) **Supportive community:** This is particularly important when there are social, economic or family constraints. Community awareness about the benefits of the KMC should be created.

3.2.5 Preparing for Kangaroo Mother Care

Preparation includes Conselling and clothing for mother and baby.

You need to do following:

Counselling

When baby is ready for KMC, arrange a time that is convenient to mother and her baby. The first few sessions are important and requires time and extended

interaction. Ask her to wear light, loose clothing. Provide a warm place to her. Respect her requirement of privacy while providing KMC. Encourage her to bring her mother-in-law, other relatives or her husband if she wishes, as it helps in building positive attitude of family support to mother which is crucial for post discharge home based KMC.

Mothers clothing

KMC can be provided using any front-open, light dress as per the local culture. KMC works well with blouse and sari, gown or shawl. Suitable apparel that can retain the baby for extended period of time can be adopted locally.

Baby clothing: Baby should be dressed with cap, socks nappy and front-open sleeveless shirt or Jhabala.

KMC can be provided using any front open garment. You can innovate/ design a garment which would help mother to provide KMC to her baby.

3.2.6 Steps or Procedure

KMC unavoidably requires some exposure on the part of the mother. This can make her nervous and could be de-motivating. The staff must respect mother's sensitivities in this regard and ensure culturally acceptable privacy standards in the nursery and the wards where KMC is practiced.

The KMC procedure is given below:

- Explain the procedure to mother.
- Make her comfortable.
- Maintain privacy.
- Help the mother in kangaroo positioning as given below.

Kangaroo positioning

- The baby should be placed between the mother's breasts in an upright position.
- The head should be turned to one side and should be in slightly extended position. This slightly extended head position keeps the airway open and allows eye-to-eye contact between the mother and the baby. Avoid both forward flexion and hyperextension of the head.
- The hips should be flexed and abducted in a "frog" position; the elbows should also be flexed.
- Baby's abdomen should be at the level of the mother's epigastrium. This way baby has enough room for abdominal breathing. Mother's breathing stimulates the baby, thus reducing the occurrence of apnea.
- Support the baby's bottom with a sling/ binder.
- Mother can provide KMC sitting or reclining in a bed or a chair. She can keep herself in slightly backward reclining position and support baby's body and neck using her own hand. The mother carrying an infant in the KMC position can walk, stand, sit or engage in different activities.

When mother is not available, other family members such as grandmother, father or other relative can provide KMC.



Fig. 3.1: (a) & (b) a) Father providing KMC to single baby b) KMC to Twin babies.

- Advice the mother to sit or recline comfortably.(Fig. 3.2)
- Undress the baby gently. However, keep the cap, nappy and socks on.
- Place the baby prone on the mother's chest in an upright and extended posture, between her breasts, in skin-to-skin contact. Turn the baby's head to one side to keep the airway clear.
- Cover the baby with the mother's blouse, 'pallu' or gown. Wrap both baby and mother with a blanket or shawl.
- Counsel the mother to breastfeed the baby frequently.
- If possible, warm the room with a heating device.
- If the mother is not available, skin-to-skin contact may be provided by the father or any other adult.
- Ensure following during KMC.



Fig. 3.2: Providing KMC

Monitoring

Babies receiving KMC should be monitored carefully especially during the initial stages. Nurses should make sure that baby's neck position is neither too flexed nor too extended, airway is clear, breathing is regular, colour is pink and baby is maintaining temperature. Mother should be involved in observing the baby during KMC so that she herself can continue monitoring at home.

> **Remember that baby's neck is not too flexed or too extended.**
>
> **Breathing is normal and feet and hands are warm.**

Feeding

The mother should be explained that she should breastfeed in the kangaroo position and that KMC actually makes breastfeeding easier. Furthermore, holding the baby near the breast stimulates milk production.

When skin-to-skin contact is not possible:

- Keep the room warm with a home heating device.
- Clothe the baby in 1–2 layers (summer).
- Clothe the baby in 3–4 layers (winter) and cover the head, hands and feet with a cap, gloves and socks, respectively.
- Let the baby and mother lie together on soft, thick bedding.
- Cover the baby and the mother with an additional quilt, blanket or shawl in cold weather.

3.2.7 Initiation and Duration of KMC

Time of initiation

KMC can be started as soon as the baby is stable. Babies with severe illness or requiring special treatment should be treated according to neonatal unit clinical guidelines. Short KMC sessions can be initiated during recovery with ongoing medical treatment (IV fluids, low concentration of oxygen). KMC can be provided while the baby is being fed via oro-gastric tube or on oxygen therapy.

- Skin-to-skin contact should start gradually with a smooth transition from conventional care to continuous KMC.
- Sessions that last less than one hour should, however, be avoided because frequent handling may be too stressful for the baby.
- The length of skin-to-skin contacts should gradually be increased upto 24 hours a day interrupted only for changing diapers. Minimum duration of 6–8 hours should be practiced.
- When the baby does not require intensive care, he/she should be transferred to the postnatal ward and KMC should be continued.
- When the mother needs to be away from her baby, other family members (father, grandmother etc.) can also help by caring for the baby in skin-to-skin kangaroo position.

How long to continue KMC?

When the mother and baby are comfortable, KMC is continued for as long as possible, at the institutions and at home. It can be desirable until the baby's gestation reaches term or the weight is about 2500 gram. It can be weaned off, once the baby starts feeling uncomfortable to the procedure as indicated by wriggling, putting limbs out, cries, fusses every time the mother tries to put her in skin to skin care position. Mothers can provide skin to skin contact occasionally after giving a birth or during cold nights.

Remember:

It may not be possible for mother to provide KMC for prolonged period in the beginning. Encourage her to increase the duration each time. The aim should be to provide KMC as long as possible.

Can mothers continue KMC during sleep?

A comfortable chair with adjustable back may be useful for primary KMC during rest or sleep.

In ward or at home the mother can sleep with the baby in kangaroo position in a reclined or semi-recumbent position, about 15 degree from horizontal. This can be achieved with an adjustable bed, if available, or with several pillows on an ordinary bed. It has been observed that this position may decrease the risk of apnea for the baby. If the mother finds the semi-recumbent uncomfortable, allow her to sleep as she prefers and she can continue KMC as much as possible.



Fig. 3.3: Mother can provide KMC during sleep and rest

3.2.8 Criteria of Transferring the Baby and Discharge

Standard criteria of the unit for transferring baby from the nursery to the post natal ward should be as follows:

- Stable baby.
- Gaining weight.
- Mother confident to look after the baby.

Discharge criteria

Usually, a KMC baby can be discharged from the hospital when the following criteria are met:

- The baby's general health is good and there is no concurrent disease such as apnea or infection.
- Baby is feeding well, and is receiving exclusively or predominantly breast milk.
- Baby is gaining weight (at least 15g/kg/day for atleast three consecutive days) and has regained birth weight.
- Baby's temperature is stable in the KMC position (within the normal range for atleast three consecutive days).
- The mother is confident of taking care of her baby at home and would be able to come regularly for follow-up visits.

These criteria are usually met by the time baby weighs around 1500 gm. The home environment is also very important for the successful outcome of KMC. The mother should go back to a warm, smoke-free home. She should have support for everyday household tasks.

3.2.9 Follow up Plan

The smaller the baby at discharge, the earlier and more frequent follow-up visits would be needed. If the baby is discharged in accordance with the above criteria, the following suggestions would be valid in most circumstances:

- One follow-up visit once or twice a weeks until 37–40 weeks of postconceptual age or baby reaches 2.5–3.0 kg weight.
- Thereafter one follow-up in two weeks till 3 months of age.
- One follow-up every 1–2 months during first year of life.

The baby should gain adequate weight (15–20 gm/kg/day upto 40 weeks of post conceptional age and 10 gm/kg/day subsequently).

- More frequent visits should be made if baby is not growing well or if the condition demands.

Check Your Progress 1

i) List the Components of KMC include.

.....

.....

ii) Explain the Benefits of KMC include.

.....

.....

iii) Mother should practice KMC atleast for _____ in one sitting.

iv) Who all can practice KMC?

.....

.....

v) A mother is practicing KMC during the day. Can mother provide KMC during the night while she is sleeping?

.....

.....

vi) Mention the discharge criteria of a baby receiving KMC.

.....

.....

viii) Can KMC be provided in the following scenarios:

a) Baby on OG tube feed Yes/No

b) Baby receiving in IV fluids Yes/No

c) Baby receiving free flow Oxygen Yes/No

3.3 LET US SUM UP

KMC is a very effective LOW COST method to keep baby warm in the home setup. It is very simple method and no special training is required. Benefits of KMC are many folds for the baby and for the mother as well.

All health care providers must ensure this at the sub-center and during home visits also. By this simple method you can prevent complications and deaths due to hypothermia.

In this unit different aspects of kangaroo mother care have been discussed in details to improve your knowledge, understanding and practice about KMC.

3.4 MODEL ANSWERS

Check Your Progress 1

i) Components of KMC include Skin-to-skin contact and Exclusive breastfeeding.

ii) Benefits of KMC:

Effective thermal control,

- increased breastfeeding rates,
- early discharge,
- decreased neonatal mortality,
- less morbidities such as apnea and infection,
- less stress, and
- better infant bonding.
- As long as possible

iii) One hour

iv) Any family members

v) A comfortable chair with adjustable back may be useful to provide KMC during sleep and rest.

vi) The standard policy of the unit for discharge from the hospital should be followed.

Generally the following criteria are accepted at most centers:

- Baby's general health is good and no evidence of infection
- Feeding well and receiving exclusively or predominantly breast milk
- Gaining weight (at least 15-20 gm/kg/day for at least three consecutive days)
- Maintaining body temperature satisfactorily for atleast three consecutive days at room temperature.
- The mother and family members are confident about giving KMC and are willing to come for follow-up visits regularly

vii) a) Yes

b) Yes

c) Yes

3.5 ACTIVITY

Select a mother and help her to provide Kangaroo Mother Care (KMC).

3.6 REFERENCES

1) Deorari AK, 2005. Teaching Aids on Newborn Care. 3rd Edition, New Delhi. Publication of National Neonatology Forum of India.

2) Standard Treatment Protocols for management of common newborn conditions at small hospitals, WHO (2013), SEARO.

3) Postnatal Care of the mother & newborn, WHO recommendations 2013.

4) Care of the Newborn Reference Manual, 2003. Saving Newborn Lives Initiative, Save the Children, USA.

5) Kangaroo Mother Care: A Practical Guide, WHO, 2003 Publication.

UNIT 4 INFANT AND YOUNG CHILD FEEDING AND COUNSELLING

Structure

4.0 Introduction

4.1 Objectives

4.2 Infant and Young Child Feeding Practices and Guidelines

4.3 Breastfeeding

- 4.3.1 Benefits of Breastfeeding
- 4.3.2 Types of Breast Milk
- 4.3.3 Steps in Helping a Mother to Breastfeed
- 4.3.4 Readiness of Breastfeed
- 4.3.5 Frequency and Adequacy of Breastfeeding
- 4.3.6 Contraindications of Breastfeeding
- 4.3.7 Problems During Breastfeeding
- 4.3.8 Working Mothers and Breastfeeding

4.4 Complementary Feeding

- 4.3.1 Benefits of Complementary Feeding
- 4.3.2 Method of Introduction of Feed

4.5 Feeding in Difficult Situations

- 4.5.1 HIV and Breastfeeding
- 4.5.2 HCV and Breastfeeding
- 4.5.3 HBs Ag and Breastfeeding

4.6 Infant and Young Child Feeding and Counselling

- 4.6.1 Listening and Learning Skills
- 4.6.2 Building Confidence and Giving Support Skills
- 4.6.3 Counselling Steps of Infant and Young Child Feeding (IYCF)

4.7 Let Us Sum Up

4.8 Model Answers

4.9 Activity

4.10 References

4.0 INTRODUCTION

The World Health Organisation (WHO) and UNICEF have developed the Global Strategy for Infant and Young Child Feeding (IYCF), which recognises appropriate infant feeding practices to be crucial for improving nutrition status and decreasing infant mortality in all countries. Strategy focuses on protecting, promoting and supporting exclusive breastfeeding for six months, and to provide safe and appropriate complementary foods with continued breastfeeding for up to two years of age or beyond. In this unit we shall focus on infant and young child feeding guidelines, breastfeeding, complementary feeding optimal infant and child feeding practices and counselling. We shall begin with infant and young child feeding guidelines. Before going through this unit you should refer Course-1 (BNS-041), Block 2, Unit 2 and 3, Section 2.6 and 3.3 respectively.

4.1 OBJECTIVES

After completing this unit, you should be able to:

- explain the mothers about importance of Infant and Young Child Feeding (IYCF) practices, breastfeeding and complementary feeding;
- demonstrate the correct positioning, attachment and technique of Breastfeeding; and
- counsel the mothers to build the confidence in breastfeeding the infant and child.

4.2 INFANT AND YOUNG CHILD FEEDING PRACTICES AND GUIDELINES

Infant and Young Child Feeding (IYCF) is a set of well-known and common recommendations for appropriate feeding of newborn and children under two years of age.

IYCF Practices

These include following:

- Early initiation of breastfeeding; immediately after birth, preferably within one hour. No pre-lacteal fluid should be given to the newborn.
- Feeding Colostrum and not to discard it.
- Exclusive breastfeeding for the first six months of life i.e. 180 days (no other foods or fluids, not even water; but allow infant to receive ORS, drops, syrups of vitamins, minerals and medicines when required).
- Timely introduction of complementary foods (solid, semisolid or soft foods) after the age of six months i.e. 180 days.
- Continued breastfeeding for 2 years or beyond.
- Age appropriate complementary feeding for children upto, 6–23 months, while continuing breastfeeding. Children should receive food from four or more food groups as mentioned below and fed for a minimum number of times (2 times for breastfed infants (6–8 months); 3 times for breastfed children (9–23 months) 4 times for non-breastfed children (6–23 months). The food groups are given below.
  - i) grains, roots and tubers, legumes and nuts;
  - ii) dairy products;
  - iii) flesh foods (meat fish, poultry);
  - iv) eggs;
  - v) vitamin A rich fruits and vegetables;
  - vi) other fruits and vegetables;
- Active feeding for children during and after illness.

Feeding during illness

- Never starve the child.

- Feed energy-rich cereals-pulse diet with milk and mashed vegetables.
- Feed small quantities at frequent intervals.
- Continue breastfeeding as long as possible.
- Give plenty of fluids during illness.
- Use oral rehydration solution to prevent and correct dehydration during diarrhoea episodes.

4.3 BREASTFEEDING

The breast milk is best milk for a newborn baby. All healthy normal weight babies (2500 g) must be exclusively breastfed till the age of 6 months. All newborns without any complications should be kept in skin to skin contact with their mothers during the first hour after birth to promote breastfeeding and to prevent hypothermia.

4.3.1 Benefits of Breastfeeding

Exclusively breastfed babies are at decreased risk of following:

Diarrhoea

Pneumonia

Ear infection and

Death in first year of life

Benefits of breastfeeding are given in Table 4.1. The breastfeeding has also been discussed in Course 1 (BNS-041), Block 2 Unit 2 under Section 2.6 and Unit 3 under Section 3.3.

Table 4.1: Benefits of Breastfeeding

Benefits to the Baby	Benefits to Family and Society	Benefits to Mother
• Breastfeeding is Complete food, species specific • Easily digested and well absorbed • Protects against infection • Promotes emotional bonding • Helps in better brain growth	• Saves money • Promotes family planning • Decreases need for hospitalisation • Contributes to child survival	• Helps in involution of uterus • Delays pregnancy • Lowers risk of breast and ovarian cancer • Decreases mother's work load

4.3.2 Types of Breast Milk

The types of breast milk are given below.

Colostrum: It is the milk secreted during the first week after delivery. It is yellow, thick and contains more antibodies and white blood cells. Though secreted only

in small quantities, it has higher protein content and is most suited for the needs of the baby it should NEVER be discarded. You should encourage mothers to feed colostrum to their babies.

Transitional milk: It is the milk secreted during the following two weeks. It is rich in sugar and fat but immunoglobulin and protein content is decreased.

Mature milk: It follows transitional milk. It is thinner and watery but contains all the nutrients essential for optimal growth of the baby.

Preterm milk: It is the breast milk of a mother who delivers prematurely. It contains higher quantities of proteins, sodium, iron, and immunoglobulins that are needed by her preterm baby.

Foremilk: It is the milk secreted at the start of a feed. It is watery and is rich in proteins, sugar, vitamins, minerals, and water. It satisfies the baby's thirst.

Hindmilk: It comes later towards the end of a feed and is richer in fat content. It provides more energy, and satisfies the baby's hunger. For optimum growth, the baby needs both fore and hind milk. The baby should therefore be allowed to empty one breast fully before offering the other one. Baby receiving predominantly foremilk may cry excessively.

Remember:

Breastfeeding should be continued during diarrhoea as well as other illnesses. It helps the baby to get optimal nutrition and recover from the illness faster. Ensure, promote and counsel mothers for exclusive breastfeeding for first six months

Help and support all mothers in establishing breastfeeding if there are any problems, they must be attended to problems.

4.3.3 Steps in Helping a Mother to Breastfeed

As a health care provider it is important for you to help mothers breastfeed their babies adequately. The steps are given below.

Step 1: Prepare the infant and the mother for breastfeeding

- Ensure that the infant is stable
- Make sure that the mother is comfortable and relaxed
- Make her to sit down in a comfortable and convenient position Fig 4.1 a,b,c.

Step 2: Demonstrate various positions for breastfeeding a baby

Explain the mother that she can feed the infant in various positions as shown below in Fig 4.1 a,b,c. Whatever the position, it is important to remember that the baby has to be fully with her forearm and the hands.

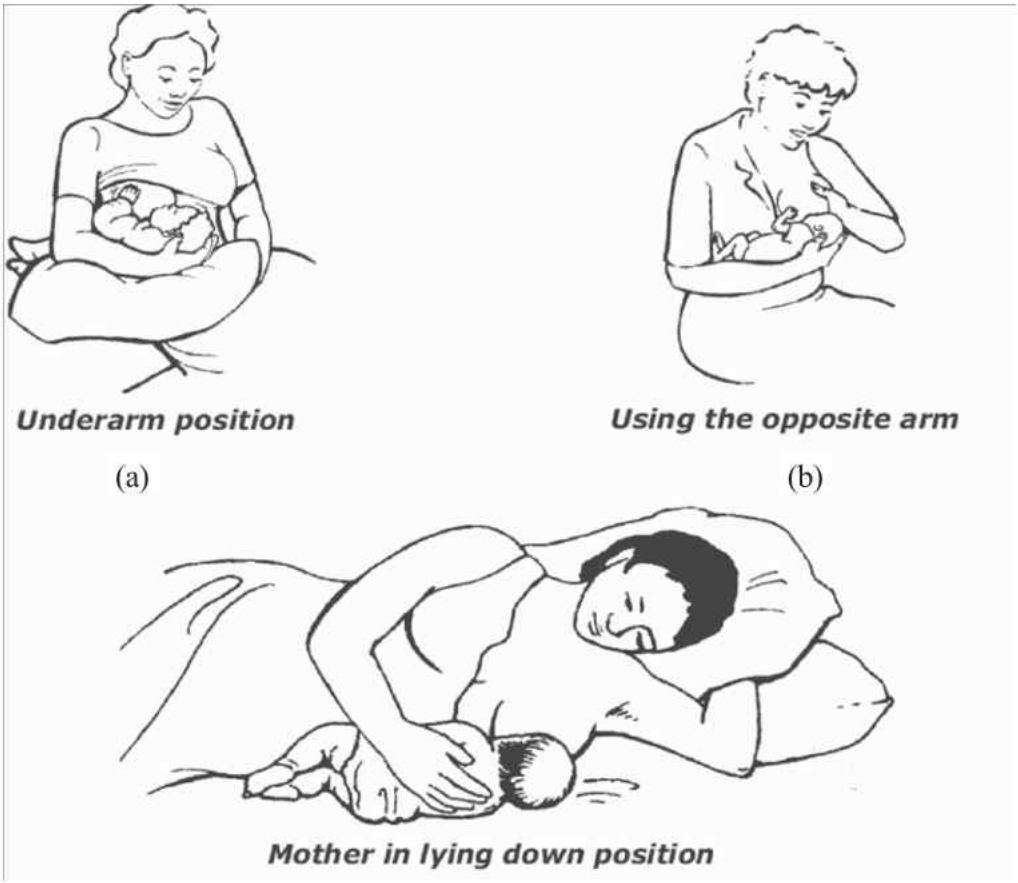


Fig. 4.1 : a, b, c Positions during breastfeeding

Step 3: Demonstrate the four key points for correct positioning of baby to mother

The **four key points** that you need to demonstrate to mother are given below:

- Baby's head in line with the body
- Whole body well supported
- Baby turned towards the mother
- Baby's abdomen touching mothers abdomen.

Step 4: Show the mother how to support her breast with the other hand

- How to put her fingers below her breast
- How to use her first finger to support the breast
- How to put her thumb above the areola helping to shape the breast
- Explain her not to keep her fingers near the nipple.

Step 5: Show the mother how to help the baby to attach the breast

Help the mother to:

- express a little milk on to her nipple
- touch the baby's lips with her nipple
- wait until the baby's mouth is opening wide, and the tongue is down and forward

- move the baby quickly onto her breast, aiming the nipple towards the baby's palate and his lower lip well below the nipple.

Step 6: Explain and show the mother, key signs of good attachment

The four key signs of good attachment are given below (Fig 4.2).

- More areola is visible above the baby's mouth than below it
- Baby's mouth is wide open
- Baby's lower lip is turned outwards
- Baby's chin is touching the breast

Examples of good and poor attachment are shown in Fig. 4.2 a and b.

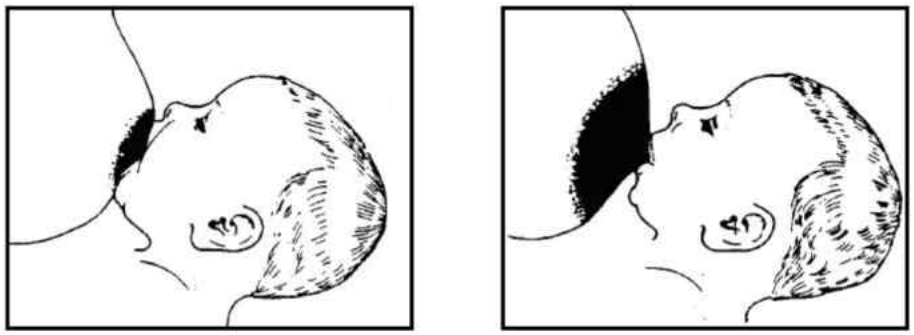


Fig. 4.2 (a-b): Good attachment and poor attachment

The causes of poor attachment may be due to following:

- Use of feeding bottles
- Inexperienced mother
- Lack of skilled support
- Inverted nipples

Hence it is very important NOT TO INTRODUCE BOTTLE FEEDS at any point of time. Poor attachment usually leads to following problems:

- Pain or damage to nipple or sore nipple
- Breast engorgement as milk is not removed effectively or breast is not emptied fully
- Hungry and irritable baby because of poor milk supply
- Poor weight gain of the baby.

Remember:

Correct positioning and attachment will ensure effective sucking and prevent sore nipples and breast engorgement.

For an infant who shows signs of good attachment, the next step would be to assess if he/she suckles and swallows effectively.

Step 7: Help the mother to assess if the infant is suckling and swallowing effectively

Effective Sucking	Ineffective sucking
Infant takes several slow deep sucks followed by swallowing, and then pauses.	Infant suckles for a short time but tires out and is unable to continue for long enough

After demonstrating the steps of breastfeeding to mother, you should observe the mother during breastfeeding her infant for correct positioning, good attachment and effective suckling.

If an infant is not able to attach and suckle effectively at the breast, or is not able to suckle for long enough to complete a feed, he or she will need to be fed with a spoon or paladai until effective feeding ability develops.

4.3.4 Readiness to Breastfeed

You should help mother to recognise when the baby is ready to be breastfed. A normal newborn baby will show one or more of the following signs when he is ready to breastfeed:

- Opens eyes
- Seeks breast
- Head back slightly
- Tongue down and forward
- Mouth wide open
- Licks and saliva drips

4.3.5 Frequency and Adequacy of Breastfeeding

Let us begin with frequency of feeding.

A healthy newborn baby can be breastfeed ON DEMAND i.e. whenever the baby cries for feeds. The usual time interval between each feed is about 2 to 3 hours. Mothers should be advised that they should feed their babies AT LEAST 8–10 times in 24 hours and importantly they should not omit any night feeds.

Assessing the Adequacy of Breastfeeding

After mother has been counselled and helped in establishing breastfeeding successfully, you should ensure that the infant is getting enough breast milk. Often, mothers would be worried about the amount of milk secreted and whether it is sufficient for their babies. You should assess adequacy of breastfeeding and reassure the mother about same.

Breastfeeding is considered adequate if it results in softening of breast after feeding and the Baby shows following characteristics.

a) Sleeps well in between feeds/2–3 hours after feeding

b) Passes urine atleast 6–8 times in a day/24 hours

c) Gains weight atleast @ 25–30 g/day after initial 7–10 days

Remember:

Breastfeeding is considered adequate if the infant passes urine 6–8 times in 24 hours, sleeps for 2–3 hours after feeds, and gains weight adequately.

Also remember that Mother needs Extra Nutrition measures to promote excessive breastfeeding.

Key message to promote exclusive breast feeding are given below you should counsel mother about these messages.

Key measures to promote exclusive breastfeeding

- Promote skin to skin contact at birth and put baby to breast as soon as possible after birth. This is important for the mother, baby, and for milk production
- On the first day, breast milk is thick and yellowish (known as colostrum). Feeding this milk provides nutrition and prevents infections. Some babies will not latch during first feeding session. Give no liquids other than breast milk (or colostrum) even if the baby does not feed. DO NOT DISCARD COLOSTRUM
- Keep baby close to mother. It is safe for baby to sleep with mother
- Mother may lie down, sit on a bed, chair or floor to breastfeed her baby
- Breastfeed during day and at night for atleast eight to ten times and whenever baby cries with hunger
- The more the baby sucks at breast, more milk the breast will produce and healthier the baby becomes
- Allow baby to feed at one breast until he leaves the nipple on his own. Then feed him at the other breast if he continues to be hungry
- Give baby only breast milk for the first six months
- Don't give baby ghutti water, gripe water, honey, animal or powdered milk
- NEVER use bottles or pacifier

Check Your Progress 1

i) List the types of Breast Milk?

.....

.....

.....

ii) List the benefits of Breastfeeding for baby.

.....

.....

.....

iii) Write the key points of correct positioning.

.....

.....

iii) List the signs of good attachment.

.....

.....

4.3.6 Contraindications of Breastfeeding

Advise mother to avoid breastfeeding in following situations.

- Mother's on chemotherapeutic drug
- Mothers addicted to alcohol
- Certain hormones and radio active isotopes
- HIV infection
- Chronic medical illness e.g. cardiac lesion and pulmonary tuberculosis, leprosy, Puerperal psychosis
- Women receiving high doses of anti epileptic, anti coagulant and anti thyroid drugs.
- Local conditions like breast abscess, cracked nipples.

  In Infants

  - Inborn errors of metabolism such as phenylketonuria, or lactose intoleranceetc
  - Breast milk jaundice.

4.3.7 Problems During Breastfeeding

Flat and Inverted nipples

Flat or short nipple which protract well, cause no problem and in this case you need to reassure the mother .

Inverted Nipple is manually stretched and rolled out several times a day.

A plastic syringe or a pump is used to draw out the nipple. (Fig 4.3)

Advise the mother to improve attachment by stimulating the inverted nipple before breastfeeding and shaping breast by supporting underneath with the fingers and pressing above with the thumb.

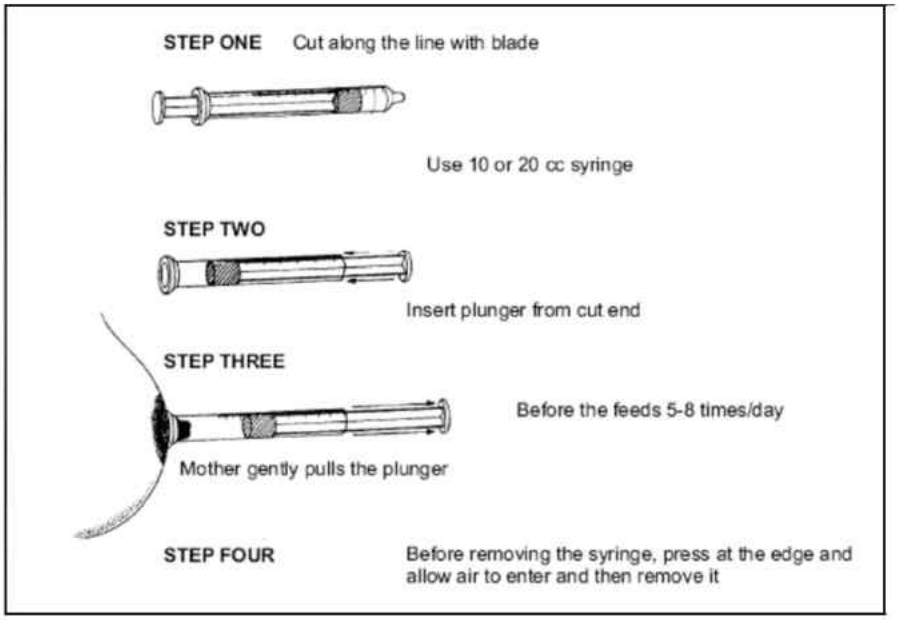


Fig. 4.3 : Management of inverted nipple using syringe

Sore nipples

Sore nipple may be caused due to following:

- Incorrect attachment of baby to breast. Due to poor attachment baby sucks only at nipple and does not get enough milk, so he sucks vigorously resulting in sore nipple. This leads to pain during feeding and fissures or crack on nipple
- Frequent washing with soap &water and pulling off the breast while still sucking.
- Fungal infection of the nipple after first few weeks.

How to Manage

- You should ensure correct positioning and attachment of baby to breast.
- Hindmilk can be applied to the nipple after feeding and nipple should be aired and allowed to heal in between feeds.
- Frequent washing with soap & water should be avoided baby should not be pulled off while still sucking.

Breast Engorgement

In breast engorgement breast becomes swollen, hard, warm and painful. Often mother feels ill. It may be caused due to delayed and/ infrequent feeding, inaccurate positioning and poor attachment of baby to breast.

Milk production increases during second and third day after delivery. If the feeding is delayed, baby is not breastfed frequently or the baby is not well positioned and attached at the breast, the milk accumulates in the alveoli. As the milk production increases the amount of milk in the breast exceeds the capacity of alveoli to store it comfortably. Which leads to engorgement. (Fig 4.4)

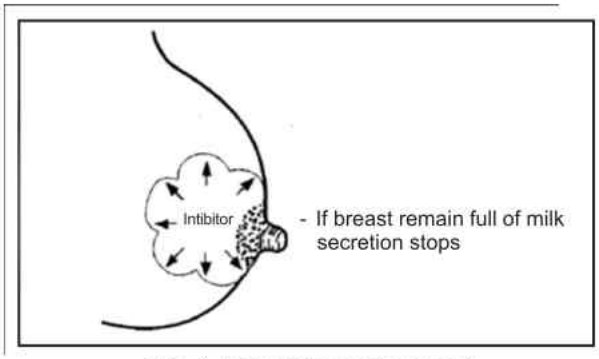


Fig. 4.4: Breast engorgement

How to prevent and manage breast engorgement

- Early and frequent breast feeds and correct attachment of the baby to the breast
- Application of local warm water packs for not more than 15 minutes
- Paracetamol can be given to the mother to relieve the pain
- Gently express the milk to soften the breast and then help the mother to correctly latch the baby to the breast.

Breast Abscess

Breast abscess may develop if engorged breast, cracked nipple, blocked duct or mastitis are not treated early due to which mother may develop high grade fever and pain in the breast.

How to manage breast abscess

- Analgesics and antibiotics are prescribed to treat the abscess
- The mother must be referred for incision and drainage of abscess
- Continue breastfeeding from the other breast.

Not enough milk

Mothers often complain that they don't have enough milk, so you have to assess to ensure that her perception about adequacy of milk is true. Common causes of not enough milk may be infrequent breastfeeding, too short or hurried breast feed, poor positioning, breast engorged or mastitis.

Assess if baby is gaining weight adequately and passing urine sufficiently , then only reassurance is needed and mother should be counselled to feed baby frequently especially at night.

How to Manage

- Make sure that baby is well attached.
- Take care of painful conditions like sore nipples or mastitis.
- Advise mother to increase fluid intake and massaging breast may help.
- Back massages 15–30 minutes, 3–4 times/day are especially useful for stimulating lactation by relaxing the mother and hormone production. You should demonstrate the technique to the relative who can give back massage to the mother.

Difficulties of the baby in Breastfeeding

Low birth weight baby: Tube feeding of expressed milk should be given until the baby becomes able to suck from the breast.

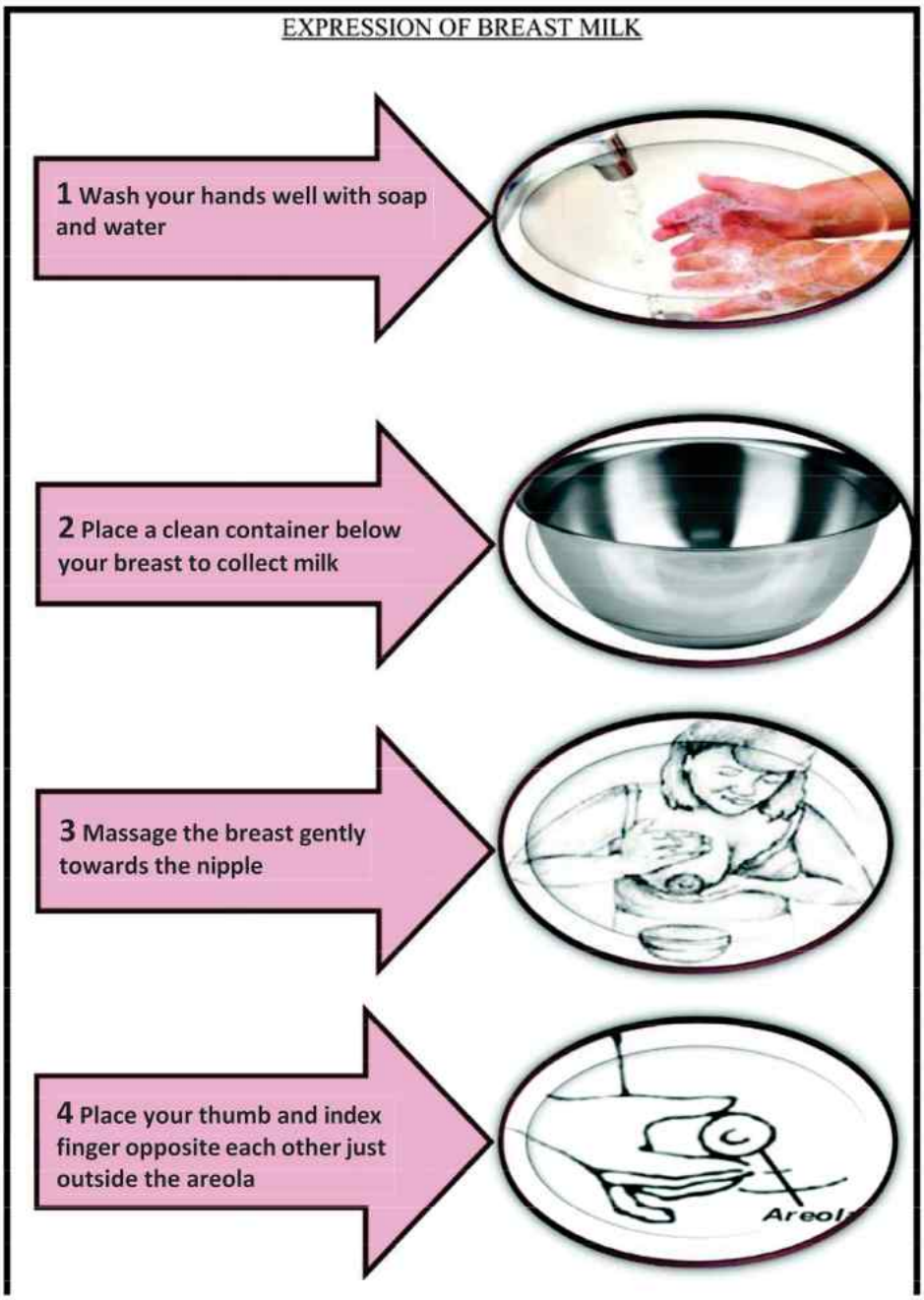
Temporary illness: Cerebral irritation, respiratory tract infections, nasal obstructions etc.

Over distension of the stomach with swallowed air can be prevented by burping the baby after feeding.

Cleft palate: Feeding with spoon or paladai.

4.3.8 Working Mothers and Breastfeeding

- Mother should express her milk in a clean wide mouthed container. Expressed breast milk can be stored at room temperature for 8 hours & in the refrigerator for 24 hours
- It should be given with cup spoon or paladai
- Expression of milk can be done manually with thumb & forefinger by pressing the areola.
- By using breast pump breast milk can be expressed electrically Steps of expressing breast milk are given in. (Fig. 4.5)



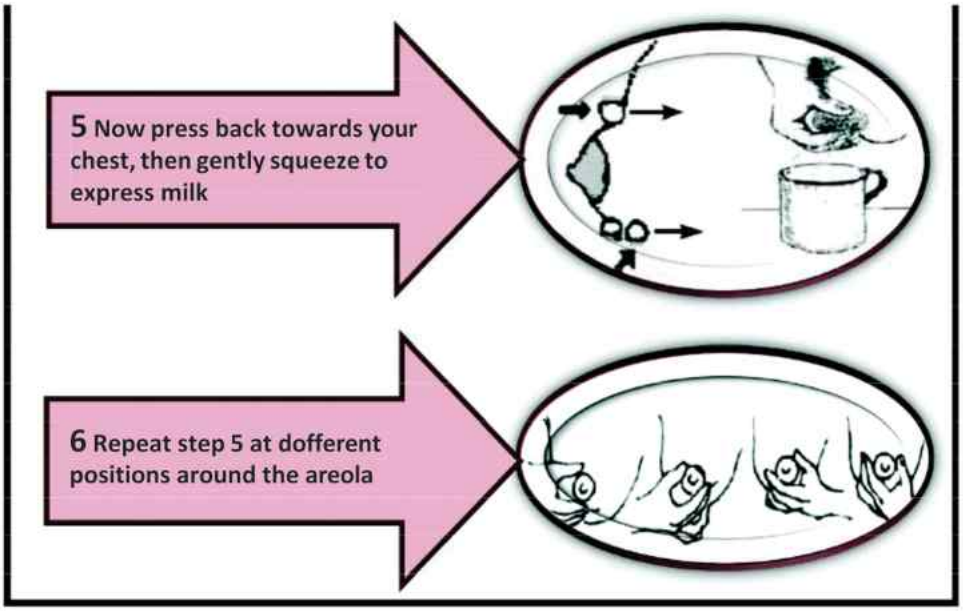


Fig. 4.5 : Expression of Breast Milk

4.4 COMPLEMENTARY FEEDING

COMPLEMENTARY FEEDING- WHY START COMPLEMENTARY FEEDING ON COMPLETION OF SIX MONTHS OF AGE AND CONTINUE BREASTFEEDING?

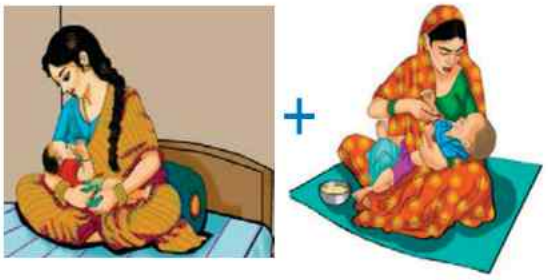


Children should be introduced to semi-solid, soft foods (complementary feeding) on completion of six months of age because:

- Breast milk alone is not sufficient to meet the growing needs of the child.
- 6 months to 24 months is a period of rapid growth and development in the young child and demands extra nutrition.

Breastfeeding should be continued:

For a minimum of 2 years or beyond because it is an important source of nutrition, provides energy and protection from illness. It protects infants from infection, who are particularly vulnerable during the transition period when complementary feeding begins.



Breastfeeding Complementary feeding

4.4.1 REQUIREMENTS OF COMPLEMENTARY FOODS

1. timely

Introduced at completion of six months when requirement for energy and nutrients exceeds that provided by breastmilk alone.

2. Adequate



Should provide sufficient nutrients to meet the growing needs of the child- energy, protein, vitamins and minerals from different food groups like cereals such as wheat, wheat flour (atta/maida), rice, rice flakes (chirwa), maize/ corn, barley, semolina (suji), vermicelli (sevian), puffed rice (murmura), etc. and millets like bajra, ragi, jowar, etc. and pulses (daals) and legumes such as channa daal, besan, moong daal, arhar daal/tur daal, white/black/green chana, lobia, etc; vegetables (including green leafy vegetables and other coloured vegetables) and fruits; milk and milk products like milk, curd, cottage cheese (paneer), etc., animal products/non-vegetarian foods (meat, liver, fish, poultry, eggs (well-cooked), etc.); and ghee/butter/cooking oil and sugar/jaggery (gur) and nuts. Roasted, crushed and powdered/mashed groundnuts can be added to the food (only if the child is not allergic).



3. Properly Fed

Active feeding method to encourage the child to eat more without forced feeding. Children have small stomach therefore should be fed more frequently. Feed children from a separate cup/katori/plate at recommended frequency (Table 3).

4. Safe



Food should be hygienically prepared and stored. Mothers/caregivers should wash their hands with soap and water before preparing food and feeding the child. Also wash the child's hands.

Disadvantages of adding foods too soon i.e. before completion of 6 months of age	Disadvantages of adding foods too late i.e. later than completion of 6 months of age
• Decrease the intake or output of breast milk resulting in a low nutrient diet • Increase risk of illness especially diarrhoea	• Growth and development slows down or stops- • physical and brain growth faltering* • Risk of deficiencies and infectious diseases

**Growth faltering means the child does not grow in an age appropriate manner in terms of weight and length/height.*

Table 3: Five important things to remember about Complementary Feeding

Consistency	Quantity	Frequency	Density	Variety
• Depends on age of the child • and readiness to chew and	• Increase with • the age of the	• Increase with • the age of the	• Add a spoon of some edible	• Add fruits and vegetables - The rule

• swallow. • Initially include soft and • mashed foods. • Move gradually to foods • with appropriate thick • consistency. • Give Daal (& not Daal ka • Paani) • Feed prepared should not • be too thin and too thick. • Test: stays on a spoon • when the spoon is tilted • (see figure given below)	• child. • Encourage for • better intake but • not force child to • eat more. • At one-year, child should receive half • the mother's • nutrition.	• child. • Number of • feeds will • increase • gradually with • increase in age of the child.	• oils or fats/ ghee/butter; sugar/ • jaggery (gur) to each feed, to make the feed rich in energy.	• is that the greener it is, • or the more red and yellow is the feed, • the more is the protective quality. • Meat, egg (well-cooked), poultry, fish, etc. are liked • by children and are also very nutritive and protective.

Figure 2: Different consistencies of Complementary Food



4.4.2 ASSESSING INFORMATION ABOUT COMPLEMENTARY FEEDING FROM THE MOTHER/CAREGIVER

- **Start by asking if the mother/caregiver is breastfeeding the child?**
  - How many times in a day- both day and night?
  - Is the child breast fed at night? If yes, how many times is the child fed at night.
- **Does the child take any other food or fluids?**
  - What foods or fluids?
  - How many times per day?
  - Are the foods thick or thin?

- What do you use to feed the child?
- How large are the servings (cup/katori, teaspoon, tablespoon)?
- Does the child receive separate serving from the family members?
- Who feeds the child and how?
- What feeding difficulties does mother/caregiver experience, if any?

- Ask if the child's feeding has changed during the illness?
  - If yes, how?

The mother's/caregiver's answers to these questions will give you an idea whether the child is receiving adequate amount of nutrition from breastfeeding and complementary feeding. You should counsel for continuation of breastfeeding during the home visits, support them in maintaining age-appropriate feeding pattern by counselling on what should be avoided and teach right quantities for complementary feeds. It is also important to inform them about feeding during illness and recovery phase and regarding specific nutritional needs of malnourished children.

4.4.3 IMPORTANT MESSAGES FOR MOTHERS AND CAREGIVERS ON COMPLEMENTARY FEEDING

- Combination of pulses (daals) and legumes with cereals and millets should be given. Example- daal with rice or cracked wheat porridge (dalia) with daal, chappati/roti soaked in daal, bajra khichri with daal, etc. Feed should be prepared from locally available pulses and cereals/ millets.

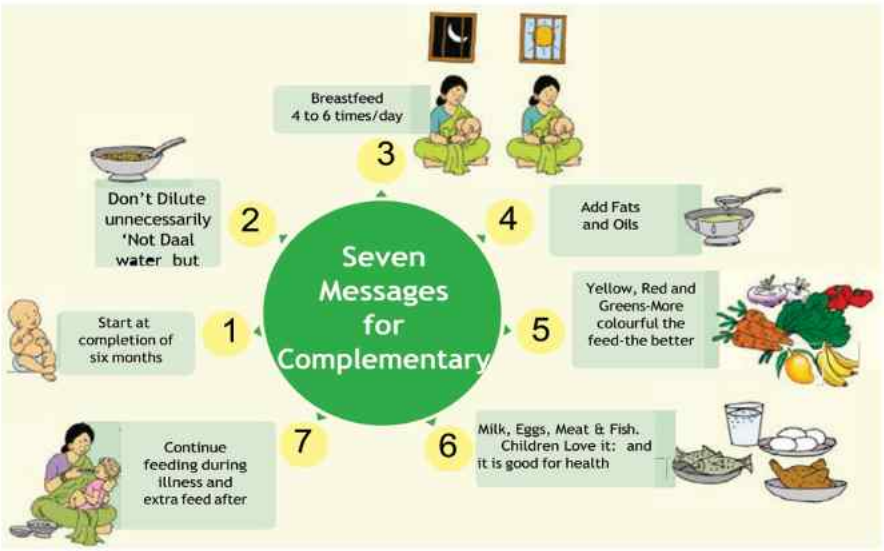


- Oil/ghee/butter, sugar/jaggery (gur), roasted crushed and powdered/ mashed groundnut (if the child is not allergic) etc. can be added to the feed for making it rich, tasty and easy to swallow. Do not add spices to the food of the child.
- Locally available, fresh and seasonal fruits and vegetables should be given to the child. Washed, cooked and mashed fruits and vegetables can be added to the feed.
- Cereals/millets and pulses that are soaked, sprouted, dry roasted and powdered for cooking can be given to the child as they are easily digested.



- Animal products/non-vegetarian foods (meat, liver, fish, poultry, eggs (well-cooked), etc.), wherever culturally acceptable, can be started as early and given as often possible to the child.
- Plan for one to two healthy snacks in between the main meals. Snacks are like small meals which are given in between main meals. These must **NOt** be a replacement of meals. Mashed fruits like banana, papaya, mango, cheeku and other soft fruits; boiled and mashed potatoes, mashed vegetables, well-cooked eggs, curd, panjeeri, laddoo, halwa, upma, idli, poha with crushed/mashed groundnuts (do not add groundnuts if child is allergic), etc. are some of the examples of food items to be given as snack to the child.

- Introduce only one food at a time, variety can be increased by adding new foods one by one.
- Show interest, smile or play games to encourage children to eat enough food.
- Continue complementary feeding during illness and increase the amount during the recovery period.
- Feed the child in a separate cup/katori/plate as it will help mother/caregivers to understand the quantity of food eaten by the child.
- If the child dislikes a particular for some time and give again at a later stage.



- Complementary foods should be prepared hygienically. Mothers/caregivers must wash their hands before preparing and before feeding the child. The child's hands should be washed also. Clean utensils should be used to prepare the feed of the child.
- Girls and boys have the same nutrition requirement to grow and develop. So they both should be
- given the same amount and similar kind of food.

4.4.4 INFORMING MOTHERS AND CAREGIVERS WHAT SHOULD BE AVOIDED IN COMPLEMENTARY FEEDING

It is also important to explain mothers/caregivers to **<u>avoid</u>**:

- Ready-made or processed food available in the market such as toffees, sweets, chips, chocolates, biscuits, namkeens; drinks such as tea, coffee, cola drinks, cold drinks, fruit juices, sharbats, etc.
- Showing personal dislikes for any food item otherwise child
- will not learn to eat all types of foods.
- Food which can pose choking hazard such as whole nuts,
- grapes, raw carrot pieces, etc. initially. These should be given



only at a later stage when the chewing and swallowing ability has been fully developed.

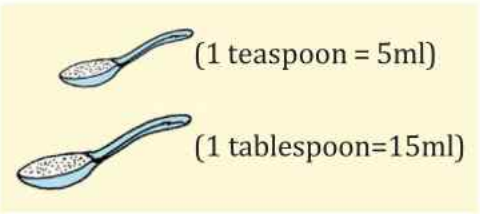
4.4.5 SOME USEFUL HOUSEHOLD MEASUREMENTS FOR PREPARING FEEDS FOR THE CHILD

Age-appropriate feeding recommendations on complementary feeding at completion of 6 months to 12 months and beyond is given the MCP card, page number 11. Refer to this, while counselling mothers/caregivers regarding complementary feeding.

The quantity mentioned may be difficult for a family to measure correctly. The size of cup/katori, serving spoon/karchi, teaspoon and tablespoon can vary in size and shape. Thus, it is important to explain the mother and caregiver about the quantity by showing common household utensils that are used in the family for serving food.

Household measurements of commonly used household utensils:

- 1 full cup/katori*= 250 ml (the volume may vary)
- 1 serving spoon/karchi= 100 ml (the volume an vary)
- 1 teaspoon- 5 ml
- 1 tablespoon- 15 ml



With the child's bowl, it can be easy to demonstrate how much is 1/2 (half), 3/4th, and a full cup/katori as shown in the figure given below.

Figure 3: Common household measurement of a cup/katori

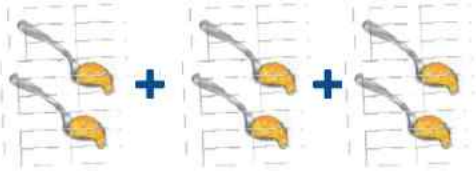


1/2 (half) cup/katori *3/4th cup/katori* *1 full cup/katori (250ml)**

Complementary Feeding- Quantity and Frequency for the Child

Breastfeed as often as the child wants and continue breastfeeding if the child is sick.





At 6 months - On completion of 6 months, start feeding 2-3 tablespoons at each meal of soft, well-mashed foods, 2-3 times each day.



From 6 months upto 9 months- 2-3 tablespoons to be gradually increased to half (1/2) cup/katori at each meal of mashed food, 2-3 times each day and 1-2 snacks.

From 9 months upto 12 months- Atleast half (1/2) cup/katori at each meal of finely chopped or mashed food and foods that the baby can pick up with her/his fingers, 3-4 times each day and 1-2 snacks.



From 12 months upto 2 years- Introduce family foods, chopped or mashed, give ¾ to 1 full cup/katori at each meal, 3-4 times each day and 1-2 snacks.



For 2 years and older children, give a variety of family foods to the child, at least 1 full cup/katori (250ml) at each meal, 3-4 meals each day with 1-2 nutritious snacks between meals.

FEEDING THE CHILD RESPONSIVELY



Mothers/caregivers should recognize the signs of hunger and respond as soon as possible. Responsive feeding means gently encouraging—not forcing—the child to eat.

Counsel the mothers/caregivers to:

1. Be patient in feeding the child and encourage them to eat. Do not force the child to eat.
2. Try different food combinations, tastes and methods to encourage feeding if children refuse many foods.
3. Play games to help the child to eat enough food and to encourage the child to try new foods.
4. Minimize any disturbances - during meals, if the child loses interest easily.
5. Smile and talk to children during feeding, with eye to eye contact as feeding times are periods of learning and affection.
6. Do not express anger at children who refuse to eat. These actions usually result in children eating less.



4.4.6 FEEDING OF SICK AND MALNOURISHED CHILD



Timely initiation of complementary feeding along with responsive feeding are also important for sick and malnourished children. The messages given above on complementary feeding are also useful for these children. During this time, the child may not want to eat much, but children need small frequent meals and more fluids, including breastmilk and other liquids to recover more quickly during illness. Children who are breastfeeding, need to be breastfed more often and for longer time. After an illness, children should be given more food and more often than usual for at least 2 weeks to help recover from the weight lost during illness.

4.4.7 ROLE OF ASHA IN PROMOTING BREASTFEEDING AND COMPLEMENTARY FEEDING

You may use the MCP card, Page 8, to ensure that activities related to breastfeeding and complementary feeding are undertaken during the home visits. Also, with reference to MCP card, pages- 10 and 11, messages related to early and exclusive breastfeeding and age-appropriate complementary feeding, respectively can be explained to the mother/caregiver. During each home visit from 3 months up to 15 months, you will:



- Encourage the mother/caregiver to exclusively breastfeed the child from birth to 6 months and

- provide complementary feeding on completion of 6 months of age, to girl and boy children alike.
- Ensure support from family members- husband, mother and father in-law, etc. for the mother to provide her sufficient rest and adequate nutrition to breastfeed her child. Family support is required to feed the child responsively.
- Provide counselling to mother/caregivers on importance of early and exclusive breastfeeding and timely introduction of age-appropriate complementary feeding to the child. Ensure that families having children- low birth weight, malnourished, sick, those discharged from SNCU/NBSU/NRC, etc. are counselled and following your advice.
- Undertake joint visits with ASHA Facilitator or ANM/MPW to a household where you are unable to convince the family for exclusive breastfeeding/complementary feeding.
- Educate regarding the importance of regular hand-washing before and after preparing food, before feeding the child and after using the toilet.
- Mobilise the lactating mothers and their children for registration at the nearby Anganwadi centre to receive 'Take Home Ration' (THR) for themselves and their children beyond 6 months of age.



- Refer mothers with problems in breastfeeding and those children who are unable to take breastfeed or complementary feed to ANM at Sub-Centre (SC) or trained medical specialist at nearest health facility for appropriate care.
- Follow-up with them closely to ensure child is provided appropriate care and is growing well.

On completion of 6 months of age, counsel mother/caregiver to ensure that all children are being given healthy food in adequate amount through responsive feeding and continued frequent on demand breastfeeding for at least 2 years.

As an ASHA, you can mobilise support from VHSNC/MAS, VHNDs/UHNDs, self-help group meetings, mother's group meetings, support groups, etc. for promotion and counselling activities related to breastfeeding and complementary feeding. These groups can also help you in overcoming the harmful traditional practices and beliefs related to young child feeding and nutrition prevalent amongst mothers- in- law, fathers- in-law, husband and other family members.

4.5 FEEDING IN DIFFICULT SITUATIONS

Families and children in difficult circumstances require special attention and practical support. Wherever possible, mothers and babies should remain together and get the support they need to exercise the most appropriate feeding option available. Breastfeeding remains the preferred mode of infant feeding in almost all difficult situations, as given below:

- low-birth-weight or premature infants;
- HIV-infected mothers;
- adolescent mothers;
- infants and young children who are malnourished; and
- families suffering the consequences of complex emergencies.

4.5.1 HIV and Breastfeeding

- Breastfeeding, and especially early and exclusive breastfeeding, is one of the most significant ways to improve infant survival rates. However, HIV can pass from mother to child during pregnancy, labour or delivery, and also through breast milk.

- The evidence on HIV and infant feeding shows that giving antiretroviral drugs (ARVs) to HIV-infected mothers can significantly reduce the risk of transmission through breastfeeding and also improve her health. This enables infants of HIV-infected mothers to be breastfed with a low risk of transmission (1–2%). HIV-infected mothers and their infants living in countries where diarrhoea, pneumonia and malnutrition are still common causes of infant and child deaths can therefore gain the benefits of breastfeeding with minimal risk of HIV transmission.
- Since 2010, WHO has recommended that mothers who are HIV-infected take ARVs and exclusively breastfeed their babies for 6 months, then introduce appropriate complementary foods and continue breastfeeding up to the child's first birthday. If breastfeeding is not possible in case of maternal death or any severe maternal illness, replacement exclusive feeding should be done only when AFASS(Available, feasible Affordable Safe Sustainable) criteria are fulfilled.

4.5.2 HCV and Breastfeeding

Infants are at risk of HCV infection primarily as a result of transmission from their infected mothers. According to guidelines from the Centers for Disease Control and Prevention and the American Academy of Paediatrics, maternal HCV infection is not a contraindication to breastfeeding. Mothers who are HCV-infected and who choose to breastfeed may be advised to abstain from breastfeeding if their nipples are cracked and bleeding.

4.5.3 HBsAg and Breastfeeding

All infants born to HBV-infected mothers should receive hepatitis B immune globulin and the first dose of hepatitis B vaccine within 12 hours of birth followed by recommended doses as per schedule There is no need to delay breastfeeding until the infant is fully immunised. All mothers who breastfeed should take good care of their nipples to avoid cracking and bleeding.

4.6 INFANT AND YOUNG CHILD FEEDING (IYCF) COUNSELLING

Positive counselling skills are important to counsel mothers and other caregivers about infant and young child feeding (IYCF). Some basic counselling skills presented below include Listening and Learning, as well as Building Confidence and Giving Support. (Fig 4.7)



Fig. 4.7 : Infant and young child feeding

4.6.1 Listening and Learning Skills

- Use helpful non-verbal communication
- Keep your head level with the mother (or caregiver)
- Pay attention
- Reduce physical barriers
- Take time
- Touch appropriately
- Ask open questions
- Use responses and gestures that show interest
- Reflect back what the mother (or caregiver) says
- Avoid using "judging" words.

4.6.2 Building Confidence and Giving Support Skills

- Accept what a mother (or caregiver) thinks and feels. Let the mother (or caregiver) talk through her or his concerns before correcting any wrong ideas or misinformation. This helps to establish confidence.
- Listen carefully to the mother's (or caregiver's) concerns.
- Recognise and praise what a mother (or caregiver) and child are doing correctly.
- Give practical help.
- Give a little, relevant information at a time.
- Use simple language that the mother or caregiver will understand.
- Use appropriate Counselling Card(s) or Take-Home Brochure(s).
- Make one or two suggestions, not commands.

4.6.3 Counselling Steps of Infant and Young Child Feeding (IYCF)

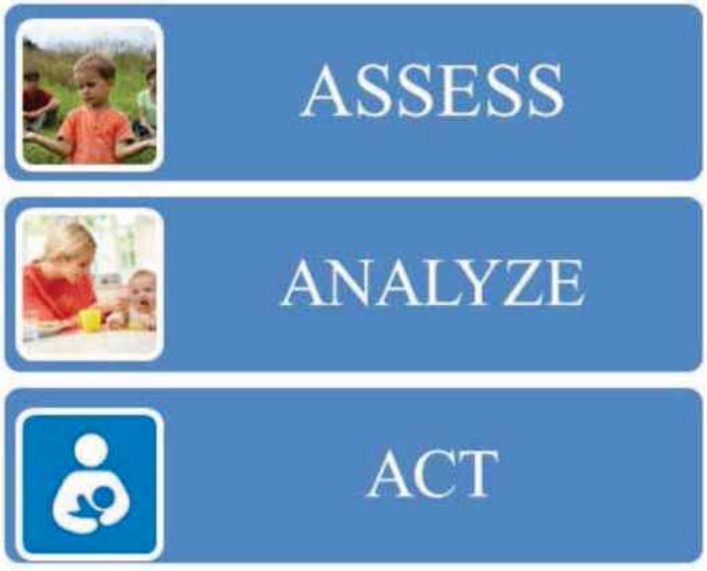


Fig. 4.8 : Steps of counselling

Step 1: Assess:

- ask
- listen
- observe
    - Greet the mother (or caregiver), using friendly language and gestures.
    - Ask some initial questions that encourage her (or him) to talk.
    - Listen to what is being said and observe what is going on using your Listening and Learning, and Building Confidence and Giving Support skills.
    - Assess the age appropriate feeding practice(s) and the condition or health of the child and mother (or caregiver).

Step 2: Analyse:

- Identify difficulty and if there is more than one – prioritise the difficulties.
    - Decide if the feeding you observe is age-appropriate and if the condition or health of the child and mother (or caregiver) is good.
    - If there are no apparent difficulties, praise the mother (or caregiver) and focus on providing information needed for the next stage of the child's development.
    - If one or more feeding difficulty is present, or the condition or health of the child or mother (or caregiver) is poor, prioritise the difficulties.
    - Answer the mother's (or caregiver's) questions if any.

Step 3: Act:

- discuss
- suggest a small amount of relevant information
- agree on do-able action
    - Depending on the factors analysed above, select a small amount of information to share with the mother or caregiver that is most relevant to her or his situation
    - Be sure to praise the mother or caregiver for what she or he is doing well.
    - Present options for addressing the feeding difficulty or condition of health of the child or caregiver in terms of small do-able actions. These actions should be time-bound (within the next few days or weeks).
    - Share key information with the mother or caregiver, using the appropriate Counselling Cards or Take home Brochures and answering questions as needed.
    - Help the mother or caregiver select one option that she or he agrees to try, in order to address or overcome the difficulty or condition that has been identified. This is called reaching-an-agreement.
    - Suggest where the mother or caregiver can find additional support. Refer to the nearest health facility if appropriate and/or encourage participation in educational talks or IYCF Support Groups in the community.

- Confirm that the mother or caregiver knows where to find a community volunteer and/or other health worker.
- Thank the mother or caregiver for her or his time.
- Agree on when you will meet again, if appropriate.

Check Your Progress 2

i) Can a mother feed baby in lying position? Yes/No

ii) Enumerate the four key points of positioning of baby for breastfeeding.

iii) List signs of good attachment.

iv) What differences do you see in Fig. A and Fig. B

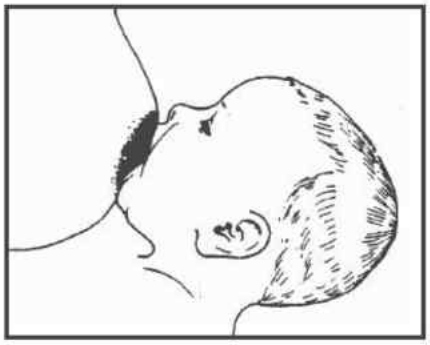


Fig. (A): Baby sucking on breast

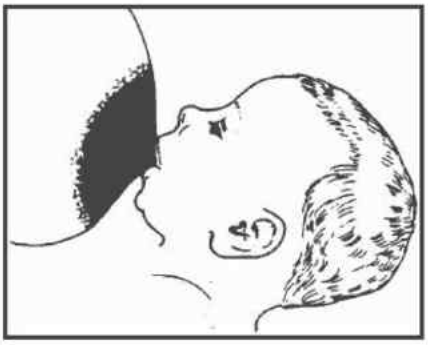


Fig. (B): Baby sucking on

v) Enumerate the problems caused by poor attachment.

vi) How will you assess the adequacy of breastfeeding?

vii) How many times should a baby be breastfed in a day?

viii) Can mother skip one or two night feeds? Yes/No

ix) What advice will you give to a mother who develops heaviness and pain in breast on third day after delivery?

x) How you will manage a mother with sore nipple?

4.6 (B) IRON AND FOLIC ACID SUPPLEMENTATION

In ASHA Module- 6, you have been trained in management of anaemia among women. In this section, you will learn that anaemia is also a common problem among children in India.

4.6.1 WHAT IS ANAEMIA?

Anaemia is a condition when there is low haemoglobin level in the body resulting in less ability to carry oxygen to all parts of the body.



Anaemia in children occurs when the haemoglobin level in the body is less than 11 g/dl.

Anaemia in children causes poor learning ability, low concentration, tiredness, poor school performance and

poor coordination of language. The child is unable to reach his/her full potential both physically and mentally.

Table 4: Haemoglobin levels to diagnose anaemia (g/dl)

Age group	Anaemia		
	Mild	Moderate	Severe
Children 6–59 months of age	10–10.9	7–9.9	<7

Source: World Health Organization (WHO)-Nutritional Anemia: Tools for Effective Prevention and Control, 2017.

4.6.2 CAUSES OF NUTRITIONAL ANAEMIA IN CHILDREN

Breastmilk is sufficient to meet the iron requirement of a breastfed child until 6 months of age. Iron from breast milk is more easily available to the young child. The onset of anaemia in young children is generally after 6 months of age and increases from 6–8 months till the child is 1 year old. The common causes of nutritional anaemia are:

- Low iron stores at birth due to anaemia in mother.
- Non-exclusive breastfeeding up to 6 months of age.
- Too early introduction of inappropriate complementary food i.e. before completion of 6 months of age (resulting in diminished breast milk intake, insufficient iron intake, and heightened risk of intestinal infections).
- Late introduction of appropriate (iron-rich) complementary foods i.e. later than completion of
  6 months of age.
- Insufficient quantity of iron and iron enhancers in diet (foods rich in Vitamin C) and low
  availability of dietary iron (especially from vegetarian diet).
- Iron loss due to parasite load (e.g. malaria, intestinal worms).
- Poor environmental sanitation, unsafe drinking water and inadequate personal hygiene leading
  to frequent illnesses.

To overcome this problem, government has launched Anemia Mukt Bharat campaign recently to promote Iron and Folic Acid (IFA) supplementation for prevention of anaemia in all children 6-59 months of age. The dose and regime of IFA supplementation and deworming under the programme is explained in this chapter.

Table 5: Dose and regime for Iron Folic Acid supplementation for prevention of

Age group	Dose and regime
Children 6-59 months of age*	Biweekly, 1 ml Iron and Folic Acid syrup Each ml of Iron and Folic Acid syrup containing 20 mg elemental Iron + 100 mcg of Folic Acid Bottle (50 ml) to have an 'auto-dispenser' and information leaflet as per Ministry of Health and Family Welfare guidelines in the mono-carton



IFA SUPPLEMENT

Source: Operational Guidelines for Programme Managers. Anemia Mukt Bharat-Intensified National Iron Plus Initiative (I-NIPI), Ministry of Health and Family Welfare, Government of India, 2018.

IFA syrup should **noT be given in children suffering from acute illness (fever, diarrhoea, pneumonia, etc.). Mother/caregiver should be advised to continue subsequent doses of IFA supplementation as soon as the child recovers from these illnesses. It is also not to be provided in children suffering from thalassemia major and in those with history of repeated blood transfusion. The IFA supplementation in severely acute malnourished (SAM) children, should be continued as per management protocol for SAM management provided by NRC or Primary Health Centre (PHC/UPHC) Medical Officer.*

DEWORMING



Children and adolescents: To address the problem of transmission of worms from soil, the government has been implementing the National Deworming Day programme. The programme undertakes biannual mass deworming (albendazole tablet) campaign for children and adolescents in the age groups between 1 and 19 years on designated dates – 10 February and 10 August every year.

Table 6: Dose and regime for deworming

Age group	Dose and regime	Appropriate Administration
Less than 12 months of age	Not to be given	Not to be given
Children 12-24 months of age	Biannual dose of 400 mg albendazole (½ tablet)	Appropriate administration of tablets to children between the ages of 1 and 3 years is important. The tablet should be broken and crushed between two spoons, then safe water added to help administer the medicine.
Children 24-59 months of age	Biannual dose of 400 mg albendazole (1 tablet)	

Source: Operational Guidelines for Programme Managers. Anemia Mukt Bharat-Intensified National Iron Plus Initiative (I-NIPI), Ministry of Health and Family Welfare, Government of India, 2018.

DOSE, REGIME AND ADMINISTRATION OF IFA SUPPLEMENTATION AND BIANNUAL DEWORMING OF CHILDREN

- IFA syrup will be provided bi-weekly and you will teach mothers/caregivers to provide thebiweekly IFA dose to their children.
- You will be provided 50 ml IFA syrup bottle (with auto-dispenser) from PHC/Sub-centre; 2 bottles/ child/year (in first year of child, one 50 ml bottle will be required). You will write the date of giving the IFA syrup bottle to the mother/caregiver in the compliance card as given on page 27 in the MCP card.
- The IFA syrup bottles have an auto-dispenser so that only 1 ml of syrup will be dispensed at a time (having the required dosage for children).
- You can provide the 50 ml IFA syrup bottle (with auto-dispenser) to mothers/caregivers during home visits or utilize the platform of VHND/UHND or other dedicated rounds such as Vitamin A round, etc.
- Albendazole tablets will be provided to children for biannual deworming, with dose as given in the table above (once in 6 months) during the National Deworming Day (10th February and 10th August every year). Under this strategy, under-five children, out-of school children and adolescents are provided deworming tablet at Anganwadi centres by AWWs, whereas school-going children and adolescents are provided the deworming treatment through school platform. The date of administration of albendazole to the child will be entered by ANM/MPW as given on Page 27 in the MCP card.

4.7 LET US SUM UP

In this unit you have learnt about infant and young child feeding. Breast milk as you have studied is the best milk for babies up to six months of age and you

should ensure exclusive breastfeeding for six months and there after breast feeding should be supplemented with complementary feeding by following good practices. You should counsel the mother for infant and young child feeding. Most of the causes of lactation failure can be prevented by team approach and careful interventions to motivate the mother for breast feeding and acceptance of the breastfeeding policy.

4.8 MODEL ANSWERS

Check Your Progress 1

i) The types of breast milk as given below.

Colostrum: It is the milk secreted during the first week after delivery. It is yellow, thick and contains more antibodies and white blood cells. Though secreted only in small quantities, it has higher protein content and is most suited for the needs of the baby it should NEVER be discarded. You should encourage mothers to feed colostrum to their babies.

Transitional milk: It is the milk secreted during the following two weeks. The immunoglobulin and protein content decreases while the fat and sugar content increases.

Mature milk: It follows transitional milk. It is thinner and watery but contains all the nutrients essential for optimal growth of the baby.

Pre-term milk: It is the breast milk of a mother who delivers prematurely. It contains higher quantities of proteins, sodium, iron, and immunoglobulins that are needed by her preterm baby.

Foremilk: It is the milk secreted at the start of a feed. It is watery and is rich in proteins, sugar, vitamins, minerals, and water. It satisfies the baby's thirst.

Hindmilk: It comes later towards the end of a feed and is richer in fat content, provides more energy, and satisfies the baby's hunger. For optimum growth the baby needs both fore and hind milk. The baby should therefore be allowed to empty one breast fully before offering the other one. Baby receiving predominant foremilk may cry excessively.

ii) Advantages of breastfeeding

- Exclusively breast fed babies are at decreased risk of
  - Diarrhoea
  - Pneumonia
  - Ear infection

iii)
- Baby's head in line with the body
- Whole body well supported
- Baby turned towards the mother
- Baby's abdomen touching mothers abdomen.

iv) A Baby in a Good Attachment:

- Is close to the mother and the chin touches the breast
- Has the mouth wide open, cheeks are full
- The lower lip has turned out
- Takes slow deep sucks
- Causes no pain to the mother
- Mother and infant are comfortable.

Check Your Progress 2

i) Yes

ii) Key points of positioning are:

- Baby's head in line with the body
- Whole body well supported
- Baby turned towards the mother
- Baby's abdomen touching mothers abdomen.

iii) The four key signs of good attachment are:

- More areola is visible above the baby's mouth than below it
- Baby's mouth is wide open
- Baby's lower lip is turned outwards
- Baby's chin is touching the breast

iv) Fig. A is Good Attachment and Fig. B is Bad Attachment

v) Poor attachment usually leads to following problems:

- Pain or damage to nipple or sore nipple
- Breast engorgement as milk is not removed effectively or breast is not emptied fully
- Hungry and irritable baby because of poor milk supply
- Poor weight gain of the baby

vi) Breastfeeding is considered adequate if it results in softening of breast after feeding and the Baby shows following characteristics:

- Sleeps well in between feeds/2–3 hours after feeding
- Passes urine atleast 6–8 times in a day/24 hours
- Gains weight atleast @ 25–30 g/day after initial 7–10 days

vii) Atleast 8–10 Times in 24 Hours

viii) No.

ix)
- Early and frequent breast feeds and correct attachment of the baby to the breast.
- Application of local warm water packs for not more than 15 minutes
- Paracetamol can be given to the mother to relieve the pain.
- Gently express the milk to soften the breast and then help the mother to correctly latch the baby to the breast.

Demonstrate correct positioning and signs of attachment.

Counsel the mother for optimal infant and young child feeding practices.

4.10 REFERENCES

1) Series papers: Breastfeeding: The Lancet (www.thelancet.com/series/breastfeeding).

2) Victora, Cesar G et al. Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect. The Lancet. 30 Jan 2016. 387: 10017, 475–490.

4) Rollins, Nigel C et al. Why invest, and what it will take to improve breastfeeding practices? The Lancet , 30 Jan 2016, 387: 10017 , 491–504.

5) Bressec JS, Mast EE, Coleman PJ et al. Mother-to-infant hepatitis C virus transmission and breastfeeding. Adv Exp. Biol. 2004; 554: 211–6

6) CDC. Recommendations for prevention and control of Hepatitis C virus (HCV) infection and HCV-related chronic disease. *MMWR*, October 16, 1998, 47(RR-19):1–39.

7) https://www.cdc.gov/breastfeeding/disease/hepatitis.htm

x) Mother with sore nipple

- Ensure correct positioning and attachment of baby to breast.
- Hind milk can be applied to the nipple after feeding and nipple should be aired and allowed to heal in between feeds.
- Frequent washing with soap &water should be avoided baby should not be pulled off while still sucking.

4.9 ACTIVITY

Observe a group of mothers during breastfeeding their infant in health centre or during home visit.

UNIT 5 PROMOTING AND MONITORING GROWTH AND DEVELOPMENT AND USE OF GROWTH CHART

Structure

5.0 Introduction

5.1 Objectives

5.2 Growth Monitoring

- 5.2.1 Measuring Weight
- 5.2.2 Measuring the Head Circumference
- 5.2.3 Measurement of Chest Circumference
- 5.2.4 Measuring the Mid Upper Arm Circumference (MUAC)
- 5.2.5 Measuring Length and Height of a Child
- 5.2.6 Average Growth Measurements of Normal Children
- 5.2.7 Tooth Eruption as an Element of Growth

5.3 Uses and Interpretation of Growth Curve

- 5.3.1 Uses of Growth Curve
- 5.3.2 Interpretation of the Growth Curve

5.4 Measuring Errors

5.5 Monitoring Development

5.6 Educating Parents about the Aspects of Baby Care

5.7 Let Us Sum Up

5.8 Model Answers

5.9 Activity

5.10 References

5.0 INTRODUCTION

You have already learnt about growth monitoring in Block 1 Unit 2 of this course Growth and Development Monitoring and Promotion (GDMP) as you have learnt is a preventive activity comprised of Growth and Development Monitoring linked with promotion (usually counselling) that increases awareness about child growth and development, improves caring practices, increases demand for other services, as needed; and serves as the core activity in an integrated child health and nutrition programme, when appropriate. In this unit we shall discuss about growth monitoring, measurement of weight, height /length, head circumference, chest circumference, mid upper arm circumference, average growth measurement of normal child, tooth eruption, uses of growth chart/ curve, measuring error, monitoring development and educating parents about aspects of baby care. Before studying this unit you should refer Block 1, Unit 2 of this course.

5.1 OBJECTIVES

After completing this unit, you should be able to:

- explain the concept of growth and development monitoring;

- measure various growth parameters in children;
- use, plot and interpret growth chart;
- monitor the developmental mile stones in children;
- recognise any deviation in growth in growth and development; and
- educate mother/parents regarding various aspects of development of baby to prevent any deviation.

5.2 GROWTH MONITORING

Growth monitoring is the process of maintaining regular close observation of a child's growth to assess growth adequacy and identify any deviation. It starts with measurement of weight every month – during first year, every two months – during second year, every three months up to five to six years. The successive weights are plotted on the growth chart of the child health card. To monitor growth, you must use the growth chart on the back of the child health card.

Importance of Growth Monitoring:

Health workers and parents should monitor the growth of children for the following reasons:

- For early detection of abnormal growth and development.
- To facilitate the early treatment or correction of any conditions that may be causing abnormal growth and development.
- To provide an opportunity for giving health education and advice for the prevention of malnutrition.

To monitor growth, you must use the growth chart on the back of the child health card. You need to study a blank growth chart to be thoroughly familiar with its contents (see Fig. 5.7). Blue chart is used for boys and pink colour for the girls.

Measuring Growth

There are various measurements that are used to measure growth. These are given below:

- weight,
- height,
- head circumference,
- Chest circumference
- Mid Upper Arm Circumference (MUAC)
- the eruption of teeth.

To be useful, these measurements must be taken accurately using reliable equipment and correct measuring techniques.

5.2.1 Measuring Weight

- For measuring the weight, a beam balance or spring balance is used.

- Before weighing a child, check the weighing scale to ensure that it is working properly.

  You can do this by weighing a child of known weight and noting whether the scale has obtained the same weight. Then proceed as follows:

- Hang the scale securely with the dial of the scale at your eye level for correct reading. If you use the Salter scale, hang the weighing pants on the hook of the scale. See Fig. 5.1(a).

- Adjust the pointer of the scale to zero ("0") by turning the knob on the top of the scale to account for the extra weight of the weighing pants.

- Ask the parent to remove any heavy clothes and shoes including the nappies and to dress the child in the weighing pants. .

- Once the child wears the weighing pants, ask her to lift the baby and fasten the loop of the pants to the hook of the weighing scale. Ask the mother to let go of the child but to continue standing nearby and to keep talking to the baby. The child's feet should be off the ground as shown in Fig. 5.1.

- If the child is upset, ask the mother to calm him or her. When the child stops moving, note the weight quickly, reading to the nearest 10 gm in infants and 100 gm in children.

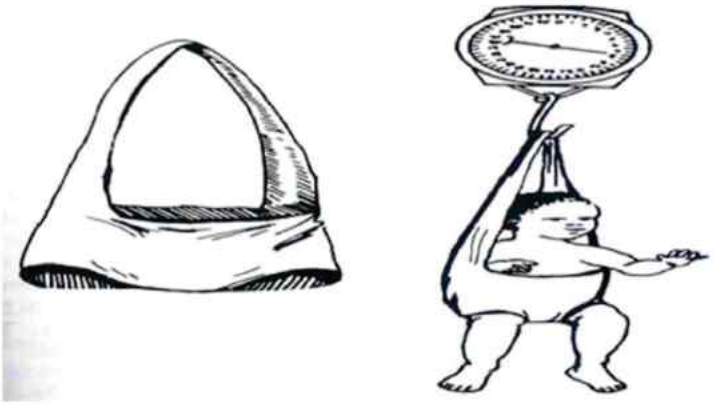


Fig. 5.1(a): Measuring weight using a spring balance

In case the child (infant) cannot stand and you have only simple weighing scale then you have to follow the Steps as given below (Fig. 5.1 (b)).

Steps of procedure to record weight (see Fig. 5.2).

- Set the machine at zero
- Help mother hold the chid and stand on weighing scale after removing shoes
- Help the mother stand on the machine keeping feet on both sides of scale so that weight is equally on the both sides of machine
- Help the needle stabilise and note the reading of mother and child's weight together
- Now take baby from mother and note reading of mother's weight
- Subtract mothers weight from the joint weight of mother and child to get the weight of the child
- Record the weight of the chid (Fig. 5.1 b)



Fig. 5.1(b): Measuring weight of child when simple weighing machine is available

Recording weight of a child

- Set the machine at zero
- Remove the shoes the child
- Let the chid stand on the machine by keeping feet on both sides of scale so that weight is equally distributed on the both sides of machine
- Let the needle stabilise and note the reading (Fig. 5.2)



Fig. 5.2: Measuring weight of the child

5.2.2 Measuring the Head Circumference

You require Non stretchable tape measure or/ string.

- Measure head circumference by encircling the head with a non stretchable tape measure, or a piece of string in the absence of a tape measure.
- Pass the tape measure over the most prominent part of the occiput posteriorly and just above the supraorbital ridges anteriorly to obtain the greatest distance around the head.
- The piece of string used in the absence of a tape measure is then measured with a ruler to obtain the head circumference. (Fig. 5.3)



Fig. 5.3: Measuring the head circumference

Remember:

The head circumference measurements are used for estimating the growth of the brain. At birth, the head circumference of a term baby averages 34 cm (see Table 5.2). The head circumference grows most rapidly in the first year: 2 cm monthly in the first 3 months, 3 cm during the next 3 months, and 3 cm in the last 6 months. This means that the average head circumference is 44 cm at 6 months and 47 cm at 12 months of age. Thus, the head circumference grows by 12 cm during the first year.

Table 5.1: Average and range of head circumference and the average length/ height of children

Age	Head Circumference		Length/Height
Years/ month	Average	Normal range	Average
0	34 cm	32-37 cm	50 cm
1 month	36 cm	34-40 cm	55 cm
2 months	38 cm	36-41 cm	58 cm
3 months	40 cm	37-43 cm	60 cm
4 months	41 cm	38-44cm	62 cm
5 months	42 cm	39-45 cm	64 cm
6 months	43 cm	40-46 cm	66 cm
7 months	44 cm	41-47 cm	68 cm
8 months			69 cm
9 months	45 cm	42-48 cm	71 cm
10 months			72 cm
11 months			73 cm
12 months	47 cm	43-50 cm	75 cm
18 months	47 cm	44-51 cm	81 cm
24 months	48 cm	45-52 cm	87 cm
30 month	49 cm	46-53 cm	92 cm
36 months	50 cm	47-54 cm	96 cm
6 years	51 cm	48-55 cm	116 cm
9 years	52 cm	49-56 cm	133 cm
12 years	53 cm	50-57 cm	148 cm

5.2.3 Measurement of Chest Circumference

- Make sure that you remove bulky jumpers or clothes of a child.
- Keep the arms of child hanging loosely by their sides

- Place one end of flexible measuring tape on the chest at nipple line, and take it around the chest and meet with the first end
- Chest circumference is measured at the level of nipple in mid inspiration. (Fig. 5.4)



Relationship of Head circumference to Chest circumference

- Head size relates to the size of the brain which increases rapidly during infancy.
- At birth head circumference is 34 cm and chest circumference is 32 cm.
- By 6–9 months both become equal.
- In a normally nourished child, chest grows faster than the head circumference during second and third years.
- In PEM, due to poor growth of chest, the head circumference may remain to be higher than the chest even at the age of 2.5 to 3 years due to poor development of thoracic cage.
- Both the measurements are not useful beyond the preschool age.

5.2.5 Measuring Length and Height of a Child

Let us begin with measuring length of child as given below. (Fig. 5.6 a)

The length of a child is measured in the first 3 years and the height is measured after 3 years of age. The length is measured using a horizontal measuring board put on the ground or on a table. Following steps should be followed.

- Help the child lay on his back with the head against the fixed head board.
- Take the help of a helper to holds the child's head so that the eye angle-external ear canal line is vertical and also keeps the body straight.
- With one hand of the health worker, press the child's knees down to straighten the child's legs fully while, with the other hand, Place the sliding foot board to touch the child's heels firmly.
- With the foot board in place, the child's length is read on the metre scale. Measuring height of child

To measure the height, make the child stand bare foot with the feet together. (Fig. 5.6 b)

- Ensure that the heels, the buttocks and the occiput slightly touch the measuring device.
- Align the head so that that the external eye angle- external ear canal plane is horizontal.
- Make the child to stand tall and the gently stretch upward by pressure on the mastoid processes with the shoulders relaxed.
- Lower the sliding head piece to rest firmly on the head.
- Then record the height.

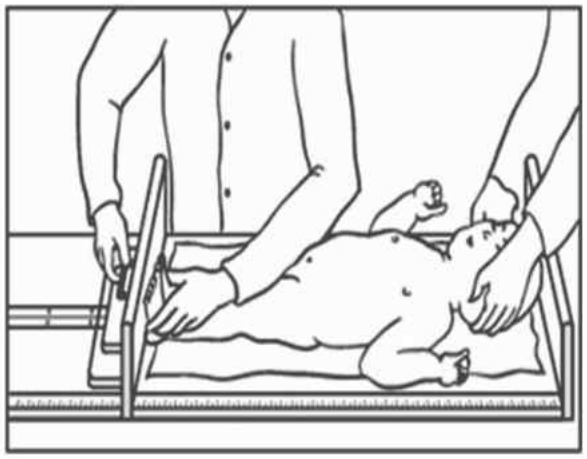


Fig. 5.6 (a): Measuring the length and the height



Fig. 5.6 (b): Measuring the height of child

5.2.6 Average Growth Measurements of Normal Children

Weight Growth Pattern

The average growth measurements of a normal child in terms of weight, length and mid arm circumference are given in Table 5.1 below. Learn them by heart so that you do not have to look in a book to find out how much a child of a certain age should weigh. Table 5.2 shows average and range of head circumference and average length/height of children.

Table 5.2: Average growth measurements of normal children

Age Years	Weight	Length	Mid Upper Arm Circumference (MUAC)
Birth	2.5-3.5 kg	50 cm	
6 Months	5-7.0 kg		
1 Year	8-10.0 kg	75 cm	13 cm
2 Years	12.0 kg		
3 Years	14.0 kg		
4 Years	16.0 kg	100 cm	14 cm
5 Years	18.0 kg		

The Table 5.2 shows that average term newborn weighs 3 kg (range 2.5 kg– 3.5 kg). The birth weight must be plotted in the first box of the growth chart and recorded in the appropriate space on the growth chart. The birth month should be written in the first box of the growth chart. Within the first 3–4 days, a term newborn loses 5–10 % of the birth weight. This weight loss is usually regained in 2 weeks by term babies and longer by premature babies. An average term baby doubles the birth weight in 4–6 months, triples it by one year and quadruples it by two years of age.

5.2.7 Tooth Eruption as an Element of Growth

Another way you can measure growth is eruption of teeth but remember that this is not very reliable as it varies from child to child. Tooth eruption is an important part of growth. In general, teething in infants usually starts at about 6 months of age, but some start later than 6 months. A new tooth appears approximately every month so that by 2–2½ years of age the baby will have 20 primary teeth. This makes the number of teeth roughly equal to age in months minus 6.

A parent should only start to worry about tooth eruption if a child has not yet started teething by 13 months. This is because at this age the child should be eating solid foods. Breast milk alone is not enough after the age of 6 months. Teething may cause excessive salivation, irritability, disturbed sleep and some pain. Sometimes it also causes diarrhoea. At the age of about 6 years, the shedding of the primary teeth starts and continues through to the age of 12 years. Eruption of permanent teeth starts at about 6 years of age.

Check Your Progress 1

i) Define growth monitoring?

.....

.....

ii) Explain the various measurements that are used to measure growth.

.....

.....

iii) Define the steps of measurement of chest circumference

.....

.....

5.3 USES AND INTERPRETATION OF GROWTH CURVE

Let us first discuss uses of growth curve.

5.3.1 GROWTH MONITORING

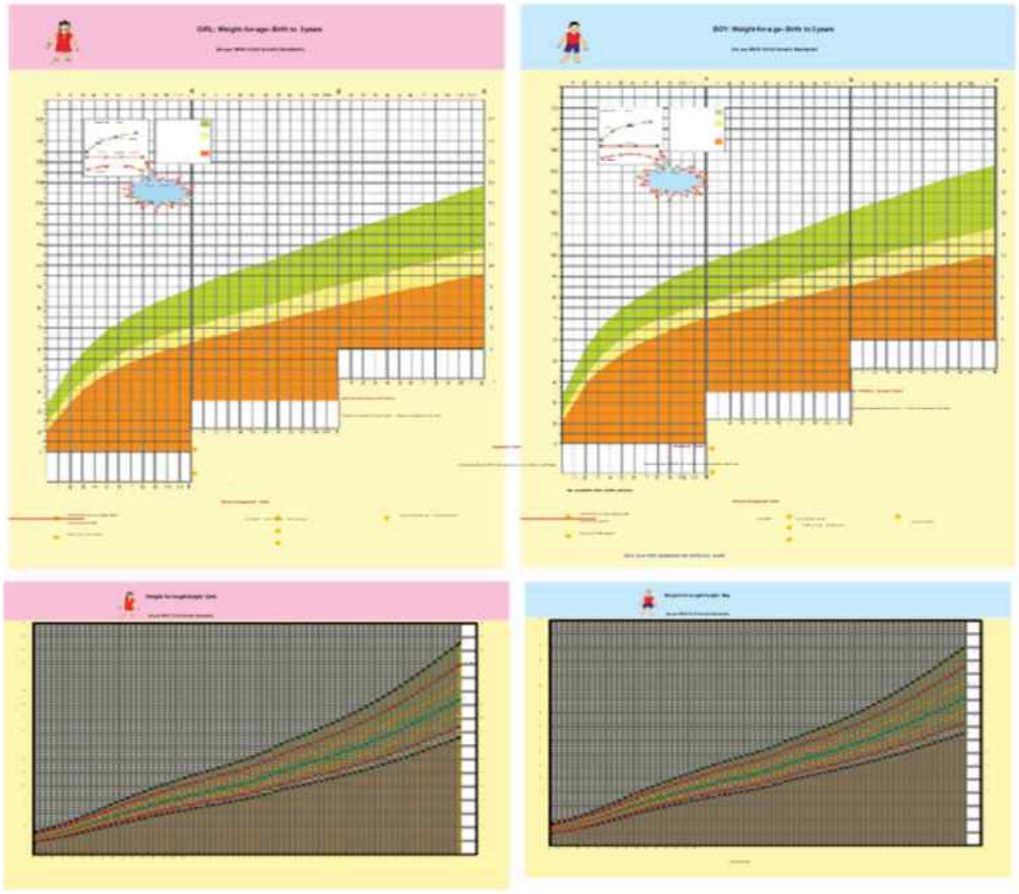
Weight and length/height are the commonly used growth measurements in children. Length is recorded for children less than 2 years of age and height for children above 2 years of age. Growth is measured in terms of changes in weight with respect to age, length or height of children. Growth monitoring helps in visualising change in weight over a period of time with respect to age, length/height of the child and helps to identify if the child is growing adequately or not. Recording of child's weight should be done once every month up to age of 3 years and at least once in 3 months, thereafter. Length is to be recorded once in three months from birth to 2 years of age and height once in 6 months (2 years to 5 years of age). There are separate growth charts for girls and boys, as they have different weights and lengths/heights beginning at birth and grow to different sizes according to age. These are available in the MCP card.

These changes are useful in giving advice to the mother about the growing pattern of the child. This process is called 'GROWTH MONITORING'. You are already familiar with growth monitoring from your training in ASHA Module 7.

Optimal growth and development of the child can be ensured only with adequate food, absence of illness and a caring, nurturing and social environment. Maximum growth happens in the first two years of life. A healthy child approximately doubles the birth weight at 5th month and is three times the birth weight by the first birthday. By the end of second year, the weight is 4 times the birth weight. We must understand that weight gain is not the only way to assess a child's growth. Increase in length or height of the child is also included in the growth pattern of the child. However, changes in child's length are slower than the weight. At the time of birth, the baby's length is around 50 cm. Expected gain in length in the first year after birth is 25 cms and in the second year is 12 cms, contributing to a total increase of 37 cms length/height in the first two years of life.

The AWW uses the growth chart for monitoring growth for every child, separately available for girls and boys. Every child in the village, should be weighed and her/his weight be plotted on the growth chart according to the age of the child. In addition, the length/height of the child will also be recorded in the growth chart given for weight-for-length/height. The AWW will be responsible for recording weight and length/height of the child during VHNDs/UHNDs, or the ANM/MPW can also record the weight and length/height of the child in the SC or during outreach sessions.

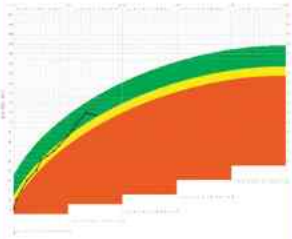
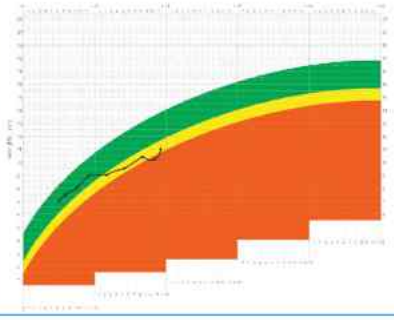
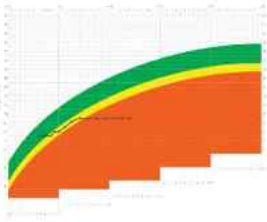
As part of your HBYC visits, you need to ensure that the weight and length/height of the child is recorded by the AWW and details are made available to the mother/caregiver by the AWW either



in MCP card or other mechanism as specified by your district or State. If the weight and/or length/ height of the child is not recorded, you will mobilise and accompany the mother/caregiver to the nearest Anganwadi Centre (AWC) or SC for recording the weight and length/height of the child for ensuring growth monitoring.

WHAT IS GROWTH FALTERING?

Growth faltering is the slowing or stopping of growth. It is a sign that something is wrong with the child and immediate action must be taken to restore growth. Monitoring or measuring growth regularly is important to see whether the child is growing properly.

Good - Upward curve	Dangerous- Flat curve	Very Dangerous- Downward curve
The curve is moving upwards. Indicates adequate weight gain for the age of the child. The child is growing well and is healthy. 	The curve is flat, but has not gone down to another colour band. Indicates that the child is not gaining weight and is not growing adequately. This is called stagnation. The child needs extra attention of the mother. Also, the cause needs to be investigated. Talk to AWW/ ANM (MPW) immediately. Such children should be taken to a 24X7 PHC/UPHC or higher facility for a medical consultation. 	The curve is moving down, into another colour band. Indicates loss of weight. Talk to AWW/ANM (MPW) immediately. Child may be severely underweight and she/he needs urgent specialised medical care and immediate referral. 
Praise, and assess feeding to reinforce the good practices of the mother/caregiver.	Review feeding, praise what she is doing well and identify feeding problems, if any and give appropriate feeding advice for bringing about change. Check for any episode of illness. Take corrective action. Follow-up for compliance.	Follow- up after 5 days to ensure compliance.

You have already learnt in ASHA Module-7, on how to check for nutritional oedema of both feet. To check for oedema (swelling due to fluid retention), grasp the foot so that it rests in your hand with your thumb on top of the foot. Press your thumb gently for a few seconds on the upper surface of each foot. The child has oedema if a pit (dent) remains in the foot when you lift your thumb. This is one of the ways to detect children with severe malnutrition in the community. Such children will require prompt hospitalisation in a centre which manages such children. This is often the District Hospital.

ROLE OF CHO IN PROMOTING GROWTH MONITORING-PREVENTIVE AND PROMOTIVE COMMUNITY LEVEL CARE

- Explain the family members regarding the importance of weighing and measuring length/height of the child regularly.
- Discuss the trend of growth of the child with the mother/caregiver during each of the home visits by looking at the MCP card or as communicated by the AWW. Provide counselling depending on the direction of the growth curve in the MCP card or as specified by the AWW.
- Prioritise and list children who are underweight, wasted, low birth weight, not gained weight for 2 months, are not growing well or who are "at risk" of undernutrition due to frequent illnesses like fever, diarrhoea and acute respiratory infection; children with inadequate or insufficient dietary intake, mother with illness or those living in unhygienic conditions, etc., should also be weighed frequently for taking corrective and timely action.
- Ensure early registration of all children soon after birth to 15 months of age at the nearest AWC to avail the child care services like supplementary nutritional support, growth monitoring and promotion, immunization, early child care, health check-up, referral services, etc.
- Ensure that children from 6 months of age to 15 months are provided Take Home Ration (THR) at the AWC.
- Counsel the mother/caregiver regarding promotion of exclusive breastfeeding for the first six months of a child's life, age-appropriate complementary feeding practices for all children aged 6–24 months, importance of hand-washing, using clean drinking water and its storage, safe sanitation and hygiene practices, age-specific immunization, appropriate play and communication with the child, etc. for proper growth and development.
- Pay extra attention to malnourished children, sick children, low birth weight children, etc. and refer to the health facility for further management in case of growth faltering. Follow-up with mother/caregiver to ensure adherence to treatment plan suggested by health facilities for these children.
- Use platforms like VHSNC/MAS, VHND/UHND, camps, mother support groups, self-help groups, community meetings, etc. to disseminate the importance of growth monitoring and finding suitable measures for rehabilitation and management of the malnourished children.
- Explore the option of using untied funds of VHSNC/MAS to meet the special care needs of malnourished children if required.

5.3.2 Interpretation of the Growth Curve

Interpretation simply means determining whether the child is growing appropriately or not. The interpretation is done by watching the direction of the child's growth pattern. Direction of the growth curve indicates whether the child is growing or not and is more important than the actual weight of the child at a given point of weighing.

A growth curve is formed by joining the plotted points on a growth chart.

On each growth chart, there are **3 printed growth curves.** These are called **Reference Lines** or **Z Score Lines.** These are used to compare and interpret the growth pattern of the child and assess her/his nutritional status.

- The **1st top curve line** on the growth chart i.e. **upper border of green band** is the median which is the **average**.
- **Second line** is the junction of **green** and **yellow bands** and **3rd line** is the **junction of yellow** and orange bands. Weight of all normal and healthy children, when plotted on the growth chart, fall above **2nd** curve **(green band)**; weight of moderately underweight children fall below the **2nd** curve to **3rd** curve **(yellow band)**; and weight of severely underweight children fall below the **3rd** curve **(orange band)**.

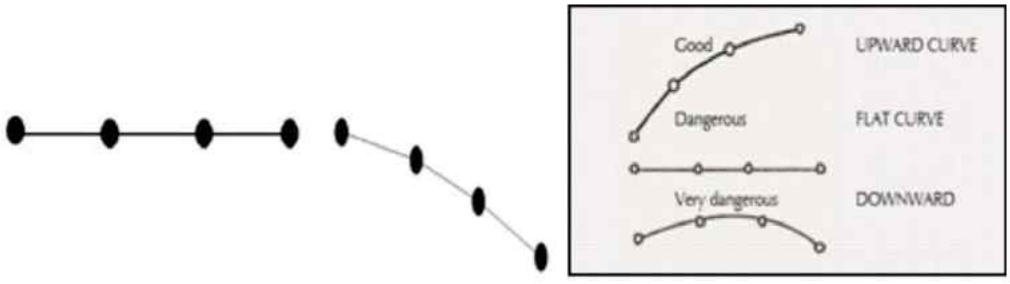
The weight growth pattern of the **larger term infants** will be above the pattern of the average term infant. On the other hand, the weight growth pattern of the **smaller term infants** will be below the pattern of the average term infant.

A small baby whose growth pattern is below the bottom line in the growth chart is healthy if that child's growth pattern is parallel to the bottom percentile line. As long as the baby is gaining weight, however, at an acceptable rate, the mother should not worry (Fig. 5.8 a).

A horizontal (flat) growth curve like the one in Fig. 5.8 (b) means DANGER! It means the child is not growing and is a sign of disease, especially malnutrition. A child who is malnourished cannot grow properly, cannot resist diseases, and is in danger of getting killer diseases. You should take a thorough history from the mother to establish the cause of growth failure and then advise the mother. You should also encourage the mother to give the child food containing enough calories, protein, vitamins and minerals.

A curve deviating downwards, as shown in Fig. 5.8 (b) indicates a VERY DANGEROUS situation. The child is losing weight. The child needs extra care immediately. The baby may be suffering from malnutrition, tuberculosis, AIDS or other medical conditions. The mother is advised to take the baby to hospital for investigations and treatment.

Any infant who does not gain weight for one month or a child who does not gain weight for two months should receive urgent attention. Such an infant or child is becoming malnourished.



(a) (b)

Fig. 5.8 (a and b): Direction of growth curve

Remember:

Note that regular weighing of infants (monthly) and young children (at least once every two months) should be done for following reasons:

- It will help you to detect growth failure and prevent malnutrition.
- Continued growth monitoring up to the age of 5 years is a component of well child care.
- Encourage parents to have their children weighed and avoid keeping them waiting for too long.
- You must always report the findings to the mother or caretaker and inform her how the child is growing.

Length/ Height Growth Pattern

An average term baby is 50 cm long. The length increases by 50% in the first year. In the second year, the average height growth is about 12 cm. The birth length doubles by 4 years of age. After the second year of age, the annual height growth averages 5–6 cm until the beginning of the adolescent growth spurt. Height growth stops at about the age of 18 years in girls and at the age of about 20 years in boys.

After plotting the child's height or length on a height chart, you should determine whether the growth pattern is normal. A normal growth pattern is parallel to the printed percentile lines.

There is also weight for height charts and tables. Weight for height below the fifth percentile is a good indicator of acute under nutrition.

5.4 MEASURING ERRORS

Error can occur while measuring weight, height/length and mid arm circumference as given below. The measurement of growth could be altered due to Measuring Errors. Hence here are some solutions to Common Errors.

- If Child is restless, postpone measurement.
- Involve parent in procedure.
- If reading is inaccurate: Training and retraining is important with focus on accuracy.

Recording: Record results immediately after taking measurements and confirm record.

Error in Length/Height

Use length only when child is under 2 years old or unable to stand properly.

- Head or body not straight, knees bent, or feet not flat on floor

  Correct technique with practice and regular retraining.

  Provide adequate assistance and Calm the child.
- Child not straight along board and foot not parallel with movable board

  Parent or assistant should be present. Move head board to compress hair.

- Sliding board not firmly against heels/head

  Correct pressure should be applied.

  Move head board to compress hair.

- Weighing Scale not calibrated to zero

  After every measurement, recalibrate at the start of each

  Weighing session with a known weight

- Child wearing heavy clothing

  Remove or make allowances for clothing.

- Child moving or anxious

  Wait until child is calm or remove cause of anxiety.

- Measurement of upper Arm Circumference (MUAC)
  - Child is not standing in the correct position
  - Mid-point of mid-upper arm incorrectly marked
  - Measure mid-point carefully
  - Examiner not level with subject
  - Tape around the arm not at mid-point
  - Tape too tight/too loose
  - Correct techniques with training, supervision and retraining.
  - Consider cultural practices for example, wearing of arm bands.

These common errors are controlled by:

- Learning and applying correct measuring techniques.
- Taking care to read the measurements correctly.
- Recording the measurements correctly and clearly so that someone else can easily read the numbers.
- Being patient with the measurement process, and being willing to do the job correctly.

If a long time has passed since you measured children, review the technique with someone who has experience and who can guide you.

5.5 MONITORING DEVELOPMENT

In monitoring development, we notice, at what age the child achieves various milestones. The various skills that a baby and a young child learn are called milestones such as smiling at the mother, sitting without support, grasping objects with his/her hands, standing, walking and talking. You should record at what age the child has achieved the various milestones. You should also remember that various factors such as infections, lack of care, psychological trauma, poor education, and malnutrition etc. effect the growth and development.

Still, it is important to remember that every child develops at his/her own rate or pace. Some walk early, others late. The average age ranges at which children reach various milestones is given in Table 5.3 and developmental mile stones in Table 5.4. The individual child's development rate often differs widely from the average but it is still be quite normal. The individual child's development is normal if the rate of development is constant and the developmental pattern is within the normal range as given below.

Table 5.3: Normal development milestones

Age range	Motor Development	Language and Social Development
Birth	When prone turns head to one side to avoid suffocation	Cries
3-6 Months	Good head control	Can follow an object with eyes, plays with hands
6-9 Months	Can sit unsupported	Grasps actively, makes loud noises
9-12 Months	Able to stand	Understands a few words, tries to use them
9-18 Months	Able to walk	Grasps small objects with thumb and index finger
15-30Months	Able to run around as much as he wants	Can say several words or even some sentences
3 Years	Plays actively, is able to jump and climb	Starts talking a lot, is curious and asks many questions

Assessment of development in various age group (Table 5.4)

You can assess various aspects of development such as Cognitive, motor, social, emotional and adaptive development as given in Table 5.4.

Table 5.4: Developmental Milestone (0-5 years of age)

0-1 month

Cognitive Milestones	Responds to sound of bell or rattle. Becomes quiet when picked up. Shows pleasure when touched and handled.
Motor Skills Milestones	**Gross Motor** • Suspended prone - head, hand completely down. • Held standing - makes stepping movements. • Pulled to sit, completely head lag. • Prone - head to one side, hips raised, knees drawn up. • Prone - lifts head and holds. **Fine Motor** • Fisted hands rest near face. • Clench small objects on contact.

	• Regards colorful object momentarily. • Follows with eyes moving person while in supine.
Social-Emotional Milestones	• Regards face, smiles reflexively. • Establishes eye contact. • Stops crying when picked up. • Eyes follow moving objects.
Adaptive Milestones	• Opens and closes mouth in response to food stimulus.

1-2 months of age

Cognitive Milestones	Inspects surroundings. Listens to voice for 30 secs. Shows active interest in person/objects for atleast 1 minute.
Motor Skills Milestones	**Gross Motor** • Prone-makes crawling movements, chin sometimes lifted off bed. • Supine-turns head side to side, legs sometimes straightened. • Held sitting - head forward, back rounded, head lifted briefly. • Straightens leg when bottom of foot is pressed. • Lifts head when held at shoulder • Thrusts arms and legs in play. **Fine Motor** • Holds hand together, holds rattle and drops with in 10 sec. • Moves arms symmetrically. • Stares and gazes. • Activates arms on sight of toys.
Social-Emotional Milestones	• Vocalises, smiles at others, besides mother. • Responds differently to people. • Molds and relaxes body when held; cuddled. • Draws attention to self in distress.
Adaptive Milestones	• Naps frequently. • Coordinates sucking, swallowing and breathing.

2-3 months of age

Cognitive Milestones	• Inspects own hands. • Watches eyes and mouth. • Searches with eyes towards sound.

	• Babbles, coos when talked to. • Chuckles. • Looks more at surrounding in a new place.
Motor Skills Milestones	**Gross Motor** • Turns from side to back. • Held sitting or standing - head position predominant sags. • Prone - holds head up well off mat. • Legs kick in sequence. • Suspended prone - head held well above level of body. • Held standing - lifts foot. **Fine Motor** • Reaches for objects, explores. • Blinks at sudden visual stimulus. • Follows things past midline, and downwards. • Indwelling thumb no longer present. • Looks from one object to another • Keeps hands open 50% of time. • Grasps toys actively.
Social-Emotional Milestones	• Looks at face and eyes of person talking to him/her. • Crying decreases dramatically. • Responds with smile when socially approached.
Adaptive Milestones	• Brings hand to mouth. • Stays awake for longer period without crying.

3-6 months of age

Cognitive Milestones	• Looks at and reaches for toys. • Anticipates food preparation. • Recovers rattle dropped on chest. • Laughs aloud when slightly tickled and talked to. • Holds arms out to be picked up. • Mouths toys. • Looks at objects while handling them. • Turns eyes, head to sound of hidden voice. • Continues a familiar activity by initiating movements involved. • Brings feet to mouth.

Motor Skills Milestones	**Gross Motor** • Prone - rests on forearms, raising head and chest. • Supine - head facing forward not turned. • Sits - propped, head steady, back curved only slightly. • Holds head and chest up on forearm for long period. • No head wobble when body is swayed. • Sits supported with back straight. • Rolls from prone to supine and back to prone. **Fine Motor** • Watches movements of own hands. • Puts hand in mouth. • Retains dangling ring. • Picks up cube, spoon, and holds first cube regards second cube. • Rakes up raisins with fingers against palm. • Lifts cup by handle.
Social-Emotional Milestones	• Stops unexplained crying. • Vocalises in response to adult talk and smile. • Discriminates strangers. • Socialises with strangers/anyone. • Becomes aware of strange situations. • Enjoys social play. • Makes approach movements to mirror. • Enjoys frolic play. • Repeats enjoyable activities. • Explores adult features.
Adaptive Milestones	• Swallows strained or pureed foods. • Brings hand to mouth with toy or objects. • Recognises bottle visually. • Pats bottle, places both hands on bottle. • Holds own bottle.
Speech and Language Milestones	• Turns head toward voices. • Searches for speaker. • Cries at an angry voice. • Stops crying when spoken to. • Recognises own name. • Responds to sounds other than voices.

	• Laughs • Babbles • Stops babbling when another person vocalises • Vocalises in response to singing • Attempts to interact with an adult • Initiates 'talking'

6-9 months of age

Cognitive Milestones	• Plays peek-a-boo. • Slides toy or object on surface. • Responds to facial expressions. • Projects on fast moving objects. • Pats mirror image. • Repeats action that produces a noise. • Shakes head no-no. • Imitates sounds.
Motor Skills Milestones	**Gross Motor** • Sits supported in high chair. • Bears almost all weight while standing supported. • Prone - bears weight on one hand. • Sits without support on floor. • Bounces when held standing. • Crawls on belly. • Pulls self to stand. • Stands holding onto furniture's for 5 minutes. • Makes stepping movements. **Fine Motor** • Reaches for objects in each hand. • Takes tiny objects. • Uses inferior pincer grasp. • Removes pegs from pegboard. • Takes objects out of container. • Holds bites and chews cracker or cookies. • Grasps with thumb and fore finger. • Plays with paper when it is offered.
Social-Emotional Milestones	• Distinguishes self as separate from mother. • Shows anxiety over separation from mother.

	• Responds playfully to mirror. • Discriminates strangers. • Smiles, pats, vocalise to mirror image. • Responds to name with head turn, eye contact, smile. • First separation anxiety begins.
Adaptive Milestones	• Feeds self a biscuit. • Bites and chews toys. • Chews food with munching pattern. • Lifts cup with handle. • Finger feeds dry cereal, bits of meat, vegetables.
Speech and Language Milestones	• Responds with gestures to 'come' or 'sit down'. • Recognises family member's name. • Attends to music. • Maintains attention to a speaker. • Stops when name is called. • Attends to pictures. • Vocalises two-syllable combinations. e.g. /baba/, /mama/ • Vocalises while playing. • Shouts or vocalises to gain attention.

9-12 months of age

Cognitive Milestones	• Responds to verbal request. • Lines up cubes in one hand with one in other hand. • Stirs, points, pokes, pries, touches with index finger. • Looks at pictures in book. • Repeats laughed at performance. • Pulls string to obtain ring. • Vocalises to music. • Pats whistle doll. • Gives toy to adult on request. • Removes lid of box to find hidden toys. • Follow simple instructions.
Motor Skills Milestones	**Gross Motor** • Stands with one hand held. • Sits down from standing. • Stands alone. • Creeping rapidly on hands and knees. • Walks along five steps without falling.

	Fine Motor • Uncovers toy seen hidden. • Hits cup with spoon. • Holds crayons, makes marks. • Builds tower of 2-3 cubes after demonstration. • Marks with pencil. • Puts objects into container.
Social-Emotional Milestones	• Responds to a verbal request, usually regarding nursery games. • Begins to establish the meaning of 'NO'. • Gives a toy to adult upon request. • Increased resistance to bedtime. • Tests parental reactions during feeding. • Engages in simple imitative play. • Explores environment enthusiastically.
Adaptive Milestones	• Attempts to remove obstacles on effort to find lost toy. • Finger feeds self for part of meal. • Takes off hats, shoes. • Cooperates in dressing. • Inhibits drooling. • Cooperates with dressing by extending arm or legs. • Sleeps night twelve fourteen hours.
Speech and Language Milestones	• Looks at the person calling out name • Attends to new words • Gives objects on verbal request • Attends to objects mentioned in conversation • Participates in speech routines games e.g. ring-a-ring-a-roses • Says 'mama', 'tata', 'papa' meaningfully • Imitates non-speech sounds e.g. 'bow-bow', 'kaka' • Says one or two words spontaneously • Vocalises desire for change in activities • Imitates the name of familiar objects

Between one and two years of age

Cognitive Milestones

• Imitates actions and words of adults. • Unwraps toys.

- Can hold 3 blocks in one hand
- Follows 2 directions
- Understands and follows simple, familiar directions.
- Overcomes simple obstacles.
- Responds to words or commands with appropriate action.
- Is able to match two similar objects.
- Looks at storybook pictures with an adult.
- Names or points to familiar objects on request.
- Recognises difference between you and me.
- Has very limited attention span.
- Can complete 3-piece inset puzzles
- Builds tower of 6-7 blocks.
- Accomplishes primary learning through own exploration.

Motor Skills Milestones

Gross Motor	Fine Motor
• Walks alone. • Walks backwards. • Picks up toys from floor without falling. • Throws ball overhead without falling. • Carries large teddy bear or doll while walking. • Pulls toys, pushes toys. • Seats self in child size chair. • Walks up and down stairs with hand held. • Jumps in one place • Moves to music.	• Builds tower of three small blocks. • Puts four rings on stick. • Places five pegs in pegboard. • Turns pages two or three at a time. • Scribbles spontaneously. • Turns knobs. • Throws small ball. • Paints with whole arm movement, shifts hands, and makes strokes. • Attempts to fold paper • Imitates circular stroke. • Uses both hands in midline - one to hold and the other to manipulate.

Social-Emotional Milestones

- Recognises self in mirror or picture.
- Refers to self by name.
- Plays by self; initiates own play.
- Imitates adult behaviours in play e.g. doing housework.

- Helps put things away.
- Gives toys to familiar people upon request.
- Hugs and kisses parents.
- Desires control of others - orders, fights, resists.
- Shows wide variety of emotions: fear, anger, sympathy, guilt, anxiety, joy.
- Interacts with peers using gestures.
- Likes rough-and-tumble play.
- Attempts to comfort others in distress.

Adaptive Milestones

- Uses spoon, spilling little.
- Drinks form cup with one hand, unassisted.
- Holds cup handle.
- Gives empty dish to adult.
- Chews food with rotary jaw movements.
- Distinguishes edible and inedible items.
- Unzips large zipper.
- Indicates toilet needs.
- Washes and dries hands partially.
- Removes shoes, socks, pants, and sweater.
- Replaces familiar objects where they belong.
- Sleeps ten-twelve hours at night.
- Naps once in the afternoon one-three hours.

Speech & Language Milestones

- Understands “no”.
- Uses 20 to 40 words, including names.
- Uses new words regularly.
- Refers to self by name.
- Combines two words such as “daddy bye-bye”.
- Waves good-bye and plays pat-a-cake.
- Makes the “sounds” of familiar animals.
- Uses words such as “more” to make wants known.
- Brings object from another room when asked.

Activities to Encourage your Child's Language

- Reward and encourage early efforts at saying new words.

- Talk to your baby about everything you're doing while you're with him.
- Talk simply, clearly, and slowly to your child.
- Talk about new situations before you go, while you're there, and again when you are home.
- Look at your child when he or she talks to you.
- Describe what your child is doing, feeling, hearing.
- Let your child listen to children's records and tapes.
- Praise your child's efforts to communicate.

Cognitive Milestones

- Responds to simple directions.
- Points to 3-4 body parts.
- Plays with water and sand.
- Identifies rooms in own house.
- Identifies clothing items for different occasions.
- Selects and looks at picture books, names pictured objects.
- Identifies several objects within one picture.
- Matches and uses associated objects meaningfully.
- Stacks rings on peg in order of size.
- Recognised self in mirror, saying baby, or own name.
- Can talk briefly about what he/she is doing; imitates adult actions.
- Has limited attention span; learning is through exploration and adult direction.
- Is beginning to understand functional concepts of familiar objects and part/whole concepts.
- Matches 3-4 colours, knows big and little.

Between two and three years of age

Motor Skills Milestones

Gross Motor	Fine Motor
• Runs forward well. • Makes sharp turns around corners when running. • Walks downstairs alternating feet. • Stands on one foot (with aid). • Uses pedals on tricycle alternately.	• Strings four large beads. • Turns single pages. • Snips with scissors. • Holds crayon with thumb and fingers. • Uses one hand consistently in most activities. • Imitates circular, vertical, horizontal strokes.

Gross Motor	Fine Motor
• Jumps in place with two feet together. • Walks and even runs on tiptoe. • Kicks a ball forward. • Catches eight inch ball. • Climbs ladders.	• Paints with some wrist action; makes dots, lines, circular strokes. • Rolls, pounds, squeezes, and pulls clay.

Social-Emotional Milestones

- Holds parents hands outdoors.
- Strongly possessive of loved ones.
- Displays shyness with strangers.
- Plays near other children, watches them.
- Throws frustration tantrums.
- Takes pride in clothing.
- Defends own possessions.
- Begins to play house or with cars, dolls.
- Symbolically uses objects, self in play.
- Participates in simple group activity.
- Knows gender identity.
- Begins to obey rules.

Adaptive Milestones

- Uses spoon, little spilling.
- Gets drink form fountain or faucet independently.
- Helps carry and put away things.
- Opens door by turning handle.
- Puts on shirt or dress unassisted.
- Takes off clothes with help on buttons.
- Puts on shoes.
- Squats, holds self and verbalises toilet needs.
- Washes and dries hands.

Speech & Language Milestones

- Identifies body parts.
- Gives full name.

- Holds up fingers to tell age.
- Carries on 'conversation' with self and dolls.
- Asks "what's that?" And "where's my?"
- Uses 2-word negative phrases such as "no want".
- Forms some plurals by adding "s"; book, books.
- Has a 450 word vocabulary.
- Combines nouns and verbs "mummy come".
- Understands simple time concepts: "last night", "tomorrow".
- Refers to self as "me" rather than by name.
- Tries to get adult attention: "watch me".
- Likes to hear same story repeated.
- May say "no" when means "yes".
- Talks to other children as well as adults.
- Solves problems by talking instead of hitting or crying.
- Answers "where" questions.
- Names common pictures and things.
- Uses short sentences like "me want more" or "me want biscuit".

Activities to Encourage your Child's Language

- Repeat new words over and over.
- Help your child listen and follow instructions by playing games: "pick up the ball," "Touch Daddy's s nose".
- Take your child on trips and talk about what you see before, during and after the trip.
- Let your child tell you answers to simple questions.
- Read books every day, perhaps as part of the bedtime routine.
- Listen attentively as your child talks to you.
- Describe what you are doing, planning, thinking.
- Have the child deliver simple messages for you (Mommy needs you, Daddy).
- Carry on conversations with the child, preferably when the two of you have some quiet time together.
- Ask questions to get your child to think and talk.
- Show the child you understand what he or she says by answering, smiling, and nodding your head.
- Expand what the; child says. If he or she says, "more juice", You say, "Priya wants more juice".

Between three and four years of age

Cognitive Milestones

- Recognises and matches six colours.
- Copies circle.
- Understands common prepositions
- Intentionally stacks blocks or rings in order of size.
- Builds tower of more than 10 blocks
- Draws somewhat recognisable picture that is meaningful to child if not to adult; names and briefly explains picture.
- Asks questions for information: why and how questions requiring simple answers.
- Knows own age.
- Knows own name.
- Has short attention span; learns through observing and imitating adults and by adult instruction and explanation; is very easily distracted.
- Has increased understanding of concepts of the functions and grouping of objects and part/whole.
- Begins to be aware of past and present.

Motor Skills Milestones

Gross Motor	Fine Motor
• Runs around obstacles. • Walks on a line. • Balances on one foot for five to ten seconds. • Hops on one foot in one place. • Pushes, pulls, steers wheeled toys. • Rides tricycle. • Uses slide independently. • Jumps over six inch high object and lands on both feet together. • Throws ball overhead. • Catches a bouncing ball.	• Builds tower of nine small blocks. • Drives nails and pegs. • Copies circle. • Imitates cross. • Manipulates clay material (rolls balls, snakes, cookies).

Social-Emotional Milestones

- Takes pride in own achievements; resists help.
- Likes to be independent; runs ahead of parents while outdoors.

- Separates easily from mother in familiar setting.
- Tends to be demanding and dictatorial.
- Talks with a loud urgent voice.
- Enjoys meeting more people.
- Verbally scolds when annoyed or angry.
- Joins in play with other children; begins to interact.
- Sings along and makes sequential moves to music.
- Shares toys; takes turns with assistance.
- Begins dramatic play, acting out whole scenes.

Adaptive Milestones

- Pours well form small pitcher.
- Spreads soft butter with knife.
- Undresses completely without help.
- Buttons and unbuttons large buttons.
- Washes hands independently.
- Blows nose when reminded.
- Uses toilet independently.

Speech & Language Milestones

- Uses verb forms.
- Uses 'I', 'you'.
- Consistent use of 's' to express plural.
- Uses 'this', 'that'.
- Names atleast one colour.
- Counts to five.
- Verbalises recent experiences.
- Can tell a story.
- Understand's 'what', 'where'
- Uses 'what', 'where' and occasionally 'when', 'who'.
- Has a sentence length of 4-5 words.
- Has a vocabulary of nearly 1000 words.
- Understands "yesterday," "summer", "lunchtime", "tonight", "little-big".
- Begins to obey requests like "put the block under the chair".
- Knows his or her last name, name of street on which he/she lives and several nursery rhymes.

Activities to Encourage your Child's Language

- Talk about how objects are the same or different.
- Help your child to tell stories using books and pictures.
- Let your child play with other children.
- Read longer stories to your child.
- Pay attention to your child when he's talking.
- Talk about places you've been or will be going.

Between four and five years of age

Cognitive Milestones

- Plays with words: creates own rhyming words, says or makes up words having similar sounds.
- Points and names four to six colours.
- Matches pictures of familiar objects.
- Draws a person with two to six recognisable parts, such as head, arms, and legs; can name or match drawn parts to own body.
- Draws, names, and describes recognisable pictures.
- Rote counts to five, imitating adult.
- Knows own street and town.
- Has more extended attention span; learns through observing and listening to adults, as well as through exploration; is easily distracted.
- Has increased understanding of concepts of function, time, part/whole relationships; function or use of objects may be stated in addition to names of objects.
- Time concepts are expanding; can talk about yesterday or last week, about today, and about what will happen tomorrow.

Motor Skills Milestones

Gross Motor	Fine Motor
• Hops on one foot (4-6 steps). • Runs more controlled with feet closed. • Walks backward toe-heel. • Jumps forward 10 times without falling. • Walks up and down stair independently, alternating feet. • Turns somersault.	• Shows hand preference. • Cuts on line continuously. • Solves 12-16 piece puzzle. • Copies cross. • Copies square. • Prints some capital letters. • Threads 1/4inch beads.

Social-Emotional Milestones

- Plays and interacts with other children.
- Dramatic play is closer to reality, with attention paid to detail, time, and space.
- Plays dress-up.
- Shows interest in exploring sex differences.

Adaptive Milestones

- Cuts easy foods with a knife.
- Laces shoes.
- Unbuckles or buckles belt or shoes.
- Recognises right shoe from left.

Speech & Language Milestones

- Has sentence length of 4-5 words.
- Uses past tense correctly.
- Comprehends the concept of 'better than'.
- Consistent use of 'a', 'the'.
- Uses size and colour adjectives in sentence form.
- Has a vocabulary of nearly 1500 words.
- Points to colors red, blue, yellow and green.
- Identifies triangles, circles and squares.
- Understands "In the morning", "next", "noontime".
- Can speak of imaginary conditions such as "I hope".
- Asks many questions, asks "who?" and "why?"

Activities to Encourage your Child's Language

- Help your child sort objects and things (ex. things you eat, animals).
- Teach your child how to use the telephone.
- Let your child help you plan activities such as what you will make for Thanksgiving dinner.
- Continue talking with him about his interests.
- Read longer stories to him.
- Let her tell and make up stories for you.
- Bathes self with some supervision.
- Crosses streets safely.

Speech & Language Milestones

- Has a sentence length of 5-6 words.
- Has a vocabulary of around 2000 words.
- Defines objects by their use (you eat with a fork) and can tell what objects are made of.
- Knows spatial relations like “on top”, “behind”, “far” and “near”.
- Knows her address.
- Identifies a penny, nickel and dime.
- Knows common opposites like “big/little”.
- Understands “same” and “different”.
- Counts ten objects.
- Asks questions for information.
- Distinguished left and right hand in herself.
- Uses all types of sentences, for example “let’s go to the store after we eat”.

Activities to Encourage your Child's Language

- Praise your child when she talks about her feelings, thoughts, hopes and fears.
- Comment on what you did or how you think your child feels.
- Sing songs, rhymes with your child.
- Continue to read longer stories.
- Talk with him as you would an adult.
- Look at family photos and talk to him about your family history.
- Listen to her when she talks to you.
- Show your pleasure when she comes to talk with you.

Between five and six years of age

Cognitive Milestones

- Retells story from picture book with reasonable accuracy.
- Names some letters and numerals.
- Rote counts to ten.
- Sorts objects by single characteristics.
- Is beginning to use accurately time concepts of tomorrow and yesterday.
- Uses classroom tools meaningfully and purposefully.
- Begins to relate clock time to daily schedule.
- Attention span increases noticeably; learns through adult instruction; when interested, can ignore distractions.
- Concepts of function increase as well as understanding of why things happen; time concepts are expanding into an understanding of the future in terms of major events.

Motor Skills Milestones

Gross motor	Fine motor
• Runs lightly on toes. • Walks on balance beam. • Can cover 2 meters hopping. • Skips on alternate feet. • Jumps rope. • Skates.	• Cuts out simple shapes. • Copies triangle. • Traces diamond. • Copies first name. • Prints numerals 1 to 5. • Colours within lines. • Has adult grasp of pencil. • Had handedness well established. • Pastes and glues appropriately.

Social-Emotional Milestones

- Chooses own friends.
- Plays simple table games.
- Plays competitive games.
- Engages in cooperative play with other children involving group decisions, role assignments, and fair play.

Adaptive Milestones

- Dresses self completely.
- Ties bow on shoe lace.
- Brushes teeth independently.

5.6 EDUCATING PARENTS ABOUT THE ASPECTS OF BABY CARE

Educating Parents about the aspects of baby care for proper growth and development of child.

- Exclusive breastfeeding for six month.
- Start supplementary feeding at six months.
- Bonding: The baby needs to be close to parents and to anticipate that they will respond to his or her needs.
- Stimulating learning and communication: newborn learns through bonding and interaction.
- Protecting baby from aspiration of feed: by always placing your baby to sleep on his or her side after feeding.
- Support newborn's head. In the first few months, baby's neck muscles are weak, and the head needs to be supported at all times.

- Never leave the newborn alone or in the care of an older child while the baby is:
  - In the bathtub.
  - On a changing table or other place where he or she could fall or get injured
- Never shake the baby. A baby's skull is not developed enough to protect it against injury. Shaking your baby in anger or frustration can lead to shaken baby syndrome.
- Make eye contact with your baby frequently, such as during feedings. Babies love to look at your face and eyes. When you cuddle your baby in the crook of your arm, you are about the perfect distance for your baby to see you well.
- Keep your baby warm, snug, and close to you. Close physical contact with your baby promotes your mutual attachment by making your newborn feel secure

Check Your Progress 2

i) Explain the use of growth chart.

.....

.....

ii) How you control the common errors.

.....

.....

iii) What are the Normal Development Milestones.

.....

.....

5.7 LET US SUM UP

In this unit you have learnt the concept of growth and development monitory. Growth and Development Monitoring and Promotion (GDMP) is a prevention activity comprised of Growth and Development Monitoring linked with promotion (usually counselling) that increases awareness about child growth and development, improves caring practices, increases demand for other services. You have also learnt various growth parameters in children, use, plot and interpret growth chart and, monitor the developmental mile stones in children. At the end we focussed on educating mother regarding various aspects of care of baby to prevent deviation. You should be able to assess and record all parameters and refer in case of any deviation in growth and development.

5.8 MODEL ANSWERS

Check Your Progress 1

i) Growth monitoring is the process of maintaining regular close observation of a child's growth. Growth monitoring starts with measurements of weight

every month - during first year, every two months - during second year, every three months up to five to six years.

ii) There are various measurements that are used to measure growth. These are:

- weight,
- height,
- head circumference,
- Chest circumference
- the eruption of teeth.

iii) Measurement of chest circumference:

- Make sure your removed bulky jumpers or clothes of a child
- Ask the child to have their arms hanging loosely by their sides
- Place one end of flexible measuring tape on the chest at nipple line, and take it around the chest and meet with the first end
- Chest circumference is measured at the level of nipple in mid inspiration.

Check Your Progress 2

i) Uses of Growth chart

- Useful tool for growth monitoring.
- Diagnostic tool to detect a high risk child.
- Educational tool for the mothers to participate more actively in growth monitoring and to teach them the importance of adequate feeds during illnesses like diarrhoea.
- Tool for action on the type of intervention that is needed and helps make referrals easier.
- Helps in evaluating the effectiveness of corrective measures and thus to note the impact the programmes.
- Helps in policy making at local and central levels.

ii) Learning and applying correct measuring techniques.

Taking care to read the measurements correctly.

Recording the measurements correctly and clearly so that someone else can easily read the numbers.

iii)

Age Range	Motor Development	Language and Social Development
Birth	When prone turns head to one side to avoid suffocation	Cries
3-6 Months	Good head control	Can follow an object with eyes, plays with hands
6-9 Months	Can sit unsupported	Grasps actively, makes loud noises

Age Range	Motor Development	Language and Social Development
9-12 Months	Able to stand	Understands a few words, tries to use them
9-18 Months	Able to walk	Grasps small objects with thumb and index finger
15-30 Months	Able to run around as much as he wants	Can say several words or even some sentences
3 Years	Plays actively, is able to jump and climb	Starts talking a lot, is curious and asks many questions

5.9 ACTIVITY

1) Plot weight of a 2 month old male child weighing on the growth chart and interpret.
2) Take anthropometry measurement of five children of various age groups Record finding in the log book. And write your observation.
3) Assess development milestone of 3 months, 6 months, 9 months, 12 months and 2 year old children. Record finding in the log book.

5.10 REFERENCES

Promoting Healthy Growth and Development. http://www.webmd.com/parenting/baby/tc/growth-and-development-newborn-promoting-healthy-growth-and-development#2

1) Monitoring Growth and Development in a child. http://vikaspedia.in/health/child-health/growth-and-development/monitoring-growth-and-development.
2) Griffiths M, and Rosso JD. Growth monitoring and the promotion of healthy young child growth. http://www.manoffgroup.com/documents/GMP_UNICEF_Nov_1608.pdf
3) WikiEducator discussion group. Growth and Development. Available athttp://wikieducator.org/Lesson_5:_Growth_and_ Development.
4) National Institute of Public Cooperation and Child Development. Growth monitoring manual. (accessed on 28.11.16) Available at http://nipccd.nic.in/elearn/manual/egm.pdf
5) Childsupport.in. Milestones. at http://www.childsupport.in/html/home_milestone.html
6) Developmental milestones and the Early Years Learning Framework and the National Quality Standard. http://files.acecqa.gov.au/files/ACECQA/2014/developmental-milestones.

UNIT 6 IMMUNISATION AND SAFE INJECTION PRACTICES

Structure

6.0 Introduction

6.1 Objectives

6.2 Injection Safety

- 6.2.1 Safe and Best Injection Practices
- 6.2.2 Safe Immunisation Practices
- 6.2.3 Routes of Safe Administration of Vaccines
- 6.2.4 Unsafe Injection/ Practices and Outcome

6.3 Immunisation Session

6.4 Safety for Health Care Providers

6.5 Handling and Disposal of Injection Related Waste

- 6.5.1 Types of Sharp Waste and Its Segregation
- 6.5.2 Guidelines for Waste Disposal
- 6.5.3 Steps to Prevent Needle Stick Injury

6.6 Do's and Don'ts in Injection

6.7 Let Us Sum Up

6.8 Key Words

6.9 Model Answers

6.10 Activity

6.11 References

6.0 INTRODUCTION

In the previous units you have learnt about the practical skills on resuscitation and assessment of Newborns, key aspects of Kangaroo Mother Care, Infant and Young Child Feeding and counselling and promoting and monitoring growth and development. With this background you are ready to move a step further and get acquainted with a common procedure that both sick and healthy children experience such as injection/ immunisations. It has been seen that there is unsafe use of injections and unsafe disposal of injection related waste materials. These unsafe injections increase the risk of infection/ abscess formation/ local reaction to the recipients and also pose a threat to the health care workers, community and environment. In order to address this major public health problem, it is important to improve injection practices and promote safe injection techniques, safe disposal of injection related waste, rational prescription of injections and generating awareness in the community regarding safe and rational use of injections

In this unit you will learn about the immunisation and injection safety issues need for injection safety, Safe practices and techniques of injections and immunisation. At the end focus will be on safe disposal of injection related waste as well as the safety of health care providers.

6.1 OBJECTIVES

After completing this unit, you should be able to:

- follow injection safety and safe injection practices;
- conduct an immunisation session using the correct administration techniques for each vaccine;
- recognise and correct unsafe injection and immunisation practices;
- take steps for the safety of the health care providers; and
- demonstrate safe disposal of injection/immunisation waste.

6.2 INJECTION SAFETY

Injection safety is a set of measures taken to perform injections in an optimally safe manner for patients, healthcare workers, bio medical waste handlers, professionals involved in handling waste outside the health facilities, rag pickers and general community to prevent transmission of infectious diseases and needle stick injuries.

6.2.1 Safe and Best Injection Practices

Injections are considered safe for patient, health worker and waste handlers in following situations:

- the ***patient/child*****,** when health workers use sterile needles and syringes and appropriate injection techniques;
- the ***health worker***, when he or she avoids needle-stick injuries; and
- ***Waste handlers*** and *the community*, when used injection equipment is disposed of properly and does not cause injuries or pollution.

Key components of safe injection practices: These include safe injection devices and medications and safe injection techniques including hand hygiene and aseptic technique. We shall discuss each one as given below:

Injection Devices and Medications

The types of devices/equipment used to administer injections/vaccines is given in Table 6.1 below.

Table 6.1: Types of equipment used to administer injections/ injectable vaccines

Equipment	Remarks
Auto-disable (AD) syringes	equipment of choice
Prefilled AD injection devices only	available for some antigens
Reusable syringes and needles	not recommended
Hypodermic syringes with reuse prevention feature (RUP) and needles	for mixing purposes only

Health-care settings should ensure an adequate supply of single-use injection devices, to allow providers to use a new device for each procedure. It is also important to ensure availability of hub cutters and waste segregation bags.

Safe Injections Techniques

Steps in giving safe injection:

- Preparing to give injection
- Drawing up the medication
- Locating the injection site
- Preparing the skin
- Giving the injection
- Safe disposal of the syringe and needles (Refer Section 6.6)

Let us elaborate on each of above steps as given below:

Preparing to give injection

- Assemble the necessary equipment like syringe and needle, dry cotton swab, medication/ vaccine vial/ ampoule, diluent, hub cutter and the bin to dispose the syringe.
- Wash hands it involves Preparation, washing, and rinsing and drying. Always use a running water source for hand washing. Refer Unit 4 of Block 2 Course (BNS-043) for technique of Hand washing.
- Wear gloves where ever possible/ available.

Drawing up the medication

Use safe technique in

- Cutting open a glass ampoule
- Drawing medication/ vaccine with AD syringe
- Drawing medication from a vial with regular plastic syringe

Note: The Ministry of Health and Family Welfare, Government of India has already introduced Auto Disabled (AD)/ plastic syringes for the universal immunisation programme throughout the country in 2005.

Locating the injection site

- Locate the route through which injection /vaccine is to be given such as the intra-dermal (ID), intra-muscular (IM), subcutaneous (SC) routes. Intravenous route may be used for IV injections, IV infusion or drawing blood samples.

Remember:

Prevent accidental injury to adjoining structures like nerves and blood vessels. Access the site safely where the injection needs to be given (muscle, subcutaneous tissue or dermis).

Irrespective of the route of injection it is important to examine the local skin for any signs of any inflammation, swelling, infection or other skin lesions and avoiding such sites where these may be present.

Preparing the skin

- Before giving the injection, clean the site with dry cotton swab in a circular in a circular motion starting from the centre of the site towards its periphery.
- Allow 30 seconds for the spirit to dry for effective action.

Remember:

Alcohol/ Spirit swabs should not be used for vaccines

Giving the injection

Proper techniques should be followed for delivery of injections as given below.

Follow Seven Rights for Safe Injection delivery

- Right medication
- Right dose
- Right patient/client and site
- Right time
- Right route of administration
- Right documentation
- Right disposal

Always use Aseptic Technique for injections: It refers to the manner of handling, preparing, and storing of medications and injection equipment/supplies (e.g., syringes, needles and IV tubing) so as to prevent microbial contamination.

Now let us turn our attention to best injection Practices.

Best Injection Practices:

The best practices for safe injections include following:

- Use sterile injection equipment preferably auto destructible one time use.
- Prevent contamination of injection equipment and medication.
- Prevent Needle Stick Injuries (NSIs) to the provider.
- Prevent access to used syringes and needles — Intentional and Downstream reuse Common errors in injection practice is shown in Fig. 6.1.



Fig. 6.1: Common errors in injection practices

Other practice issues include:

- Use of Safety Engineered Medical Devices (SEMDs) —Reuse Prevention (RUP) syringes, safety syringes and safety needles Fig. 6.2.
- Maintaining Hand Hygiene all the times
- Ensuring skin integrity of the provider
- Using gloves, if indicated
- Swabbing vial tops or ampoules
- Adequate site preparation of patient
- Handle syringe and needle safely
- Assume all used equipment is contaminated: Cut the used syringe at the hub immediately after use.
- Practice safe disposal of all medical sharps waste: Used sharps (needles) must be collected in a hub cutter and then carried to the PHC for safe disposal.

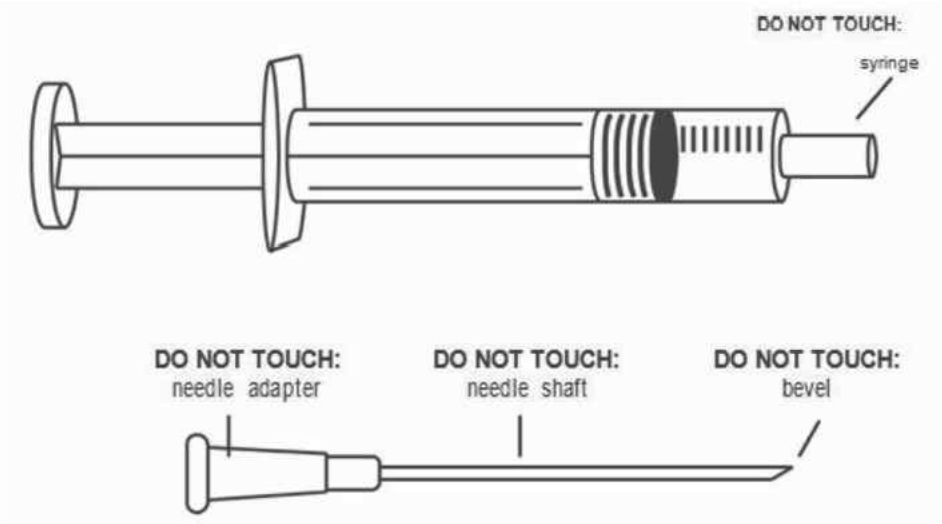


Fig. 6.2: Parts of a syringe and needle

	Do not recap the needle
	Do not leave the needle inside the vial
	Do not touch the needle
	Do not dispose of used needles in an open cardboard box
	Do not overfill the safety box

Fig. 6.3: Key points in injection administration

Remember:

If any of these parts are touched, discard the needle and syringe and get new sterile ones.

6.2.2 Safe Immunisation Practices

In this section focus will be on safe injection practices as given below.

Giving the right vaccine safely:

- Maintain the *cold chain* for all vaccines (You are advised to refer the Unit on Universal Immunisation Programme for recommended vaccine specific temperatures)
- Before administering a vaccine to an infant/ child, it is important to check which vaccines are due:
  - Verify the infant's/ child's age
  - Verify which vaccines the infant has received

- Verify all vaccines the infant needs at this session to allow efficient preparation
- Use appropriate techniques for reconstitution and administration of the vaccines.
- DO NOT use a vaccine that has expired.
- Position the children receiving immunisation in a secure position before administering the injection to prevent needle stick injury to the child or the vaccinator.
- Remove all empty/ discarded vials, all used lancets/swabs/gauze pieces/ syringes and needles from the immunisation site before leaving. These items are potentially infectious and can cause physical injury to members of the community.
- Reconstitute the vaccine only with the diluent provided with the vaccine.
- Utilise a disposable needle and a syringe of the size recommended for each type of vaccine and for each vaccination.
- Discard used vaccine at the time recommended.
- Plan the disposal of the injectable material so that it is risk-free.
- DO NOT store drugs and other substances in the UIP refrigerator; it is to be used exclusively for vaccines.
- Specify the contraindications to the administration of the vaccine and the precautions that should be taken by the personnel in charge immunisation session.
- Train and supervise workers appropriately so that they observe safe injection/ immunisation practices.

Remember:

Always keep an Anaphylaxis kit ready for use at the injection/ immunisation centre for use in case of emergency (like anaphylaxis) following injection. The kit should be checked AT LEAST once a month for availability and expiry of medicines.

6.2.3 Routes of Safe Administration of Vaccines

- Intra-dermal injection (BCG, fIPV).
- An Intra-dermal injection is given directly into the dermis (skin) layer. Carry out the following steps when giving an intra-dermal injection:
- Position the baby, and load the reconstituted BCG vaccine 0.05 ml for infants under one month and 0.1ml for infants older than one month.
- Position your left hand under the child's left arm and gently pull the skin under the arm to stretch the skin at the injection site.
- Hold the syringe in your right hand with the bevelled edge of the needle pointing up.
- Insert the tip of the needle into skin-just the bevel and a little bit more at 15^0 angle.
- Do not push too far, and do not point downward (**This way, the needle will go under the skin and will make the injection subcutaneous, instead of Intradermal)**

- Put your left thumb over the needle-end of the syringe (not on the needle itself) to hold it in position.
- Hold the plunger end of the syringe between the index and middle fingers of your right hand and press the plunger in with your right thumb. When an intradermal injection is given correctly the plunger is hard to push.

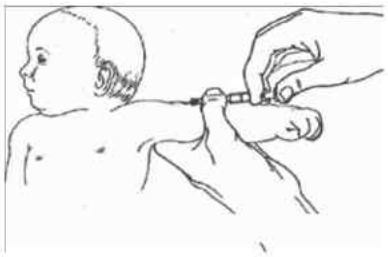


Fig. 6.4 : Intra-dermal injection

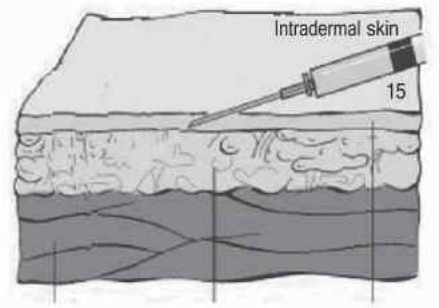


Fig. 6.5 : Intra-dermal needle position

- Inject vaccine (0.05/0.1 ml as required) and withdraw the needle.
- Cut the hub of syringe with the hub cutter and put plastic portion of the syringe into the red bag.
- If you have injected BCG correctly, a flat-topped swelling appears on the skin. The swelling may look pale with very small pits (like an orange peel).
- After 2–3 weeks of a correct injection, a papule develops which increases slowly in size up to 5 weeks (4–8mm). It then subsides and breaks into a shallow ulcer. Healing occurs spontaneously within 6–12 weeks, leaving a permanent tiny round scar, 4–8 mm in diameter.
- This is a normal reaction. When the technique is incorrect (the vaccine will go in easily and no swelling will be visible).
    - If the whole dose has been delivered under the skin, consider the child vaccinated.
- Do not repeat the injection.
    - If the whole dose has not been administered, reposition the needle and give the remaining dose.
    - Follow-up for side effects such as abscess and enlargement of the glands.

Intra-muscular injection (DPT, Td, PCV, Penta and Hepatitis B) Fig. 6.6 and Fig. 6.7

- Carry out the following steps when giving an intra-muscular injection:
    - Check the VVM on the vaccine vial.
    - Position the child on the mother's lap.
    - Load the vaccine into a 0.5 ml AD syringe.
- Throw the AD syringe wrapper and plastic cap in the black bag.
    - If necessary, expel excess air from the syringe by tapping the syringe.
    - Make sure you have exactly 0.5 ml of vaccine in the syringe (no more, no less).

- Put the finger and thumb of your left hand on either side of the injection site.
- Stretch the skin flat between finger and thumb.

- Hold the syringe like a pen in the right hand and push the needle straight down at 90° (as it will traumatise fewer muscle fibres) through the skin between finger and thumb. Penetrate deep into the muscle, but not all the way to the bone.



Fig 6.6: Intra-muscular Injection

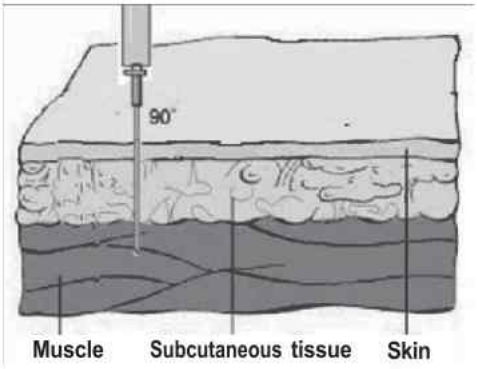


Fig 6.7: Intra-muscular Needle Position

- Do not massage the injection site after vaccination
  - Press the top of the plunger with the thumb to inject the vaccine.
  - Withdraw the needle and press the site of injection with a dry cotton swab.
  - Cut the hub of syringe with the hub cutter and put the plastic part of the syringe into the red bag.

Caution: Infants should never be given injections in the buttock as evidence Indicates that there is risk of damaging the nerves in the area. The vaccine will also be less effective if injected deep into fatty tissues.

Subcutaneous injection (MR)

- A subcutaneous injection is one that is given into the thin layer of tissue between the dermis (skin) and the muscle Fig. 6.10. The injection should be given in the right arm on the deltoid site of the skin.
- Carry out the following steps when giving a subcutaneous injection:
- Make sure the reconstituted vaccine has not expired. (To be used with in four hours of reconstitution)
- Position the child on the mother's lap.
- Load the vaccine into a 0.5 ml AD syringe (put the AD syringe wrapper and plastic cap in the black bag)
- If necessary, expel excess air from the syringe by tapping the syringe.
- Make sure you have exactly 0.5 ml vaccine in the syringe (no more, no less).
- Pinch the skin of the right upper arm through the left index finger and thumb.
- Push the needle in a slanting position at 45° angle into the pinched-up skin. Do not push the needle too far. Fig. 6.8

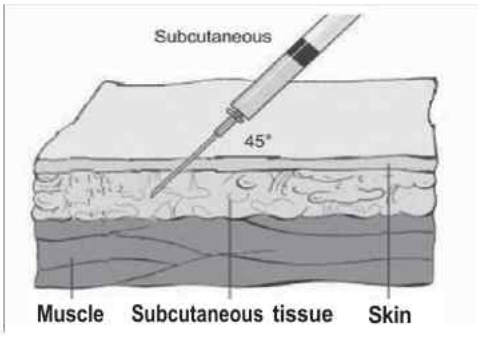


Fig. 6.8 : Sub-cutaneous injection, Sub-cutaneous needle position

- Press the plunger with your thumb to inject the vaccine.
- Withdraw the needle and press the site of injection with a dry cotton swab.
- Cut the hub of syringe with the Hub cutter and put the plastic part of the syringe into the red bag.
- Oral administration (OPV, RVV)
- The Oral Polio Vaccine (OPV) comes in a glass/plastic vial with a sterile dropper. The vaccine is given orally; two drops in the child's mouth as shown in Fig. 6.9.
- Check VVM on the vial before use.
- Remove the metal or rubber cap on the vaccine vial.
- Fit the dropper on the vial.
- Put two drops directly in the mouth of the child. Take care that the dropper does not touch the mouth.
- Make sure the child swallows the vaccine. If it is spit out, give another dose.



Fig. 6.9 : OPV Administration

Remember:

Contraindications to immunisation

1) Anaphylaxis or a severe allergic reaction is an absolute contraindication to subsequent doses of a vaccine. Persons with a known allergy to a vaccine component should not be vaccinated.
2) Any serious AEFI reported during previous vaccination to the child with the same vaccine is also a contraindication. e.g. convulsion and encephalitis with a previous dose of DPT
3) High fever

6.2.4 Unsafe Injection/ Practices and Outcome

Unsafe injection is any such practice which cause harm to patients, providers or the community The unsafe injection Practices are given in Table 6.2 and incorrect Injection practices and possible adverse events is given in Table 6.3.

Table 6. 2 : Unsafe Injection practices.

Reuse: 1. Using the same syringe or needle to administer medication to more than one patient 2. Using cannula's with a needle that has already been used for a patient	
Unhygienic practices: 1. Not washing hands, not wearing gloves by provider 2. Not cleaning the injection sites 3. Touching the needles with hands or with any objects before and after injections 4. Flushing the syringes or needles before injections 5. Administering injections over clothes 6. Leaving the needles in a multi dose vial	
Wrong techniques: 1. Wrong selection of injection sites 2. Using medications without checking labels or expiry dates 3. Using medicines packed as single-dose or single-use for more than once 4. Recapping the syringes after injections	
Waste management mechanism: 1. Not segregating the injection related waste at source 2. Not cutting hub (needles and plungers) after every injections 3. No sharp containers for needle storage 4. No adequate storage sites 5. No terminal disposal mechanism	

Now let us look at incorrect injection practices as given in following Table 6.3.

Table 6.3. : Some incorrect immunisation practices and adverse events

Incorrect Practices	Possible Adverse Events Following Immunisation
Non-sterile injection due to: • reuse of disposable syringe or needle • improperly sterilised syringe or needle contaminated vaccine or diluent	Infections such as local abscess at injection site, sepsis, toxic shock syndrome, or death Transmission of blood borne infections such as hepatitis or HIV

Incorrect Practices	Possible Adverse Events Following Immunisation
Reconstitution error due to: • inadequate mixing of vaccine • reconstitution with incorrect diluent • drug substituted for vaccine or diluent • inappropriate reuse of reconstituted vaccine at subsequent session	Local abscess at injection site Vaccine ineffective[a] Negative effect of drug (for example, insulin, oxytocin, muscle relaxants) Death
Injection at incorrect site such as: • BCG given subcutaneously • DPT/Td not administered superficial and not into buttocks	Local reaction or abscess Sciatic nerve damage
Vaccine transportation/storage incorrect such as: • VVM(Vaccine Vial Monitor) changed colour • clumping of adsorbed vaccine	Local reaction Vaccine ineffective
Contraindications ignored	Avoidable severe reaction
[a]Strictly speaking, ineffective vaccine is considered to be an effect, not an adverse event	

Outcome of Unsafe Injection/Immunisation Practices?

Outcomes of unsafe injections could be grouped as:

- **Short term** - Abscess formation, skin rashes, irritation, pain, disabilities
- **Long term** - HBV, HCV and HlV infections.

Check Your Progress 1

List any two incorrect immunisation practices and their possible adverse events.

.....

.....

.....

.....

6.3 IMMUNISATION SESSION

Before beginning your immunisation session, and before giving each vaccine, you should take the following steps to ensure that every dose that you are going to give is safe and effective.

Check label: Make sure the label on the vaccine vial is attached and clear enough to read. If the label is not clear enough to read or has come off, **discard the vial**.

Check vaccine and diluent: Check that the vaccine and diluent being given are the correct one.

Check expiry: Look for the expiry date on the vial. If the expiry date has passed, do not use the vial; **Discard it**.

Check the vaccine vial monitor (VVM) on vaccine vials to make sure that the vaccine is in the usable stage.

Shake the T-series and HepB vials to rule-out freezing or floccules.

Note down the batch number of each vaccine vial and diluent.

Mild fever, diarrhoea, and cough are not contraindications for immunisation.

Steps in conducting the immunisation session

You should follow the steps given below while conducting an immunisation session:

- Welcome the beneficiaries.
- Verify beneficiaries' record and age and check that the beneficiary is due for vaccination today.
- Screen for contraindications.
- Explain what vaccine(s) will be given and the disease it prevents.
- Check the vial label for VVM.
- Check vial expiry date on the label.
- **Wash hands** before reconstituting vaccine and conducting the session.
- For T series vaccines lightly shake the vials before withdrawing the dose.
- Use only the diluent supplied with the vaccine as it is specifically designed by the manufacturer for the needs of that vaccine, with respect to volume, PH level and chemical properties.
- Write the time and date of reconstitution on the vial (BCG, MR)
- **Check the label of the vial for VVM and the expiry date before drawing the dose**
- Maintain aseptic technique throughout.
- Position the child correctly. (Fig. 6.10)



Fig. 6.10: Correct positioning of child

- The correct positioning of a child for immunisation is to ask the mother (or caregiver) to sit with the baby on her lap with one arm around the back of the baby, holding the baby's hand and leg steady. The baby's other arm should wrap around the mother's side.
    - Clean the injection site if dirty with clean water swab.
    - Inject the vaccine at the correct site and follow the correct route of administration of the vaccine e.g. Intradermal; subcutaneous; intramuscular. (Fig. 6.11).

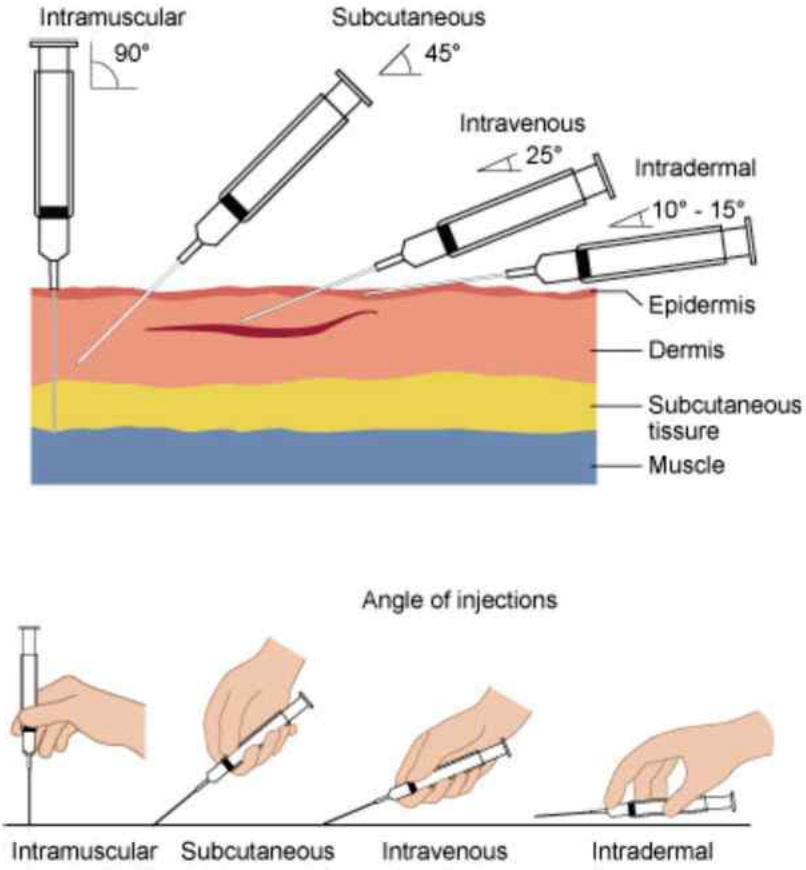


Fig. 6.11 : Various Needle Positions

Always give vaccines through the correct route and at the correct site.

Inject the vaccine using steady pressure.

- Withdraw the needle at the angle of insertion.
- ***Do not massage the injection site after giving the injection.***
- Cut the hub of the syringe with the hub cutter. Collect cut needles in the hub cutter and place the cut syringes in the red bag.
- Explain potential minor side-effects/ problems that may occur due to the vaccine and how to deal with them.
- Remind parents about the next visit and ask them to bring the card on next visit.
- Ask beneficiaries to wait for half an hour after vaccination to observe for any AEFI.

- Fully document each immunisation in the immunisation card, counterfoil, tally sheet and immunisation register.
- Retain the counter foil in the tracking bag.

- Ensure disinfection of the needles and syringes followed by their disposal as per guidelines.
- Leave the list of children vaccinated in a session with the AWW/ASHA and request them to be alert and report AEFIs. Share contact details of self and PHC.

Reconstituting vaccines

BCG and MR vaccines are freeze-dried (dry powder) and must be reconstituted with diluents before use. Keep the diluents in the ILR for atleast 24 hours before use to ensure that vaccines and diluents are at the same temperature (2^0 to + 8^0 C) at the time of reconstitution. Otherwise it can lead to thermal shock i.e. the death of some or all the essential live organisms in the vaccine. Keep diluents with vaccines in plastic zipper bag in the vaccine carrier during transportation.

Diluents for BCG are normal saline. Diluents for MR are pyrogen-free, double-distilled water. Diluents for JE are phosphate buffer solution.

When reconstituting vaccines, carry out following steps carefully:

- Double check that you have chosen the correct diluent, which has been supplied by the manufacturer for the specific freeze-dried vaccine, you are going to mix.
- Check expiry date on the label and VVM on the cap of vaccine vial. This VVM indicates whether the dry vaccine is usable or not. ***Once reconstituted, VVM is of no use as the vaccine has to be used with in 4 hours.***
- Reconstitute the vaccine even when only one eligible child is present.
- Use a new 5 ml disposable syringe for each reconstitution. Do not use it for injecting.
- Open the vaccine vial and open an ampoule of diluent.
- Draw the entire quantity of the diluent into the mixing syringe.
- Insert the reconstitution needle into the vaccine vial, inject the diluent from the syringe into the vial and remove the needle.
- Cut the mixing syringe at the hub with the hub cutter.
- To mix the vaccine and diluent, shake the vial gently by holding at the neck.
- Write the time of reconstitution on the vial label.

Use the reconstituted vaccine, within four hours of reconstitution. At the end of four hours, discard the vaccine and reconstitute a new one if required.

6.4 SAFETY FOR HEALTH CARE PROVIDERS

Effective measures to prevent infections from occupational exposure of healthcare workers to blood includes following:

- ***Rational use of injections:*** Substitute injections by administering, medications through another route such as tablet, inhaler etc. where ever possible.
- ***Immunisation against HBV:*** for every health care worker (even for contractual workers and staff engaged in any type of health care plan).
- ***Implementing Universal Precautions:*** Bio safety measures for medical waste disposal should be strictly followed at the point of waste generation. Use of Post Exposure Prophylaxis (PEP) by healthcare worker should be encouraged, following the NACO guidelines.
- Eliminating needle recapping:
  - Disposing of the sharp into a sharps container immediately after use
  - Use of safer devices such as needles i.e. safety needles and cannulas
  - Provision and use of personal protective equipment, and
  - Training of workers regarding the risks and prevention of transmission of infections.

What to do if there is exposure to blood and body fluid during injection procedure?

First Aid management of the Exposure to Blood and Body Fluid during Injection Procedure (Post Exposure Prophylaxis, PEP):

Injury or Exposure	Management
Needle-stick or other sharps injury	Immediately wash the affected area with soap and water Allow injury to bleed freely and report immediately to higher authority. Report to the higher authority where PEP is available DO NOT suck blood from the site
Splash of blood and/or body fluids on non-intact skin	Splash of blood and/or body fluids on non-intact skin DO NOT use disinfectant on skin DO NOT scrub or rub the area DO NOT squeeze or press the area
Splash of blood or body fluids to eyes	Flush the area gently but thoroughly with running water or saline for atleast 15 minutes while the eyes are open. Keep eyelid gently inverted
Splash of blood skin	Immediately wash the affected area with soap and water DO NOT rub the area

Check Your Progress 2

i) List the measures needed for the safety of the health care providers.

.....

.....

.....

ii) What will you do if there is needle-stick injury?

.....

.....

6.5 HANDLING AND DISPOSAL OF INJECTION RELATED WASTE

You have learnt in detail about collection, segregation, transportation and management of Bio-Medical waste in Unit 6 of Theory Course (BNS-041) i.e. Foundations of Community Health and also in Unit 1 of Block 2 under Practical Course III. (BNS-043) (Public Health and Primary Health Care Skills).

Here focus will be on handling and disposal of injection related waste.

6.5.1 Types of Sharp Waste and Its Segregation

As per the BMW Rules, sharp wastes are classified in category 4 and include needles, syringes, scalpel blades, glass etc. that may cause puncture and cuts. This includes both used and unused sharps. Disposal of immunisation waste is strictly as per Central Pollution Control Board (CPCB) guidelines for biomedical waste disposal.

6.6.2 Guidelines for Waste Disposal

Steps of waste disposal are given below.

Step1 Cut the AD syringe at the hub immediately after administering the injection at the session site using the Hub cutter that cuts plastic hub of syringe and not the metal part of needle. (Fig 6.12)

Step 2 The cut needles will get collected in the puncture proof translucent container of the hub cutter.

Step 3 Store broken ampoules / vials in a separate white translucent sturdy and puncture proof container or in the same hub cutter in case its capacity is able to accommodate broken vials also.

Step 4 Segregate and store the plastic portion of the cut syringes and unbroken (but discarded) vials in the red bag or container.

Step 5 Send the red bag and the hub cutter to PHC for disinfection and disposal by designated person at the PHC. Dispose off the black bag as general waste.

Step 6 Treat the collected material in an autoclave. If autoclaving is not possible, boil the waste in water for atleast 10 minutes or provide chemical treatment (using atleast 1% solution of freshly prepared sodium hypochlorite for 30 minutes). Ensure that these treatments result in disinfection. However, District Hospital/ CHC/PHC etc. will ultimately make the necessary arrangements to autoclave on a regular basis.

Step 7 Dispose the autoclaved / disinfected waste as follows:

- Dispose the needles and broken vials in a safety pit/tank
- Send the syringes for recycling and unbroken vials for landfill.

Step 8 Wash the hub cutters properly for re-use.

Step 9 Make a proper record of generation, treatment and disposal of waste at the PHC.



Fig. 6.12 : Disposal of needle

6.5.3 Steps to Prevent Needle Stick Injury

- Do Not recap needles using both hands
- Do Not bend/ break the needles
- Do Not manually remove needle from the syringe

6.6 DO'S AND DON'TS IN INJECTION

Let us look at Do's and Don'ts in following box

Do's	Don'ts
• Maintain hand hygiene (use Soap and water or alcohol rub) • Use alcohol swab to clean the site for injection and plain sterile swab for vaccinations • Use a single-use device for blood sampling and drawing • Do disinfect the skin at the vein puncture site • After giving injection, if using Re use prevention syringe, break the plunger of syringe and needle through hub cutter	• Don't forget to clean your hands. • Don't pre soak cotton wool in a container. • Don't re use a syringe, needle or lancet for more than one patient. • Don't use a single loaded syringe to administer medication to several patients. • Don't touch the puncture site after disinfecting it. • Don't change the needle in order to reuse the syringe. • Don't use the same mixing syringe to reconstitute several vials.

Do's	Don'ts
• Where recapping of a needle is unavoidable, DO use the one-hand scoop technique • Seal the sharps container with a tamper-proof lid • Ensure One needle, One syringe and One patient • Take post exposure prophylaxis, in case of needle stick Injuries and Blood & Body Fluid splash • Do report to higher authority as per PEP	• Don't recap a needle using both hands. • Don't leave an unprotected needle lying outside anywhere. • Don't overfill or decant a sharps container. • Don't delay PEP for HIV beyond 72 hours, then PEP for HIV is NOT effective. • Don't suck blood from the site of needle prick and don't squeeze out the blood.

Check Your Progress 3

List the steps required to prevent needle stick injury.

.....

.....

ABREVIATION

AD	:	Auto Disable
BMW	:	Bio Medical Waste
CVC	:	Central Venous Catheter
DPT	:	Diphtheria Pertussis Tetanus vaccine
HBV	:	Hepatitis B Virus
HCV	:	Hepatitis C Virus
HIV	:	Human Immunodeficiency Virus
ID	:	Intradermal
IM	:	Intramuscular
IV	:	Intravenous
NACO	:	National Aids Control Organization
NSI	:	Needle Stick Injuries
OPD	:	Out Patient Department
PEP	:	Post Exposure Porphylaxis
RUP	:	Reuse Prevention
SC	:	Subcutaneous
SEMD	:	Safety Engineered Medical Devices
WHO	:	World Health Organization

6.7 LET US SUM UP

Most children receive injection/s at some time or the other. While some of these injections are justified and actually needed, on many occasions these are used irrationally and are avoidable. A safe injection does not harm the recipient, does not expose the provider to any avoidable risk and does not result in any waste that is dangerous for the community. Use of aseptic techniques in preparing, drawing and administering the medication/ vaccines is critical in preventing related harmful effects including blood borne diseases. In this unit, you learnt that by using injections judiciously, following appropriate steps for giving injections, and by safe disposal of injection related waste, a large number of complications and deaths can be averted.

In the next unit you will be learning about the 'Use of Equipment (Suction Machine, Oxygen Administration Device, Ambo-Bag, Radiant Warner. Phototherapy Unit etc)'.

6.8 KEY WORDS

Bio Medical Waste : Any waste which is generated during the diagnosis, treatment or immunisation of human beings or animals or in research activities pertaining thereto or in the production or testing of biological or any solid waste or liquid, which may present a threat of infections to humans.

Downstream reuse : Picking up used needles and/or syringes at the point of disposal for repackaging and recirculation in the market.

Needle stick injury : A penetrating stab wound caused by a needle. It can cause the transmission of blood-borne pathogens.

Reuse : Using an object or material again either for its original purpose or for a similar purpose without significantly altering the physical form of the object or material

Sharps : Include needles, syringes, scalpel blades, glass etc. that may cause puncture and cuts. This includes both used and unused sharps, which should be treated.

6.9 MODEL ANSWERS

Check Your Progress 1

What is safe injection?

Injections are considered safe for:

- the *patient/child*, when health workers use sterile needles and syringes and appropriate injection techniques;
- the *health worker*, when he or she avoids needle-stick injuries; and
- *waste handlers* and *the community*, when used injection equipment is disposed of properly and does not cause injuries or pollution.

"Safe Injection practices should not be sacrificed in efforts to save time or money."

Check Your Progress 2

A combination of factors makes injections unsafe, such as:

- Reuse of disposable injection devices (needle and syringe)
- Use of injection devices (needle and syringe) without adequate sterilisation
- In-appropriate, unhygienic practices and improper technique of giving injections
- Improper management of injection related waste like not segregating the waste at source

Check Your Progress 3

Following are the two examples of incorrect immunisation practices and their possible adverse events.

Incorrect Practices	Possible Adverse Events Following Immunisation
1. Non-sterile injection due to: • reuse of disposable syringe or needle • improperly sterilised syringe or needle contaminated vaccine or diluent	• Infections such as local abscess at injection site, sepsis, toxic shock syndrome, or death • Transmission of blood borne infections such as hepatitis or HIV
2. Reconstitution error due to: • inadequate mixing of vaccine • reconstitution with incorrect diluent • drug substituted for vaccine or diluent • inappropriate reuse of reconstituted vaccine at subsequent session	• Local abscess at injection site • Vaccine ineffective • Negative effect of drug (for example, insulin, oxytocin, • muscle relaxants • Death

Other incorrect practices possible, such as Injection at incorrect site or incorrect storage/ transportation of vaccines with consequent adverse events.

Check Your Progress 4

The measures needed for the safety of the health care providers are:

- Rational use of injections
- Immunisation against HBV
- Implementing Universal Precautions
- Eliminating needle recapping

Check Your Progress 5

In case of a needle-stick injury, I will

- Immediately wash the affected area with soap and water
- Allow injury to bleed freely and report immediately to higher authority. Report to the higher authority where PEP is available
- NOT suck blood from the site

Check Your Progress 6

The steps required to prevent needle stick injury:

- Do Not recap needles using both hands
- Do Not bend/ break the needles
- Do Not manually remove needle from the syringe

6.10 ACTIVITY

- Visit the OPD and perform perform immunisation safely
- Guidelines
  - Select safe and potent vaccines .....

    .....

    .....
  - Consider contraindications to immunisation .....

    .....

    .....
  - Follow correct steps in conducting the immunisation session
    - Verify benefciaary's due vaccination/s .....

      .....
    - Screen for contraindications .....

      .....
    - Check for vaccine safety: .....

      .....
    - Reconstitute vaccine correctly: .....

      .....
    - Maintain aseptic technique .....

      .....
    - Give the vaccine and document .....

      .....
    - Dispose immunisation related waste .....
    - Monitor .....

6.11 REFERENCES

1) Government of India, **National Centre for Disease Control (NCDC).** Handbook on safe injection practices **(2014)** www.ncdc.gov.in/ **safe**_inj_**practice2014**.pdf

2) India CLEN Program Evaluation Network. Model Injection Centres (MICs): A Program to Improve Injection Practices in the country; Training Manual.2006.

3) IPEN Study group, Injection Practices in India, WHO South-East Asia Journal of Public Health 2012;l(2):189-200

4) World Health Organization, "Media Centre: Injection Safety," Fact sheet No. 231 (2006) http://www. who. int/mediacentre/factsheets/fs231/en

5) World Health Organization, "Guiding Principles to Ensure Injection Device Security " WHO/BCT/03 12

6) World Health Organization, Immunization in Practice A practical guide for health staff -2015 update *a*pps.who.int/iris/bitstream/10665/193412/1/9789241549097_eng.pdf

7) World Health Organization, "Best practices for injections and related procedures toolkit", WHO/EHT/IO.02, Geneva, March 2010

8) Pan American Health Organization Regional Office of the World Health Organization Division of Vaccines and Immunization. Immunization Safety: How to address events allegedly attributable to vaccination or immunization. (2002) http://www.paho.org

9) K Park. Textbook of preventive and social medicine. 21st edition.Jabalpur: BanarasidasBhanot Publishers; 2011.

10. Universal Immunization Program (2013) http://www.mohfw.nic.in

UNIT 7 USE OF EQUIPMENTS

Structure

7.0 Introduction

7.1 Objectives

7.2 Commonly used Equipments for Newborn Care

- 7.2.1 Radiant Warmer
- 7.2.2 Weighing Scales
- 7.2.3 Pulse Oximeter
- 7.2.4 Phototherapy Unit
- 7.2.5 Suction Device
- 7.2.6 Self Inflating Bag
- 7.2.7 The Flow Inflating Bag
- 7.2.8 T Piece Resuscitation
- 7.2.9 Resuscitation Masks

7.3 Other Equipments

- 7.3.1 Sphygomanometer
- 7.3.2 Oxygen Cylinders

7.4 Let Us Sum Up

7.5 Model Answers

7.6 Activity

7.7 References

7.0 INTRODUCTION

We have all seen oxygen being administered to a sick babies /adults in a hospital. But did you think what would be required if the oxygen in the cylinder finished and you were to replace it with another one? It would be tricky and unless you knew it well, you would not even attempt it, because wrong handling can spoil the flow meter or the pressure regulating valve. Equipment such as the oxygen delivery set, radiant warmer to provide warmth and safely to a newborn, phototherapy unit to provide light treatment for jaundice in newborns, a suction device to clear secretions from the mouth and throat of a baby or an Ambu bag with mask to provide artificial respiration in a baby, are commonly required for carrying out essential newborn care as well as to resuscitate any sick patients.

Health care providers must know the proper use of these equipments that the client derives optimal benefit and no harm is caused. Also the equipment is not spoilt due to misuse or mishandling. You should also know what to check if there are errors in its functioning and when to call for a maintenance person to check or rectify it.

In this unit you will learn about use, functioning operating procedure, cleaning and disinfection, maintenance and trouble shooting of various equipments used in newborn care.

7.1 OBJECTIVES

After completing this practical, you should be able to:

- follow basic principles in working of equipments while using them in a health facility;
- identify the various parts of equipments;
- apply the correct technique of setting up and using the various equipments for care of newborn;
- take precautions while using the equipment;
- use effective techniques of cleaning and disinfection; and
- manage minor problems with their operation, and ensure appropriate maintenance.

7.2 COMMONLY USED EQUIPMENTS FOR NEWBORN CARE

We shall begin with Radiant Warmer as given below.

7.2.1 Radiant Warmer

Newborn babies, in particular, the preterm and the low birth weight babies are extremely predisposed to hypothermia. Special care of newborn babies can be provided with radiant warmers.

Functioning of radiant warmer

- Radiant warmers provide intense source of radiant heat energy.
- They also reduce the conductive heat losses by providing a warm microenvironment surrounding the baby.
- The radiant warmer (also called open care system) was developed as an 'open incubator' that ensures ready access to the baby.
- The overhead quartz heating element produces heat which is reflected by the parabolic reflector on to the baby in the bassinet.
- The quantity of heat produced is displayed in the heater output display panel.
- Temperature selection knobs select the desired skin temperature. This information is processed by the microprocessor inside the control panel and matched against the actual temperature of the baby. If the temperature of the baby is lower than the set temperature, the microprocessor will send feedback to the quartz rod heater to increase the heat output till the baby's temperature reaches the set temperature. At this point the heater output will be reduced. This system in which the heater output is determined automatically based on skin temparature information is called **servo system.**
- Servo system is the preferred method of running the open care system.
- The heat output from the quartz heating rod could also be increased or decreased manually. This is done by the heater output control knobs/buttons. This is called the **manual mode** of operation.

- In the servo mode, whenever the baby's temperature rises by more than 0.5ºC above the set temperature, a visual /audible alarm is activated. You must pay attention to sort out the fault. Often this occurs when the temperature probe comes off the baby's skin.

Parts of an open care system (Fig 7.1)

- Bassinet
  For placing the neonate (with mattress and pre-warmed clean cloth)
- Quartz rod with reflector
  Provides radiant heat
- Skin probe
  When attached to the baby's skin, displays skin temperature
- Control panel
  Has a collection of display and control features/knobs
- Heater output display
  Indicates how much is the heater output
- Heater output control knobs
  For increasing or decreasing the heater output manually
- Temperature selection panel
  Select either set temperature or skin temperature
- Temperature selection knobs
  Select a desired set temperature
- Temperature display
  Display temperature as selected, either of the baby's skin (via skin probe) or the set temperature
- Mode selector
  Selects manual or servo mode

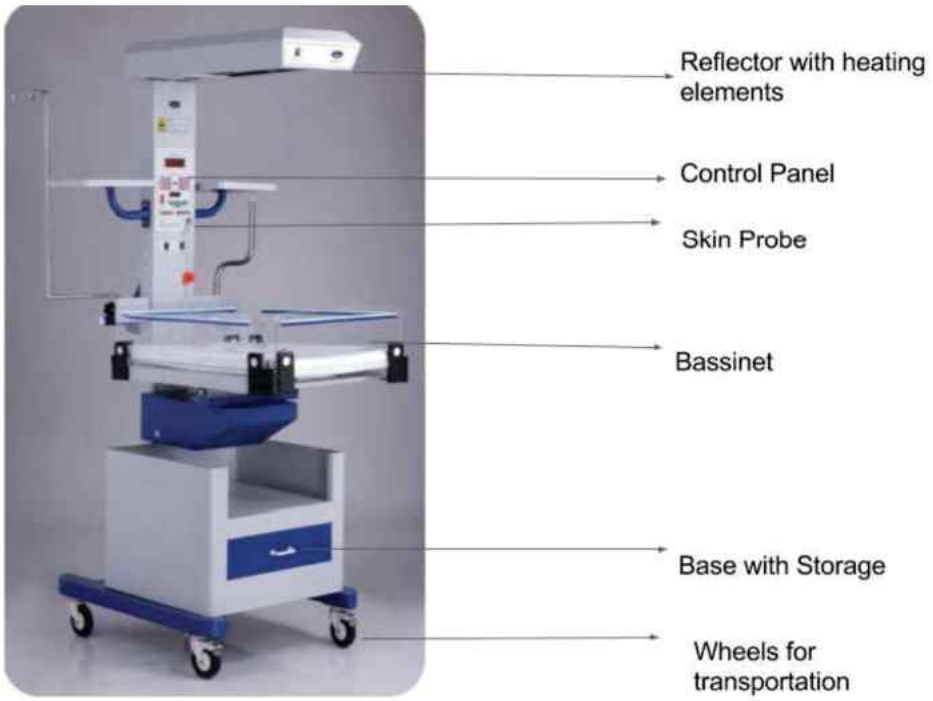


Fig. 7.1 : Radiant Warmer

The heating element (silicon quartz /infrared/ceramic/quartz crystal), the control panels (electronic/electrical /microprocessor based) and alarms (air temperature /skin temperature/air sensor fail /power failure etc.) form the basic unit of all the warming devices. Power consumption is around 750 watts. In good equipment, temperature stability is usually with an accuracy of ±0.5ºC.

The baby is placed in a pre-warmed bassinet covered with linen. Serve-mode should be used with skin probe applied to the baby and skin temperature set at 36.5ºC.

Steps in use of warmer

- Connect the unit to the mains. Switch it on.
- Select manual mode.
- Select heater output to 100% for some time to allow quick pre-warming of the bassinet covered with linen.
- Select servo mode.
- Select the desired set temperature of baby as 36.5ºC.
- Place the baby in the bassinet.
- Connect skin probe to the baby's abdomen with sticking tape.
- If you want the manual mode to be used, select the desired heater output.
- In the manual mode, record baby's axillary temperature at 30 minutes and then 2 hourly.
- Respond to the alarm immediately. Identify the fault and rectify it.

Application of skin probe

Do's

- Prepare the skin using an alcohol/spirit swab to ensure good adhesion to the skin.
- Apply probe over the right hypochondrium area in the supine position.
- Apply probe to the flank in the prone position.
- Check sensor probe regularly so as to ensure that it is in place. Ensure that skin probe is free of contact with bed.
- Cover probe with a reflective cover pad, if available (foil covered foam adhesive pad).

Don'ts

- Do not apply to bruised skin.
- Do not apply clear plastic dressings over probe.
- Do not use fingernails to remove skin surface probes.
- Do not reuse disposable probes.

Use of cling wrap to decrease insensible water losses

Use of cling wrap (transparent polythene used for covering fruits or vegetable for storage) over the baby, tied across the panels of warmer, has been shown to

reduce insensible water losses and result in better thermal control for VLBW (<1.5 kg) babies.

Potential pitfalls of servo-controlled warmer

In the event of probe getting displaced from baby's abdominal skin, overheating of the baby will occur because the skin probe depicts air temperature and heater output keeps on increasing till probe temperature matches control temperature. Also, repeated activation of alarm will occur when baby develops fever. In this situation, it is better to shift to manual mode with least heater output.

Useful tips for use of radiant warmers

- Don't use the warmer in a cold room. It works best when the environmental temperature is above 20ºC.
- Keeping the warmer where there are a lot of air currents reduces its efficiency.
- The warmer must be pre-warmed around 20 minutes before the arrival of the baby or till the set temperature is reached with less than 50% of total heater output.
- While using the manual mode in a warmer without a temperature display, record the baby's temperature regularly, preferably 2 hourly.
- The manual mode is used for initial preparation of bed for the baby or when rapid warming of a severely hypothermic baby has to be done. However, this may be hazardous as babies may become overheated. Except in the continuous presence of a nurse who is watching the skin temperature, it is preferable to use the skin probe with the warmer on servo-mode.
- Care should be taken ensure that the skin probe is applied to the baby's skin properly and has not come off. Else it will cause overheating of the baby.
- Radiant warmers provide dry heat and increase insensible water losses. Hence, the fluid received by the baby I/v or orally should be increased by giving extra breast feeds.

Disinfection and maintenance

We shall begin with disinfection and the talk about maintenance.

Disinfection

When the equipment is in use, all approachable external surfaces should be cleaned daily with an antiseptic solution like glutaraldehyde. Spirit or other organic solvents must not be used to clean the glass side panels or display panel. For disinfection of reusable probe, isopropyl alcohol swab should be used.

Every seventh day, after shifting the baby to another cot, the used equipment should be cleaned thoroughly first by light detergent solution and then by antiseptic solution. All detachable assemblies are to be treated similarly.

Maintenance

Ongoing maintenance is the key to increase the mean time between failures. The hospital biomedical engineer must regularly check equipment but the authorised company engineer must be called for preventive checks and major breakdowns. The control and power units should be calibrated every 4–6 months and thorough

servicing should be done annually. Temperature calibration should ensure sensitivity to ± 0.5ºC of the set value.

Troubleshooting – Radiant warmer

Fault	Possible Cause	Solution
1. Warmer is not running	No power from mains socket	Check power switch is on. Replace fuse with correct voltage and current if blown.Check mains power is present at socket using equipment known to be working. Contact electrician for re-wiring if power not present.
	Electrical cable fault	Try cable on another piece of equipment. Contact electrician for repair if required.
2. Fuse keeps blowing	Power supply or cable fault	Refer to electrician
3. Alarms not working	Alarm battery dead	Replace the battery and recheck. Send for repair if problem remains.
4. Temperature not properly controlled	Temperature probe and sensor not working	Check the temperature probes and sensor connections.Replace the temperature probe and sensor and recheck.
	Warmer placed in direct sunlight or near a draught / fan.	Move warmer if placed near heat or drought.
	Fan or air duct problem	Call technician if fan not working. Unblock air duct if obstructed.
5. Warmer not heating even when the heater lamp is on.	Heating element problem	If accessible, replace heating element. Otherwise refer to technician for repair.
6. Electrical shocks	Wiring fault	Refer to electrician immediately

User Maintenance Checklist – Radiant warmer

	Daily
Cleaning	√ Wipe dust off exterior and cover equipment after checks
	√ Remove any tape, paper or foreign body from equipment
Visual checks	√ Check all fittings and accessories are mounted correctly

Function checks	√ Check all the functions while starting the unit. Check skin temperature readings and cross check with a thermometer
Weekly	
Cleaning	√ Unplug, clean outside with damp cloth and disinfecting solution as per procedures and dry off √ Remove any dirt from wheels √ Wash (or replace) the air filters, dry thoroughly for reuse
Visual checks	√ Check mains plug screws are tight √ Check mains cable has no bare wire and is not damaged √ Check doors, cable and tray. Repair if damaged
Function checks	√ Check all controls operate correctly √ Check the readings of thermometer and oxygen sensors change when breathed upon √ Check any batteries are working properly
Every six months	
Biomedical Technician check required	

Key messages : Radiant warmers

- Radiant warmers are essential in the special care of newborn babies particularly the preterm and LBW babies to prevent morbidity and mortality due to hypothermia.
- Servo mode is the preferred method of running the open care system as the baby's temperature controls heat output.
- The baby should never be left unmonitored under the manual mode as it can lead to severe hyperthermia.
- While using the radiant warmer one must check that the temperature probe does not come off the baby because in that case a falsely low recording may lead to overheating of the baby in the servo mode.
- The radiant warmer and probe must be thoroughly cleaned and sterilised before use to prevent cross infection.
- Fluid intake of baby nursed in a radiant warmer should be increased as the insensible water losses.

Check Your Progress 1

i) What is the preferred mode for keeping a baby under the radiant warmer?

.....

.....

ii) How should the probe be applied to a baby kept under the radiant warmer?

.....

.....

7.2.2 Weighing Scales

Accurate weighing scale is a fundamental need for all special care neonatal units and delivery rooms.

- Weight record is essential to monitor the adequacy of nutrition as well as fluid balance. Weight at birth is the single most useful predictor of neonatal morbidity and mortality.
- Birth weight helps in identifying the level of care required for the baby and classification into weight for age categories.
- Babies below 2000 gm require special newborn care. Hence, a weighing scale for measuring the weight at birth is essential for all health care facilities where deliveries take place and neonates are looked after as given in Fig. 7.2.



Fig. 7.2 : Baby Weighing Scale

Indications

- All babies at birth.
- All LBW babies at 2 weeks (to check for regaining of the birth weight), 4 weeks (to ascertain a weight gain of 80–100 g/kg per week) and then every month.
- Sick new born once or twice a day
- VLBW (<1500 g) babies once or twice daily to monitor and plan fluid therapy
- Measuring urine output by pre-weighed napkin

Sick and VLBW babies need daily weighing to decide fluid requirements, drug dosages and weight gain patterns. Sudden weight loss in a baby who had been gaining weight satisfactorily suggests the possibility of dehydration.

Adequate daily weight gain in a newborn is a sensitive index of its well being. Term babies lose about 10% of birth weight and regain birth weight at 7 to 10 days of age while preterm babies lose weight up to 10-15 per cent of the birth weight and regain birth weight usually by 14 days of age.

After the initial weight loss, babies start gaining weight at a rate of 1-1.5% of birth weight per day.

Scales with an accuracy of ± 5 gm are essential in weight monitoring of VLBW babies. Newborn units that manage babies under 1000 g in weight need weighing scale with a accuracy of 1 gm. Excessive weight loss, delay in regaining birth weight or slow weight gain suggest that either the baby is not being fed adequately or the newborn is unwell and needs attention.

A weighing scale can also be employed to measure the urine output of the babies. Pre-weighed nappies should be used for nursing babies. Weighing the nappies post micturition would be helpful in assessing adequacy of feeding in breastfed newborns. A towel/paper is placed over the pan of the weighting scale and the scale is then adjusted to zero. The baby is then placed on this towel/paper to get the weight.

Procedure

- Put the weighing scale on a flat and stable surface.
- Record weight prior to feeding.
- Detach as many tubes/ equipment as possible.
- Keep the naked baby on the towel and record the weight (Subtract the weight of the towel if the scale has no facility to zero).
- Keep baby in middle of scale pan: hold the remaining tubes lines in hand.
- Use separate sterile towel for each baby.
- If using pre-weighed splint, reduce the weight from baby's weight.
- For quality assurance check accuracy of weighing scale with standard known weights every week.

Operating instructions

- The weighing pan should be cleaned before weighing each baby.
- Connect to the mains and switch on the machine.
- The digital display will show some figure.
- Place a sterile towel or paper on the pan to reduce the chances of hypothermia and cross infection.
- Adjust the digital display to zero by manually adjusting the knob. Some weighing scales have automatic zero facility.
- Place the infant on the towel/paper in the middle of the pan.

- Note the reading on the digital display. Freeze reading facility will continue to show the reading.
- The machine should be switched off after use.
- Do not press the weighing pan with your hand. It could damage the load cell system in the weighing machine.

How should the baby pan be cleaned before use?

It is very important to clean the baby pan before and after weighing each baby. A single weighing scale in the unit, could be a source of infection. Commonly available disinfectants like savlon or Glutaraldehyde may be used to clean the pan. Spirit/ alcohol should be avoided as it can damage the pan material or LED display. If the baby pan is detachable major stains like blood and stools can be cleared with a detergent and water. Further a sterile towel / paper can be placed on the pan before weighing the baby which should then be changed before weighing each baby.

Troubleshooting – Scales

Fault	Possible Cause	Solution
1. Zero point cannot be set	Scales are not level	Set scales on level ground and retest
	Zero control broken or internal part jammed	Send for repair
2. Movement is stiff or jerky	Dirt lodged inside	Remove any visible dirt or foreign body and retest
	Internal blockage	Send for repair
3. Reading is inaccurate	Zero not properly set Calibration error	Reset zero and retest Recalibrate or send for repair
4. Electronic display is blank	Battery / power failed Internal error	Replace battery or power supply and retest. Send for repair

User Maintenance Checklist – Scales

Daily		
Cleaning	√	Wipe off dust and replace dust cover after checks
	√	Clear away any dirt or hair on controls and feet
Visual checks	√	If bent, cracked or damaged, send for repair
Function checks	√	Check zero at start of day and before each patient
Weekly		
Cleaning	√	Clean exterior with damp cloth and dry off
	√	Clean off then repaint any exposed or rusted metal

Visual checks	√ Tighten any loose screws and check parts are fitted tightly
Function checks	√ Check reading is accurate using a known weight √ Send for repair if inaccurate or sticking √ Replace battery if display shows low battery
Every six months	
Biomedical Technician check required	

Key Messages: Weighing Scale

Remember to adjust the scale to zero before weighing the baby.

The pan must be cleaned before weighing each baby to prevent infection.

Check Your Progress 2

What steps must one take before weighing a baby on the weighing scale?

.....

.....

7.2.3 Pulse Oximeter

A pulse oximeter is a device used for the noninvasive monitoring of a patient's blood oxygen saturation. (Fig 7.3)

It also displays the pulse rate and produces a plethysmogram.

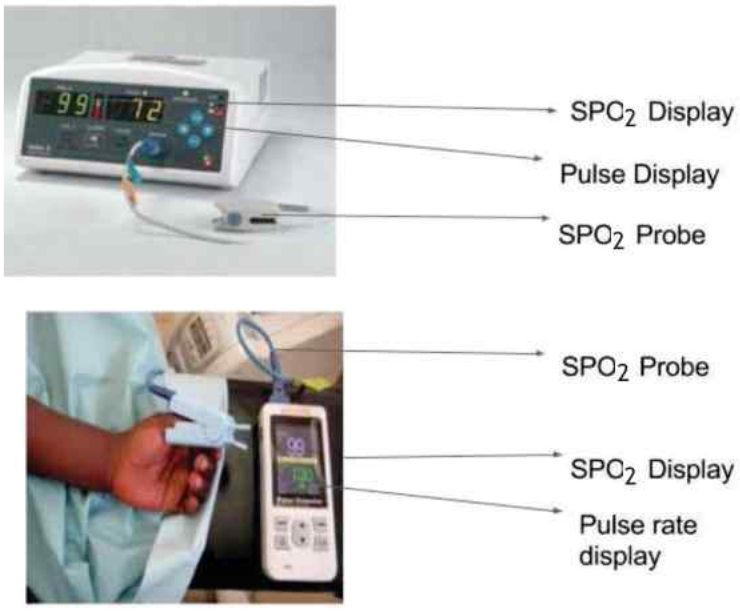


Fig. 7.3 : Hand held Pulse Oximeter

Uses

- To measure oxygen saturation in patients with respiratory or cardiac illnesses.

- To measure the oxygen saturation in newborns and infants suffering from respiratory distress, hypoxia, cardiac illness or sepsis.
- In newborn screening to detect the presence of critical congenital heart disease.
- During anaesthesia.
- During cardiopulmonary resuscitation.

Pitfalls and precautions

- Pulse oximeters are accurate mainly when the oxygen saturation is between 80 to 95%.
- Interference from other light sources can be avoided by covering the pulse oximeter probe with an opaque material.
- Movement by the newborn baby may lead to disrupted signal and artifacts.
- Avoid compromising blood flow to the limb to which the probe is attached e.g. by inflating a BP cuff to prevent a false low reading. Also, change the site of the probe every 2–3 hours.
- If probe does not fit properly, the light can be shunted from the LEDs directly to photo-detector affecting the accuracy of the measurement.
- Pulse oximeter is not reliable (in such conditions an ear probe may be more reliable than a finger probe.)
- Currently available pulse-oximeters are unable to distinguish different types of haemoglobins. Hence, in the presence of COHb (carboxyhaemoglobin) and MethHb (methemoglobin), the saturation readings may be falsely and significantly elevated, thus masking the presence of hypoxemia.
- Always remember that pulse-oximetry reflects only the state of oxygenation. It has no value in estimation of adequacy of ventilation.
- Accuracy of pulse–oximetry is about ± 4 to 5% at or above 80% saturation. Accuracy declines below a saturation of 80%(CO_2 Removal)

The oxygen saturation monitor is reliable, practical, and accurate for use in infants with a wide range of birth weights, postnatal ages and heart rates.

The probe can be positioned on the fingers or toes of a patient or on the hand, foot, or wrist of the neonate. Newer probes allow for forehead placement.

Cleanse the probe with alcohol and let it dry before using on another patient.

Procedure

- Assemble all necessary equipment.
- If saturation monitor probe is reusable, cleanse probe with alcohol, let it dry.
- Turn monitor on.
- Apply probe to a site that is well perfused.
- Ensure both sides of probe are directly opposite each other.
- Secure probe in place. Avoid oedematous, bruised sites and applying excessive pressure.

- Set high and low alarm limits for saturation and heart rate (2% above and below desired limits).
- Set pulse and alarm volumes.
- Check for correlation of depicted heart rate on monitor and the actual heart rate by auscultation.
- Record heart rate, respiratory rate, colour, oxygen saturation and FiO_2 hourly.
- Observe and change site atleast once per shift. (6–8 hrs)

Troubleshooting – Pulse Oximeters

Fault	Possible Cause	Solution
1. Equipment is not running	No power from mains socket	Check power switch is on. Replace fuse with correct voltage and current if blown. Check mains power is present at socket using equipment known to be working. Contact electrician for rewiring if power not present.
	Battery (if present) is discharged	Recharge or replace battery
	Electrical cable fault	Try cable on another piece of equipment. Contact electrician for repair if required.
2. SpO_2 or pulse rate not displayed or unstable	Probe is not mounted correctly	Connect probe and cable properly
	Probe not able to read through dirt, nail polish, etc.	Remove grease, dirt, nail polish and clean probe
	Patient movement	Request patient to remain still
	Patient's SpO_2 value is too low to be measurd	Further clinical examination of patient. Resite probe if necessary.
	Internal malfunction	Call biomedical technician
3. "Probe off" displayed on screen	Probe is not connected properly	Connect the sensor
	The connection between the probe and oximeter is loose	Refer to biomedical technician for repair
4. "Error" displayed on screen	Faulty probe or control circuit	Refer to biomedical technician
5. Continuous alarm sounds	Alarm limits set too low or high Power disconnected Internal malfunction	Set appropriate alarm limits Connect power cable Refer to biomedical technician
6. Electrical shocks	Wiring fault	Refer to biomedical technician immediately

User Maintenance Checklist – Pulse Oximeters

	Daily
Cleaning	√ Remove any dust / dirt and replace equipment cover √ Remove any tape, paper or foreign body from equipment √ Clean probe with alcohol wipe after each use
Visual checks	√ Check all parts are present and connected √ Check cables are not twisted and remove from service if any damage is visible
Function checks	√ Check operation on healthy subject before use
	Weekly
Cleaning	√ Unplug, clean outside with damp cloth and dry off
Visual checks	√ Tighten any loose screws and check parts are fitted tightly √ If plug, cable or socket are damaged, replace
Function checks	√ Check operation of all lights, indicators and visual displays √ Check probe disconnection alarm.
Every six months	
Biomedical Technician check required	

Key messages: Pulse oxmeter

A pulse oximeter is a device used for noninvasive monitoring of patient's blood oxygen saturation. It is useful in patients suffering from respiratory or cardiac illnesses, monitoring during anaesthesia and during cardiopulmonary resuscitation key Messages.

Check Your Progress 3

What factors can give an erroneous reading with the pulse oximeter?

.....

.....

7.2.4 Phototherapy Unit

Phototherapy is the use of visible light to treat severe jaundice in the newborn. It reduces the serum concentration of bilirubin and the risk of bilirubin toxicity. This has dramatically reduced the need for exchange transfusion. Unconjugated bilirubin in the skin gets converted to water soluble photo products on exposure to light of a particular wavelength (425–475 nm). These products are water soluble, nontoxic and excreted through the intestine and in the urine. Phototherapy involves

exposure of the skin of the jaundiced baby to blue or cool white light of wavelength 400–520 nm. Detoxification begins immediately by the production of configurational and structural photo-isomers of bilirubin in the skin and precedes the fall in serum bilirubin. Special lamps emitting light predominantly in these wavelengths are considered to be the most effective and specific for administering phototherapy. Light is effective in the treatment of hyperbilirubinemia mainly because of its blue content. (Fig 7.4)

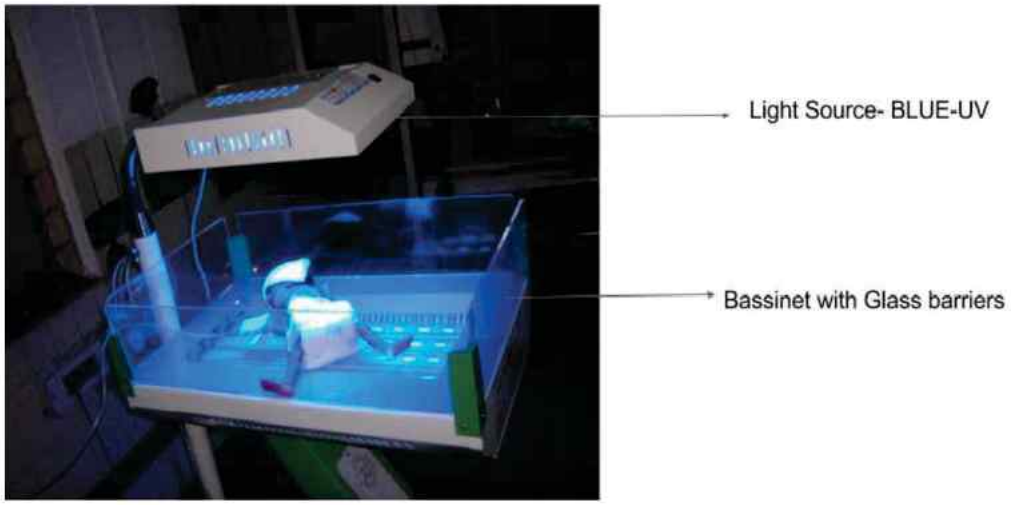


Fig. 7.4 : Phototherapy unit

Indications for phototherapy:

Phototherapy should be initiated whenever it seems that bilirubin may reach levels that can cause bilirubin induced brain damage. That generally means there is staining of the trunk of the baby and sole/palm staining with bilirubin begins to appear.

- For term healthy babies phototherapy may be required if –
  - Jaundice appears before 24 hrs. of age.
  - Jaundice is present on the arms and legs on day 2.
  - Staining of palms and soles is present.
  - Depth of jaundice is more.
- For VLBW babies phototherapy is initiated at a level equal to 1% of the body weight.
- In case of haemolysis, asphyxia, hypoglycemia or sepsis, consider early phototherapy.

Procedure for giving phototherapy:

- Undress the baby completely except for a small nappy.
- Cover the eyes to prevent damage by the bright lights.
- Keep the baby at a distance of 45 cm from the light source.
- Provide frequent breastfeeding. During breastfeeding switch off the phototherapy unit.
- Turn the baby after each feed to expose maximum surface area of the baby to light.

- Monitor temperature every 2 to 4 hourly or more frequently if temperature variation is noted.
- Record weight daily.
- Ensure that the baby passes adequate urine (6–8 times per day).
- Monitor bilirubin levels atleast once a day.
- Discontinue phototherapy when bilirubin returns to a safe level and watch for rebound increase after stopping phototherapy.

Precautions

- Do not give phototherapy without trying to find out the cause of jaundice.
- Always cover eyes well before starting phototherapy
- Phototherapy may lead to dehydration or hypothermia/hyperthermia.
- Blue light may interfere with monitoring of cyanosis.
- The efficiency of the phototherapy unit should be checked periodically with the help of a flux meter.

Troubleshooting –Phototherapy

Fault	Possible Cause	Solution
1. Photo therapy unit is not running	No power from mains socket	Check power switch is on. Replace fuse with correct voltage and current if blown.Check mains power is present at socket using equipment known to be working. Contact electrician for re-wiring if power not present.
	Electrical cable fault Tubes /CFL not working	Try cable on another piece of equipment. Contact electrician for repair if required.Check Tubes and chokes OR Check the CFL and replace the parts.
2. Fuse keeps blowing	Power supply or cable fault	Refer to electrician
3. Alarms not working	Alarm battery dead	Replace the battery and recheck. Send for repair if problem remains.
4. Intensity of light not properly controlled	Tubes/CFL has expired its life	Check Tubes and chokes OR Check the CFL and replace the parts. Check the life of operation and replace if it has served its life.
5. Electrical shocks	Wiring fault	Refer to electrician immediately

User Maintenance Checklist–Phototherapy Unit

Daily	
Cleaning	√ Wipe dust off exterior and cover equipment after checks √ Remove any tape, paper or foreign body from equipment
Visual checks	√ Check all fittings and accessories are mounted correctly
Function checks	√ Check all the functions while starting the unit. Check intensity readings while Tubes/CFL ON and OFF and cross check with a Lux meter.
Weekly	
Cleaning	√ Unplug, clean outside with damp cloth and disinfecting solution as per procedures and dry off √ Remove any dirt from wheels √ Wash (or replace) the air filters, dry thoroughly for reuse
Visual checks	√ Check mains plug screws are tight √ Check mains cable has no bare wire and is not damaged √ Check doors, cable and tray. Repair if damaged
Function checks	√ Check all controls operate correctly √ Check the readings of intensity sensors change when CFL/Tubes are in ON/OFF conditions and verify with the Lux meters/ irradiance meters. √ Check any batteries are working properly.
Every six months	
Biomedical Technician check required	

Key Messages : Phototherapy unit

Phototherapy uses visible light to convert unconjugated bilirubin in the skin to water soluble photoproducts which can be excreted through the intestine and urine. While giving phototherapy, eyes should be covered to prevent damage. Extra feeds should be given to the baby receiving phototherapy to prevent dehydration.Temperature of a baby receiving phototherapy should be monitored frequently to prevent hypo-or hyperthermia.

Check Your Progress 4

i) How will you start phototherapy in a newborn.

.....

.....

ii) What precautions will you take while giving phototherapy to a newborn?

.....

.....

7.2.5 Suction Device

Suctioning is used to remove secretions from the oral and nasopharyngeal area of a patient using a catheter to ensure patency. It is often used to prevent aspiration of oral or gastric secretions.

After each use the tubing of the device has to be cleared of the thick secretions before they dry and clog the pipe. Hence suck in clean water from a bowl to clear the entire tubing, so that the device is ready for use.

DeLee's suction trap and Suction bulb

DeLee's trap (Fig. 7.6) is a small portable plastic suctioning device.

- It consists of two tubes arising from a small plastic jar.
- The operator applies negative suction with his mouth to the tube with the mouthpiece. The other tube is inserted into the mouth of a baby.
- The mucous goes into the trap and not into the mouth of the operator.

Bulb syringe

It consists of a rubber bulb attached to a plastic tube. When the bulb is compressed air is expelled out and on releasing vacuum is created which pulls secretions into the bulb. It can be used for aspirating oral or nasal secretions in babies.

Suctioning a baby's nose with a suction bulb. (Fig 7.5)



Fig. 7.5 : Suctioning a baby's nose

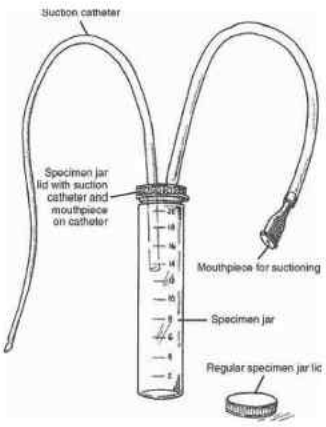


Fig. 7.6 : Delee's Suction Trap

Other suction devices include following:

Electrically operated suction machine: (Fig 7.7(a))

It consists of a motor, vacuum gauge with a precision regulator, jars.

There should be a tight seal of the vacuum jar but it should be easy to open whenever the jar has to be emptied. The jar should be easy to clean and sterilise. There should be a regulator to adjust for the amount of suction required. If a lot of suctioned material is expected as in surgery or caesarean section, a two jar suction machine may be used.

Foot suction: (Fig 7.7(b))

It is useful even in the absence of electricity. When the bellows are compressed, air is forced through the air outlet valve in the upper part of the bellows. As the bellows re-expand, a vacuum is created and air is drawn through the tube connection out of the beaker. This vacuum transfers the secretions from the patient to the beaker.

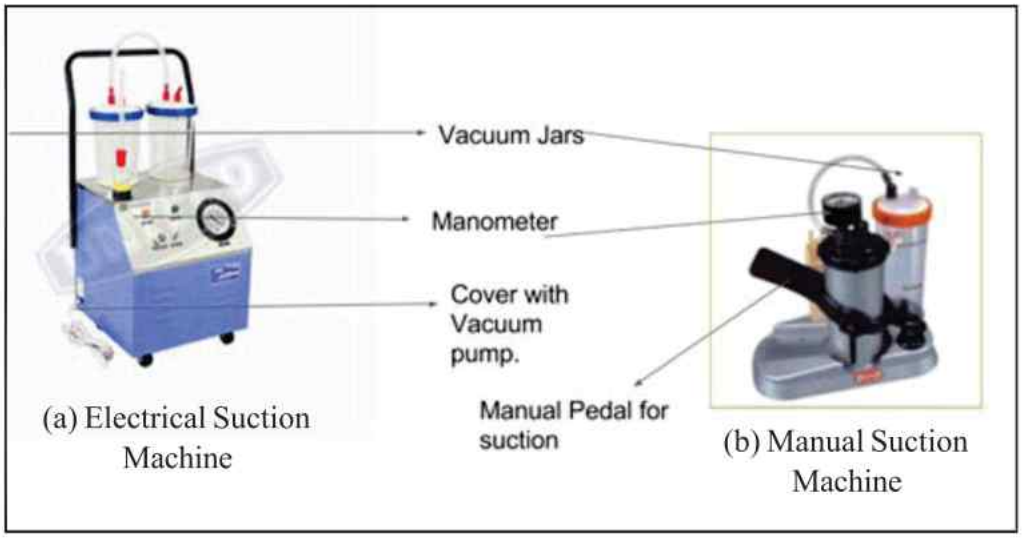


Fig. 7.7: Suction Machine

Check Your Progress 5

Name some devices which can be used for suction when electricity supply is erratic.

.....

.....

7.2.6 Self Inflating Bag

It is also known as Ambu bag. (Fig. 7.8 a-b) As the name implies, it inflates automatically without a compressed gas source. Since it is not dependent on a compressed source for inflation, it is always ready to use and is portable. It has four parts as given below:

1) **Air inlet:** As the bag re-expands following compression, air is drawn through a one-way valve located at one end of the bag. This is the air inlet.

2) **Oxygen inlet:** It is located next to the air inlet where oxygen tubing can be attached if the patient is to be resuscitated with oxygen enriched air.

3) **Patient outlet:** This is where air/oxygen exits from the bag to the patient through a mask or an endotracheal tube.

4) An oxygen reservoir is an appliance that can be placed over the bag's air inlet. It helps in delivering a high concentration of oxygen to the baby and allows oxygen to be administered in a concentration as high as 90% to 100%.

5) **Valve assembly:** This is positioned between the bag and the patient outlet. It opens when the bag is squeezed during ventilation, releasing air/oxygen to the lungs of the patient. When the bag re-inflates, the valve is closed, preventing the patient's exhaled air from entering the bag and being rebreathed.

A resuscitation bag used in neonatal resuscitation has a safety mechanism in the form of a pressure release valve to guard against inadvertent transmission of excess pressure to the baby's lungs. Pressure release valves on self-inflating bags are generally set to release at 30 to 40 cm H_2O. If pressures greater than 30 to 40 cm H_2O are generated as the bag is compressed, the valve opens, limiting the pressure being transmitted to the lungs of infant. The ideal size of the bag for neonates is 240 to 500 ml capacity.



Fig. 7.8 (a): Self inflating bag (External view)

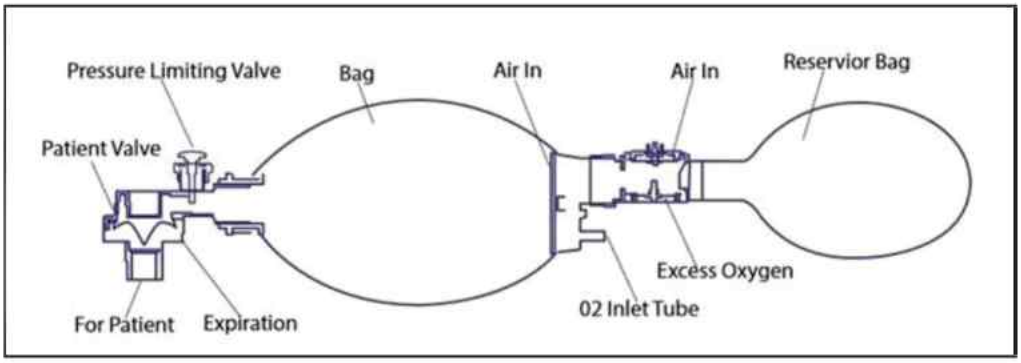


Fig. 7.8 (b): Self Inflating Bag (Internal view)

Using the bag:

- The self-inflating bag comes in different sizes– neonatal, infant, paediatric and adult. It is necessary to use an appropriate sized bag in a particular patient.
- When the self inflating bag is connected to 100% oxygen through the oxygen

inlet without an oxygen reservoir the oxygen concentration delivered to the patient is 40–70%.

- By attaching an oxygen reservoir one can deliver 90–100% oxygen to the patient.

Any resuscitation bag should have atleast one of the following two safety features:

1) A pressure release or pop-off or safety valve- In a neonatal bag this is set to release at 30–40 cm of water thereby preventing excess pressure from being transmitted to the neonate.
2) The second safety feature is a pressure gauge or manometer which measures the peak inspiratory pressure delivered.

Precautions

- The bag cannot be used for providing free flow of oxygen.
- Prolonged ventilation with 100% oxygen may lead to oxygen toxicity.
- Excessive pressure may lead to pneumothorax.
- Resuscitation masks are available in different sizes. For the mask to be the correct size, the rim must cover the tip of the chin, the mouth and the nose but not the eyes. Too large a mask will lead to ineffective seal and ventilation. Too small a mask will not cover the mouth and nose.

Decontamination

Thorough decontamination is necessary after each use. All parts should be washed with detergent and warm water and should be dried before reassembling. Chemical disinfection can be done by soaking in 2% glutaraldehyde solution for 20 minutes. All parts should be dried before reassembling.

7.2.7 The Flow Inflating Bag

The flow inflating bag is also called anaesthesia bag. It fills only when the source of compressed gas (oxygen, air, or a mix of two) is connected. They usually do not have a fixed safety pop off valve and may be used with/without an attached manometer. PEEP can be provided by adjusting the flow of gas out of the bag through the flow control valve. Large leaks at the face mask, or too low a flow, will result in collapse of the bag and inability to deliver any positive pressure breath. (Fig. 7.9)



Fig. 7.9: Flow inflating bag

7.2.8 T Piece Resuscitator

T piece resuscitator is a flow controlled pressure limited ventilator device (Fig. 7.10). Piped compressed gas is delivered at one port of T piece. A preset peak inspiratory pressure (PIP), positive end expiratory pressure (PEEP) and maximum circuit pressure is set. With a T piece device, gas flows into a face mask or endotracheal tube through a patient supply line. Inflation is achieved by interrupting the escape of gas through an outlet hole on the T piece using a thumb so that the pressure rises and is displayed by a manometer. Adjusting the PEEP valve varies positive end expiratory pressure. The newborn is ventilated by placing a finer over the outlet aperture (hole in the PEEP valve) and removing it periodically at about 40–60 times a minute.



Fig. : 7.10 T Piece Resuscitator

7.2.9 Resuscitation Masks

Masks come in a variety of shapes, sizes and materials. Resuscitation masks should have cushioned rim for better seal. The rim conforms more easily to the shape of the infant's face, making it easier to form a seal. It requires less pressure on the infant's face to obtain a seal. There is less chance of damaging the infant's eyes if the mask is correctly positioned. Masks come in several sizes (Fig. 7.11). Masks suitable for small, premature infants as well as for term infants should be available for use. For the mask to be of correct size, the rim will cover tip of the chin, the mouth and the nose but not the eyes.



Fig. 7.11: Resuscitation masks

Troubleshooting – Suction machines

Fault	Possible Cause	Solution
1. Machine is not running	No power from mains socket	Check power switch is on. Check mains power is present at socket using equipment known to be working. Contact electrician for rewiring if power not present.
	Fuse blown	Check for leaks or wire causing fuse to blow and correct this. Replace fuse with correct voltage and current rating. Test operation.
	Electrical cable fault	
	Internal wiring or switch fault	Try cable on another piece of equipment. Contact electrician for repair if required. Refer to electrician
2. Poor fluid flow, pressure gauge low	Tube /seal / bottle leaking or disconnected	Close different tubes by bending. When pressure gauge changes, leakage point has been passed. Replaced damaged tube or seal.
	Air outlet valve blocked	
	Control valve stuck	Clean outlet valve
	Internal or control error	Operate control valve through full range. Send for repair if stuck
		Refer to technician
3. Poor fluid flow, pressure gauge high	Blocked filter or tube	Disconnect each tube one at a time. When air flow is stopped, blockage has been passed. Replace filter or unblock tube.
4. Filter discoloured	Floating valve broken	Change filter, clean or replace floating valve
5. Electrical shocks	Wiring fault	Refer to electrician
6. Manual suction is jammed	Internal slider stuck	Refer to technician for greasing

User Maintenance Checklist – Suction Machines

		Daily
Cleaning	√	Wipe dust off exterior and cover equipment after checks
	√	Wash bottle and patient tubing with sterilising solution

Visual checks	√ Check all fittings and accessories are mounted correctly
	√ Check filter is clean
Function checks	√ If in use that day, run a brief function check before clinic
	Weekly
Cleaning	√ Unplug, clean outside with damp cloth and dry off
	√ Wipe round bottle seal with damp cloth, replace if cracked
	√ Remove dirt from wheels / moving parts
Visual checks	√ Check parts are fitted tightly and replace any cracked tubes
	√ Check mains plug screws are tight
	√ Check mains cable has no bare wire and is not damaged
Function checks	√ Check all switches and vacuum control operate correctly
	Every six months
	Biomedical Technician check required

Key Messages- Self-inflating bag

Always use the correct size bag and mask for ventilating any patient.

A tight seal should be provided with the mask while ventilating to increase the effectiveness of ventilation.

Check Your Progress 6

How does one determine if the mask being used with an ambu bag is the correct size for a patient?

.....

.....

7.3 OTHER EQUIPMENTS

There may be a few other equipments in a health facility which are not commonly used for newborn baby but are used for newborn child/ adult patients These are given below.

- Sphygmomanometer
- Oxygen Cylinder

Let us begin with Sphygmomanometer/Blood Pressure Apparatus.

7.3.1 Sphygmomanometer

A sphygmomanometer is a device used to measure blood pressure. It consists of an inflatable cuff to collapse and then release the artery under the cuff in a

controlled manner, and a mercury or mechanical manometer to measure the pressure and a mechanism for inflation which may be a manually operated bulb and valve or a pump operated electrically. (Fig 7.12)

Types of sphygmomanometers



Fig. 7.12: Types of Sphygmomanometers

> **Remember:**
>
> Mercury Sphygmomanometer is no more used now.

Mercury sphygmomanometers and Aneroid sphygmomanometers require a stethoscope for auscultation.

Digital sphygmomanometers

They use oscillometric measurements and electronic calculations rather than auscultation. They are electronic and easy to operate without training.

Procedure

- The patient should be relaxed and sitting upright with the arm positioned at the level of the heart and feet flat on the floor.
- Choose the proper BP cuff size. The bladder length should be more than 80% of the arm circumference and the width should be atleast 40% of the arm circumference. If the cuff is too large the measured BP value is lower than the actual value whereas if the cuff is small one will record erroneous high values.
- Place the BP cuff on the patient's arm. For correct placement the midline of the cuff bladder should be placed over the arterial pulsation in the patient's arm after palpating the brachial artery. There should be a 2–3 cm space for the stethoscope between the lower end of the cuff and the antecubital fossa.
- Inflate the cuff to a point 30 mmHg above the point at which the radial pulse disappears.
- Slowly deflate the cuff while auscultating over the antecubital fossa.
- The first occurrence of rhythmic sounds heard as blood begins to flow through the artery is the patient's systolic BP.

- Continue to listen as the BP cuff pressure falls and the sounds fade. The reading where the rhythmic sounds stop corresponds to the diastolic pressure.
- For accuracy record two readings and take their average.

Troubleshooting – Sphygmomanometers (B.P. sets)

Fault	Possible Cause	Solution
1. Mercury leakage OR Mercury not at zero level	Mercury leakage or overfilling	Refer to technician for correction
2. Mercury is dirty	Oxidation of mercury	Refer to technician for cleaning
3. Pressure does not increase easily OR Pressure increases after inflation	Valve or tube blockage	Remove and clean all valves and tubes. Reassemble and test
4. Aneroid instrument does not return to zero	Zero setting has moved	Rotate collar on base until zero setting achieved and tighten. If still malfunctioning, refer to technician
5. Pressure does not remain steady	Leakage of air	Isolate leak by closing off parts of tubing. Replace leaking section and retest

User Maintenance Checklist – Sphygmomanometers (B.P. sets)

Daily		
Cleaning	√	Check equipment is safely packed
	√	If mercury is spilled, seal unit and send to technician
Visual checks	√	Ensure all parts are present and are tightly fitted
	√	Check display is zero when cuff deflated
Function checks	√	Before use, check pressure rises and returns to zero
Weekly		
Cleaning	√	Remove all dust and dirt with damp cloth or by hand
Visual checks	√	Remove or replace any cracked rubber parts
Function checks	√	Check correct operation of inflation bulb and valves
	√	Remove any batteries if not in use for more than one month
	√	Inflate to 200 mmHg and check leakage is not faster than 2 mmHg in 10 seconds

Every six months
√ Biomedical Technician check required
√ Check calibration of aneroid devices against mercury device

Check Your Progress 7

i). How should one determine the correct size of the BP cuff for a patient?

.....

.....

ii) How can the BP cuff size affect the reading while recording blood pressure?

.....

.....

7.3.2 Oxygen Cylinder

Oxygen is used as a medical treatment in several acute and chronic conditions both in and out of the hospital. It is commonly used in patients with hypoxia such as those with pneumonia, COPD, or heart failure. It is also indicated in emergency medicine for use in resuscitation, major trauma, convulsions, sepsis and shock.





Fig. 7.13: Oxygen Cylinder

Oxygen for hospital use is available as compressed oxygen stored in gas cylinders. The cylinder size can be small, medium or large. Small and medium sized cylinders are easily portable. (Fig. 7.13)

Use

Before using an oxygen cylinder a pressure gauge with a flowmeter is attached to the cylinder. The knob of the cylinder is opened with the help of a wrench. The pressure in the pressure gauge is checked to determine the amount of oxygen remaining in the cylinder. A tube is connected to the oxygen outlet the other end of which is connected to a facemask or nasal prongs which can be applied to the patient.

Precautions

- A humidifier containing fresh distilled water should be used to humidify the oxygen.
- A patient on oxygen therapy should be monitored with a pulse oximeter to prevent hypoxia or hyperoxia.
- The oxygen cylinder should be kept away from heat and open flames as oxygen can cause fire easily.
- When not in use oxygen cylinders should be stored in an open well ventilated space, after switching of the gas from the pressure reducing valve.
- Be sure to keep the wrench tied to the cylinder trolley, so that it is available immediately when required.
- Make sure to watch for correct COLOUR CODE of the cylinder. Oxygen cylinders are black in colour with white top and sometimes small cylinders are entirely black in colour, Care should be taken to ensure right colour coding while connecting the cylinder.

Troubleshooting – Oxygen Cylinders and Flowmeters

Fault	Possible Cause	Solution
1. No oxygen is flowing	Empty cylinder	Replace cylinder
	Flow meter knob or cylinder valve is closed.Faulty regulator	Open valves, then check flow meter registers flow Close all valves and replace regulator
2. Leakage from cylinder or flowmeter	Cylinder is not connected to pressure regulator properly	Tighten all fittings
	Faulty or missing washer between regulator and cylinder	Replace washer
	Flowmeter seal damaged or loose	Tighten flowmeter
	Cylinder faulty	Label 'Faulty' and return to manufacturer

Fault	Possible Cause	Solution
3. Leakage cannot be located	Leakage too small to be heard	Apply detergent solution (NOT oily soap) to joints. Bubbles will show at leak point. Clean/replace washer and tighten at that joint.
4. Flowmeter ball not moving, yet oxygen is flowing	Faulty flow meter	Close all valves, disconnect flowmeter and clean inside. Reconnect and test. If problem persists, replace flowmeter
5. Pressure gauge does not show pressure, yet oxygen is flowing	Faulty pressure gauge	Refer to biomedical technician for replacement

User Maintenance Checklist – Oxygen Cylinders and Flowmeters

		Daily
Cleaning	√	Ensure delivery tubes and masks are sterile
	√	If humidifier bottle is used, refill with clean water
Visual checks	√	Check cylinder is correct type and marked oxygen
	√	Check all parts are fitted tightly and correctly
Function checks	√	Before use, ensure cylinder is filled and flow is present
	√	Close cylinder valve after each use.
		Weekly
Cleaning	√	Clean cylinder, valve and flowmeter with damp cloth
Visual checks	√	Check for leakage: hissing sound or reduction in pressure
Function checks	√	Remove valve dust with brief, fast oxygen flow
	√	Check flow can be varied using flow control
		Every six months
		Biomedical Technician check required

Record the work

It is normally helpful to have some way of recording when user care has been done. This will tell colleagues or the next shift that the daily check has been carried out, or remind the user themselves that the weekly job has been done. It can also be helpful to show supervisors and patients that care is being taken of equipment. An example record sheet is shown below, which can be copied for use with each piece of equipment.

User care task record sheet – sign and date when user care done Equipment:..... Location:.....					
DAILY TASK					
Date	Sign	Date	Sign	Date	Sign
WEEKLY TASKS					
Date					
Sign					

Check Your Progress 8

i) How should oxygen cylinder be stored when in use and when not in use?

.....

.....

ii) How is the humidifier filled in an oxygen cylinder?

.....

.....

7.4 LET US SUM UP

While working in a newborn care unit, it is important for you to know the types of equipments used, their functions and techniques of using, disinfection and maintenance. In this practical unit you have learnt about use of various equipments such as radiant warmer, weighing scale, pulse oximeter, phototheraphy unit, Sphygmomanometers, Self Inflating Bag: Manual Resuscitator and oxygen cylinder. You need to practice using these equipments in order to be able to use the equipments effectively and efficiently.

7.5 MODEL ANSWERS

Check Your Progress 1

i) Servo mode.

ii) The probe should be cleaned with spirit before application. It should be applied over the right hypochondrium or the epigastric region with adhesive tape. It should not be applied over bruised skin.

Check Your Progress 2

- Movement artifact
- Ambient lights
- Cold extremities

Check Your Progress 3

- Clean the pan with spirit.
- Place a sterile towel or paper on the pan.
- Adjust the digital to zero by adjusting the knob.
- Place the baby in the middle of the pan.
- Note the reading.

Check Your Progress 4

i) 1) Undress the baby completely except for a small nappy.
   2) Cover the eyes to prevent damage.
   3) Keep the baby at a distance of 45 cm from the light source.

ii) Turn the baby after each feed to expose the maximum surface area of the baby to light.

Provide frequent feeds to prevent dehydration

Monitor temperature 2 to 4 hourly to prevent hypo- or hyperthermia.

Check Your Progress 5

A. 1) Foot suction
   2) DeLee's trap
   3) Bulb syringe

Check Your progress 6

The bladder length should be more than 80% of the arm circumference and the width should be at least 40% of the arm circumference.

Check Your progress 7

i) Choose the proper BP cuff size. The bladder length should be more than 80% of the arm circumference and the width should be at least 40% of the arm circumference. If the cuff is too large the measured BP value is lower than the actual value whereas if the cuff is small one will record erroneous high values.

ii) If the cuff is too large the measured BP value is lower than the actual value whereas if the cuff is too small the measured value will be erroneously high.

Check Your Progress 8

i) When in use the oxygen cylinder should be kept away from heat and electrical appliances as oxygen can cause fire easily. When not in use oxygen cylinders should be stored in an open well ventilated place.

ii) The humidifier should be filled up to the given mark with fresh distilled water.

7.6 ACTIVITY

During your posting in Newborn Unit in District Hospital

a) Observe the functioning of all the equipments use in care of Newborn.

b) Identify the parts of each equipment.

c) Use the equipment while providing care.

d) Record in your log book.

7.7 REFERENCES

1) Gluck, Louis (7 October 1985). Conceptualization and initiation of a neonatal intensive care nursery in 1960 (PDF). Neonatal intensive care: a history of excellence. Maryland: National Institutes of Health.

2) Lissauer T, Fanaroff A.UK: al. Neonatology at a Glance K: Blackwell publishing Ltd, 2006. Chapter 26.

3) "Neonatology on the Web: Cadogan - An Essay upon Nursing - 1749" neonatology

4) Deorari AK and Paul VK. Neonatal Equipment : Everything you would like to know. 4th Edition, New Delhi: Sagar Publications, 2010.

UNIT 8 NATIONAL CHILD HEALTH PROGRAMMES

Structure

8.0 Introduction

8.1 Roles and responsibilities of Community Health Officer (CHO) in Newborn, Child Health and Nutrition Interventions

8.0 INTRODUCTION

Based on the identified causes of mortality, four major strategic areas have been identified to improve child health outcomes. These are:

1. Newborn health interventions	2. Nutrition related interventions	3. Community & Facility based Interventions for sick child	4. Interventions to address birth defects, disabilities, delays and deficiencies

Following initiatives are being implemented under National Health Mission to deliver key interventions to improve the newborn and child health in your area:

Key newborn and child intervention	Schemes/Programmes under NHM	Role of CHOs
Financial incentives / entitle - ments for free transport and treatment of newborns and infants (up to 1 year of age) in health facilities	Janani Suraksha Yojana (JSY) (https://nhm.gov.in/WriteReadData/l892s/97827133331523438951.pdf) and Janani Shishu Suraksha Karyakaram (JSSK) (https://nhm.gov.in/images/pdf/programmes/jssk/guidelines/guidelines_for_jssk.pdf)	Ensure that all babies up to one year of age get free treatment, drugs, blood, diagnosis and referral transport
Care at birth, including resusci- tation, at delivery points	Janani Suraksha Yojana (JSY) (https://nhm.gov.in/WriteReadData/l892s/97827133331523438951.pdf) and Janani Shishu Suraksha Karyakaram (JSSK) (https://nhm.gov.in/images/pdf/programmes/jssk/guidelines/guidelines_for_jssk.pdf)	Ensure that all babies up to one year of age get free treatment, drugs, blood, diagnosis and referral transport
Facility based newborn care	Special Newborn Care Unit (SNCU), Newborn Stabilization Unit (NBSU) *(https://nhm.gov.in/images/pdf/programmes/child-health/ guidelines/fbnc_operational_guide.zip)*	CHO needs to ensure that all sick newborns are referred at appropriate level (should be aware of nearest functional NBSU/SNCU) All babies admitted in SNCU and NBSU are High Risk Babies / LBW/Pre Term therefore, after dis- charge of babies from SNCU, NBSU CHO should visit them at least once in the first week along with the local ASHA

Home based care by community health workers	Home Based Newborn Care (HBNC) *(https://nhm.gov.in/images/pdf/programmes/child-health/guidelines/Revised_Home_Based_New_Born_Care_Operational_Guidelines_2014.pdf)*	HBNC-Under HBNC Programme CHO should ensure the following: Full coverage- All babies born in the area should be followed by ASHA All babies identified with Danger Signs should be referred at appropriate level NBSU/SNCU CHO should visit the baby once with local ASHAs for monitoring
HBYC	Home Based Care For Young Child (HBYC) (https://www.nhm.gov.in /images/pdf/programmes/RBSK/Operational_Guidelines/HBYC_ Guidelines.pdf)	Full coverage All babies born in the area should be followed by ASHA All babies identified with Danger Signs should be referred at appropriate level including MTCs All babies after 6 months of age should be started IFA supplementation Growth Monitoring of all babies should be ensured in Mamta Card CHO should visit the baby once with local ASHAs for monitoring
Screening and management of 4 Ds – developmental delays, defects, disease and deficiency disorders	Rashtriya Bal Swasthya Karyakram (RBSK) *(https://nhm.gov.in /images/pdf/programmes/child-health/guidelines/Rastri- ya-Bal-Swasthya-Karyakram(RBSK).pdf)* and resource document *(https://nhm.gov.in/index1.php?lang=1&level=5&sublink- id=1197&lid=371)*	All newborns should be screened for birth defects and appropriately referred Babies identified with Deficiencies, Diseases and Developmental delays should be referred through RBSK Teams
Screening and management of 4 Ds – developmental delays, defects, disease and deficiency disordersFacility based management of Severe Acute Malnutrition	Nutrition Rehabilitation Centres (NRCs)/ Malnutrition Treatment Centres (MTCs) *(https://www.nhm.gov.in/images/pdf/programmes/child-health/guidelines/operational_guidelines_on_fbmc_with_sam.pdf)*	All malnourished babies identified during ASHA visits under HBYC or directly coming to the Sub Centre should be referred for MTCs

Mother's Absolute Affection (MAA) programme	Mother's Absolute Affection (MAA) programme for promotion of breastfeeding and Infant and Young Child Feeding (IYCF) practices resources *(https://nhm.gov.in/index1.php?lang=1&level=4&sublink- id=1258&lid=330)*	Regular quarterly meetings of the MAA groups should be attended and facilitated
IYCF	Infant and Young Child Feeding (IYCF) *(https://nhm.gov.in/images/pdf/programmes/child-health/guidelines/Enhancing-optimal-IY-CF-practices.pdf)*	Ensure Exclusive Breast Feeding for babies upto 6 months of age also covered under HBNC/ HBYC Ensure comp-lementary feeding is initiated for all babies after 6 months also covered under HBYC Ensure coordination with WCD department and local AWCs
CLMC/LMU	Human Milk Banking- Comprehensive Lactation Management Centres (CLMC) and Lactation Management Unts (LMUs) *(https://nhm.gov.in/images/pdf/programmes/IYCF/National_Guide-lines_Lactation_Management_Centres.pdf)*	Identify mothers having lactational problems and refer them to nearest health facility or LMU/CLMCs
Micronutrient supplementation (Iron, Folic acid)	Anemia Mukt Bharat (AMB) *(https://anemiamuktbharat.info/re-sources/#operational-guideline)*	Ensure screening of anaemia for all children, adolescent, Pregnant and lactating women, Women of reproductive age group (20-49 yrs) Ensure monitoring of availability and consumption prophylactic IFA syrup/tablets as per age
Deworming	National Deworming Day (NDD) *(https://nhm.gov.in/images/pdf/programmes/child-health/guidelines/deworming_guidelines.zip)*	NDD is organized once a year in Rajasthan. CHO should ensure that all children get timely dose of Albendazole in AWCs and Schools
In-patient and Out-patient management of common childhood illnesses including pneumonia, diarrhea, malnutri- tion etc.	Integrated management of newborn and childhood illnesses in community (IMNCI) & Facility *(F-IMNCI) (https://nhm.gov.in/images/pdf/programmes/child-health/guidelines/operational_guidelines_for_fimnci.pdf),*	*I*MNCI is covered under the HBNC and HBYC programmes therefore, all sick children should be given primary treatment and referred to appropriate level

SAANS	Social Awareness & Action to Neutralize Pneumo- nia Successfully (SAANS) *(https://nhm.gov.in/New_Updates_2018/SAANS/Childhood_Pneumonia_Management_Guidelines.zip),*	Ensure awareness generation about symptom of pneumonia in children, orientation of ANM and ASHA about identification and appropriate referral of children with pneumonia providing pre referral dose of amoxicillin during the SAANS campaign, give primary treatment and referral.
Stop Diarrahoea Campaign	*Stop Diarrahoea Campaign Intensified Diarrhoea Control Fortnight (IDCF) (https://nhm.gov.in/New_Updates_2018/NHM_Components/RMNCHA/CH/Schemes/IDCF/IDCF_2019/IDCF_2019_Guideline.docx),* Strengthening Pe- diatric Care at District Hospital *(https://nhm.gov.in/images/pdf/programmes/child-health/guidelines/Strenghtening_Facility_Based_Paediatric_Care-Operational_Guidelines.pdf)*	Ensure pre positioning of ORS Packets and Zinc Tablets to all families having under 5 children, identify cases of severe dehydration and give proper treatment Promote use of ORS and Zinc in cases of diarrohea.
CDR	Child Death Audit *https://nhm.gov.in/index1.php?lang=1&level=1&sublinkid=1415&lid=768*	Ensure that all under five child deaths are reported. Linelisting of every child death in ASHAs area (irrespective of place of death) should be entered in PCTS. First Brief Investigation report (FBIR) of every child death of her area (irrespective of place of death) should be done by ANM and submit to block through MOIC.

This training manual will help you develop an overall understanding of important newborn and child health interventions being implemented as part of the various programmes to facilitate effective delivery of these initiatives. Various neonatal, infant and child health care services are delivered across different levels of care ranging from household and outreach sites in the community level (ASHAs and Multi-Purpose Workers), to primary care facilities (Sub-Health Centres and Primary Health Centres) and secondary level facilities [Community Health Centres (CHC), Sub-District Hospital (SDH) and District Hospital (DH)].

8.1 ROLES AND RESPONSIBILITIES OF COMMUNITY HEALTH OFFICER (CHO) IN NEWBORN, CHILD HEALTH AND NUTRITION INTERVENTIONS

A. Clinical Functions for Ambulatory care and management

a. Newborn Care Services

- At Ayushman Bharat-Health and Wellness Centre-Sub Health Centre (AB-HWC-SHC) delivery point: provide essential newborn care which includes establishment of respiration, delayed cord clamping, vitamin-K injection, immunization, immediate drying and skin-to-skin contact, prevention of hypothermia, early initiation of breastfeeding (within an hour), exclusive breastfeeding, prevention of infection, identification and recording of birth defect/congenital anomalies and appropriate referral, identification of danger signs and early and appropriate referral.
- Assess the newborn referred by ASHAs under HBNC for any danger signs/symptoms as per IMNCI protocol and perform pre-referral stabilisation and facilitate referral to nearest NBSU/SNCU. Maintain high-risk newborn list for NBSU/SNCU discharged babies and low birth weight babies in AB-HWC-SHC catchment area and facilitate their regular facility and community follow-up care.
- Counselling support to mothers/caregivers in the postnatal period during each contact at the health facility or during visit to community on danger signs in newborn, keeping the newborn warm, responsive feeding, exclusive breastfeeding, play and communication and importance of immunization.

b. Infant and Childhood Health Services

- Outpatient management of sick young infants and children for all illnesses as per IMNCI protocol including assessment, classification, and management.
- Ensure referral linkages to nearest appropriate health facility for appropriate management of sick young infants and children maintaining time to care.
- Ensure provision of follow-up care of children discharged from higher health facilities.
- Ensure completion of age-appropriate immunization of children. Reporting of Adverse Events Following Immunization (AEFI) and providing follow-up care to children with AEFI.
- Ensure age-appropriate Vitamin-A supplementation, de-worming and iron and folic acid (IFA) supplementation of children.
- Ensure Oral Rehydration Salts (ORS) and Zinc for 14 days for the treatment of diarrhoea in under- five children.
- Screening, early management, timely referral and follow-up care for nutritional disorders including childhood nutritional deficiencies, overweight and obesity related problems in children.
- Ensure use of and validate records of children in the Mother and Child Protection (MCP) card with focus on Nutritional Status and Growth Monitoring.
- Counselling support to mothers/caregivers at the health facility or during visit to community on promotion of IYCF practices, key hygiene practices, importance of immunization, age-appropriate play and communication activities. Facilitate teleconsultation services with Medical Officer (MO) at Ayushman Bharat-Health and Wellness Centre-Primary Health Centre (AB-HWC-PHC) to seek advice/clarifications on treatment, pre-referral stabilisation, referral advice, appropriate care during follow-up, etc.

- Confirm sick Severe Acute Malnutrition (SAM) status of under-five children and coordinate with NRC for early referral. In case, NRC beds are occupied, sick SAM child may be referred to the nearest paediatric facility of CHC/SDH/DH for management of sickness.

c. Managerial Functions for efficient functioning of AB-HWCs

- Ensure ASHA/Multi-Purpose Worker (MPW) maintain line list of all newborns (delivered at home and institution both), infants, children especially those vulnerable newborns – NBSU/SNCU/NRC discharged, children identified under RBSK, children with malnutrition, etc.
- ASHA/MPW may have the list of SAM children identified by Anganwadi Worker (AWW) by Weight- for-height/length chart/Common Application Software (CAS) during Village Health Sanitation and Nutrition Day (VHSND). List of SAM children may be kept at AB-HWC level for confirmation the status of sick SAM and coordinate with nearest health facility for timely referral and treatment.
- Monitor regular follow-ups of NRC discharged children and connecting them with Anganwadi Centre (AWC) for update of supplementary nutrition and regular growth monitoring services.
- Provide mentoring and supportive supervision to the primary health care team for effectively conducting community and outreach and facility-level activities. Provide regular feedback to the team.
- Supervise that records of newborn, infants and children, are maintained in reporting formats, integrated Reproductive and Child Health (RCH) register/RCH Portal, Health Management Information System (HMIS), and updated regularly.
- Support ASHA, ASHA Facilitators and MPW for maintaining functional items as per guidelines and proper use of HBNC kit and HBYC kit (wherever available) during each home visit. Ensure child health related medicines, consumables, reagents, and logistics are in adequate stock at the AB- HWC-SHC.
- Ensure quality of home visits in HBNC and HBYC by proper filling of MCP card, use of HBNC and HBYC kit for early detection of danger sign, growth and development. Monitor community follow up of SNCU discharged babies and low-birth weight (LBW) babies.
- Support and supervise ASHA/ASHA Facilitators and MPWs in mentoring role by undertaking joint home visits every month to at least 2-3 identified vulnerable newborns/children or resistant families for motivating families to adopt healthy behaviour, utilise services at AB-HWCs, access referral, ensuring treatment compliance, etc.
- Support MPWs in undertaking routine immunization sessions and provide supportive supervision to ensure immunization coverage as per due list.
- Conducting monthly meetings with MPW and ASHAs at the AB-HWC-SHC for assessing progress on child health outcomes, identifying and addressing gaps, discussing common issues and planning for necessary actions and capacity building.
- Ensure that monthly HBNC and HBYC reports are collated and submitted for onward transmission.
- Submission of monthly performance report of AB-HWC-SHC to Medical Officer for disbursement of performance linked payments to AB-HWC-SHC team.
- Facilitate participation of all stakeholders during VHSND sessions and monitoring of atleast two sessions/month using the VHSND monitoring checklist to record/observe quality of services and availability of medicines and diagnostics.
- CHO may monitor that appropriate nutrition counselling is being provided during VHSND and other contact points.
- Participate in the community/village level meetings of Village Health, Sanitation and Nutrition Committee (VHSNC) and discuss about new health services available at AB-HWC-SHC and current health programmes with the community.

d. Public Health Functions for Health Promotion, Prevention and Disease Surveillance

- Surveillance for unusually high incidence of cases of childhood diarrhoea, dysentery, fever, jaundice, diphtheria, whooping cough, tetanus, polio, and other diseases with immediate notification to MO and other authorities.
- Facilitate multi-sectoral convergence for community level action on health promotion and prevention with support of ASHA, MPW, AWW, VHSNC, Panchayat/tribal groups and VHSND sessions. Organise health camps/special health education drives/health promotion campaigns/activities to improve community awareness about different health and nutrition related initiatives like The Prime Minister's Overarching Scheme for Holistic Nourishment (POSHAN) Maah, Information on 'SAM identification' and 'services available at NRC, National Deworming Day (NDD), National Newborn Week and SAANS campaign, Intensified Diarrhoea Control Fortnight (IDCF) etc., and improve uptake of services.

The CHOs are expected to work under the overall supervision of the Medical Officer at AB-HWC-PHC. The Medical Officer will monitor, support and supervise the delivery of comprehensive primary health care through the network of AB-HWC-SHC. The MO will provide support to the Primary Health Care team at AB-HWC-SHC undertaking through monthly visits and holding PHC review meetings for technical handholding capacity building, assessing progress on coverage of beneficiaries under various services, identifying and addressing gaps/problem solving.

Certificate in Community Health for Nurses (BPCCHN)
Practical Course

CHO - 0003 Public Health and Primary Health Care Skills (10 Credits)

Block – 1 : Public Health Skills

Unit 1 : Community Need Assessment and Identification of Common Health Problems
Unit 2 : Nutritional Assessment
Unit 3 : Investigation of an Outbreak
Unit 4 : Organizing and Conducting Special Clinics
Unit 5 : Social Mobilisation Skills
Unit 6 : Health Education and Counselling
Unit 7 : Report Writing and IT Skills including Interpretation and Use of Data

Block- 2 : General Skills and Laboratory Skills

Unit 1 : Universal Precautions and Bio Medical Waste Management
Unit 2 : Procedures for Basic Tests
Unit 3 : Common Blood Tests and Preparation of Peripheral Smear
Unit 4 : Examination of Swelling, Lump and Joint
Unit 5 : Eye and ENT Examination
Unit 6 : Screening and Management of Common Dental Conditions
Unit 7 : Suturing of Superficial Wounds
Unit 8 : Drugs Dispensing and Injections

Block – 3 : Skills for Management of Common Conditions and Emergencies

Unit 1 : Basic Life Support (BLS)
Unit 2 : Assessment and Management of Fevers
Unit 3 : Management of Common Aches and Pains
Unit 4 : First Aid Techniques and Stabilization Care in Common Emergencies – 1
Unit 5 : First Aid Techniques and Stabilization Care in Common Emergencies – 2
Unit 6 : Geriatric and Palliative Care

Block – 4 : Maternal Health Skills

Unit 1 : Assessment of Health Status of Women
Unit 2 : Antenatal, Intranatal, Postnatal Examination and Care
Unit 3 : Organising Labor Room
Unit 4 : Conducting Normal Deliveries and Partograph
Unit 5 : Identification, Care and Referral of Complications during Labour
Unit 6 : Postnatal Examinations and Care
Unit 7 : Emergency and Injectable Contraceptives and Follow - up Care
Unit 8 : Understanding Continuum of Care (CoC) and the Use of Digital Interventions in Rajasthan

Block 5 : Reproductive and Adolescent Health Skills

Unit 1 : Assessment and Management of STIs / RTIs
Unit 2 : Insertion and Removal of IUCDS
Unit 3 : Management of Abortion and Counselling
Unit 4 : Adolescent Counselling

Block 6 : Newborn and Child Health Skills

Unit 1 : Newborn Resuscitation
Unit 2 : Assessment of the Newborn
Unit 3 : Kangaroo Mother Care
Unit 4 : Infant and Young Child Feeding and Counselling
Unit 5 : Promoting and Monitoring Growth and Development and use of Growth Chart
Unit 6 : Immunisation and Safe Injection Practices
Unit 7 : Use of Equipments
Unit 8 : National Child Health programmes