1

PREVENTIVE AND PROMOTIONAL ASPECTS OF NEWBORN

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Each year 26 million infants are born in India. Of these, 1.2 million die during the neonatal period before completing four weeks of life. In India this contributes to nearly 30 per cent of the 4.6 million neonatal deaths worldwide. The main causes of the neonatal deaths are infection, birth asphyxia, and prematurity. The large number of deaths due to these causes can be prevented by taking preventive measures before, during, and after the birth of the new born. This block will help you update your knowledge in general aspects of newborn health, maternal care, and other preventive measures. This block is divided into 4 units.

Unit 1 Importance of New Born Care
Unit 2 Antenatal, Perinatal and Post-Natal Care
Unit 3 Organization of Newborn Care Facilities
Unit 4 Prevention of Infection in Newborn Unit
Preventive and Promotional Aspects of Newborn
UNIT 1 IMPORTANCE OF NEWBORN CARE

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1.0 OBJECTIVES

After going through this unit, you should be able to:
• Define terms related to neonatology;
• Discuss the significance of newborn care;
• Explain the health indices related to Newborn Care;
• Describe the National Health Programmes and Policies related to Newborn Care; and
• List down the Roles and Responsibilities of Nurse in Perinatal Care.

1.1 INTRODUCTION

Birth of healthy newborn is one of the finest gifts of nature. You know that when a baby is born, baby has to adapt from intra-uterine life to extra-uterine life. The newborn’s survival is dependent on his ability to adapt to his extra uterine environment. This involves adaptations in cardio pulmonary circulation and other physiological adjustments to replace placental function and maintain homeostasis. Simultaneously newborn has to make major adjustment in respiratory and circulatory system as well as in maintaining body temperature. These initial adaptations are crucial to his subsequent well-being and should be facilitated by trained and skilled nursing personnel.

Basic needs of any newborn include breathing, warmth, cleanliness and feeding. All newborns require essential newborn care to minimize the risk of illness and maximize their growth and development. Essential care of the newborn will prevent many newborn emergencies e.g. cleanliness at delivery reduces the risk of infection for the mother and baby. The umbilical cord may be the most common source of neonatal sepsis and also of neonatal tetanus and good cord care could
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...dramatically reduce the risk of this serious condition. Breast-feeding has the significant protective effect against infections. Early breast-feeding and the baby nursed close to the mother reduces the risk of hypothermia and as well as hypoglycemia.

Newborn health is the foundation of child and adult health. A healthy start to life also depends on the health of the mother and the care that she and her baby receive before, at and after birth. Evidence based intervention can save millions of lives of newborn in India in the next few years. Translating knowledge into action is the key to meeting the challenge and realizing the goal.

This unit shall appraise you regarding significance of care of the newborn, which is primarily aimed at helping the newborn to adapt to the extrauterine environment. We shall also learn/review meaning of various terms related to neonatology, health indices related to newborn, national health programmes and policies related to newborn, epidemiological and physiological aspects of newborn.

1.2 DEFINITION OF TERMS

It is essential for nurses involved in the care of newborn to understand terms related to neonatology. The common definitions and terms are described below:

**Fetus:** Fetus is a product of conception, irrespective of the duration of pregnancy, which is not completely expelled or extracted from his mother. Upto 8 weeks of gestation it is referred to as embryo.

**Live birth:** Live birth is defined as complete expulsion or extraction from the mother a product of conception (irrespective of duration of pregnancy) and which after such separation breathes or shows any other evidence of life such as beating of the heart, pulsation of umbilical cord.

In 1970, WHO recommended that babies weighing less than 500 grams at birth should show signs of life for at least one hour before they are designated as live born.

**Perinatal period:** Perinatal period extends from the 28 week of gestation (or more than 1000 g) to the 7th day of life.

**Neonatal period:** Neonatal period extends from birth upto 28th day of life. Early neonatal period refers to first 7 days of life while late neonatal period signifies period from 7 days to 28 completed days of life.

**Neonate:** Infant from birth upto 28 days of life is called as neonate.

**Low birth weight:** The internationally accepted definition of a low birth weight baby is one whose weight at birth is 2500 grams or less (WHO 1977). Further subdivisions with in this group include the very low birth (VLBW) baby weighing 1001-1500 grams and the extremely low birth weight (ELBW) who weighs 1000 grams or less.

**Term infant:** A term infant is born with a gestational age between 37-41 weeks.

**Preterm:** A preterm infant is born before 37 completed weeks of gestation.
Post term: A post term infant is born with a gestational age of 42 weeks or more.

Appropriate for Gestational Age (AGA): A new born whose birth weight lies between the 10th and 90th percentile is considered appropriate for gestational age.

Large for Gestational Age (LGA): A new born whose birth weight is greater than the 90th percentile is described as large for gestational age.

Small for Gestational Age (SGA): A new born whose birth weight is below the 10th percentile is described as small for gestational age.

Check Your Progress 1
Define following terms:
1) Neonatal period
   ...............................................................................................................
   ...............................................................................................................
   ...............................................................................................................
   ...............................................................................................................
   ...............................................................................................................

2) Low birth weight
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1.3 SIGNIFICANCE OF NEWBORN CARE

Newborn health is the foundation of child and adult health. A healthy start to life also depends on the health of the mother and the care that she and her baby receive before, at and after birth. Evidence based intervention can save millions of lives of newborn.

During the period of postnatal transition the newborn encounters various environmental stimuli i.e. light, temperature, sound. New born breathing is stimulated and changes from fetal circulation to neonatal circulation. It undergoes alteration in metabolic process with activation of liver and gastrointestinal tract for passage of meconium.

The first twenty four hours of life are critical as respiratory distress and circulatory failure can occur rapidly with little warning signals. Most newborns make the necessary bio-physiological, psycho-social adjustment to extrauterine existence without undue difficulty. Their well being depends on the nursing care they receive during these critical hours. Hence, it is essential that the newborn care is provided on the basis of careful assessment of biologic and behavioral responses and
identifying problems based on the assessment findings. It includes planning and implementing appropriate nursing action and evaluating its effectiveness.

1.4 HEALTH INDICES RELATED TO NEWBORN AND INFANT CARE

It is essential for nurses involved in the care of newborn to understand health indices related to newborn care. The Health Indices are discussed below:

1.4.1 Definitions and Trends

Definitions:

Crude birth rate: The crude birth rate is defined as “the number of live births during a year per thousand estimated midyear population”.

\[ \frac{\text{Number of live births during the year}}{\text{Mid-year population}} \times 1000 \]

Fetal Death: Death prior to the complete expulsion or extraction from mother a product of conception, the death being indicated by absence of any signs of life.

Infant Mortality rate: An infant death is one occurring in the first year of life. It is defined as “rate of infant deaths registered in a given year to the total number of live births registered in the same year, usually expressed as a rate per 1000 live births”.

\[ \frac{\text{Number of infant deaths during the year}}{\text{Number of live births during the year}} \times 1000 \]

Infant mortality rate is taken as one of the best measures of nation’s health.

Still birth: The death of fetus weighing at least 500 gm (or when birth weight is unavailable, after 22 completed weeks of gestation or with a crown-heel of 25 centimeters or more), before the complete expulsion or extraction from its mother.

Perinatal death: The death of fetus weighing at least 500 gm (or when birth weight is unavailable, after 22 completed weeks of gestation or with a crown-heel of 25 centimeters or more), or the death of an infant during the first week of life.

Neonatal death: The death of a live-born infant during the period that commences at birth and ends 28 completed days after birth.

Neonatal mortality rate (NMR): Number of deaths among live births during the first 28 completed days of life per 1000 live births.

Early neonatal mortality rate (ENMR): Number of newborn deaths less than 7 days of life expressed as per 1000 live births in the reference year.

Late neonatal mortality rate (LNMR): Number of newborn deaths of 7 days to 28 completed days of life expressed as per 1000 live births in the reference year.
**Importance of Newborn Care**

**Post neonatal mortality rate (PNMR):** Number of infant deaths of 29 days to less than 1 year of age expressed as per 1000 live births in the reference year.

**Perinatal mortality rate (PMR):** Number of deaths of fetuses weighing at least 500 g (or when birth weight is unavailable, after 22 completed weeks of gestation or with a crown heel length of 25 cm or more) plus the number of early neonatal deaths, per 1000 total births.

**Still birth rate (SBR):** Number of still births per 1000 births (live and still births) during the reference year.

**Trends:**

Trends in Neonatal, Infant and Child Mortality as seen in Table 1.1, show a slow but steady decline in Infant Mortality Rate (IMR). The decline is a consistent one. Under Five Mortality also shows a gradual decline over the period of years. There is a slow decline in Early and Late Neonatal Mortality Rate.

<table>
<thead>
<tr>
<th>Table 1.1: Trend for Child Mortality Rates – SRS data, 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Indicator (per 1000 live Births)</strong></td>
</tr>
<tr>
<td>Early NMR (Death of babies during first 7 days of birth per 1000 live births)</td>
</tr>
<tr>
<td>Late NMR (Death of babies during first one month of birth per 1000 live births)</td>
</tr>
<tr>
<td>IMR (Death of children below one year of age per 1000 live births)</td>
</tr>
<tr>
<td>U5MR (Deaths of Children below 5 years of children per 1000 live births)</td>
</tr>
</tbody>
</table>

**Source:** SRS 2010

The Figure 1.1 below shows consistent decline in U5MR and IMR with slow decline in NMR.

**Fig. 1.1: Neonatal Mortality, Infant and Under 5 Mortality Rate in India (SRS 2010)**
The policy makers identified goals in terms of Infant, Neonatal and Under 5 Mortality Rates which needed to be strived for and reached in the twelfth plan and also in the Millennium Development Goals (MDG) 2015. The current status as stated shows the actual state of affairs needs to be reduced in order to reach the goals identified as per Twelfth plan and MDGs 2015 (Refer Table 1.2).

Table 1.2: Child Health Goals including MDGs 2015

<table>
<thead>
<tr>
<th>Child Health Indicator</th>
<th>Current status</th>
<th>Twelfth plan</th>
<th>MDG 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMR (Infant Mortality Rate)</td>
<td>44 (SRS 2011)</td>
<td>&lt; 27 per 1000 live births</td>
<td>28</td>
</tr>
<tr>
<td>Neonatal Mortality rate</td>
<td>31 (SRS 2011)</td>
<td>&lt; 18 per 1000 live births</td>
<td>—</td>
</tr>
<tr>
<td>Under 5 Mortality Rate</td>
<td>55 (SRS 2011)</td>
<td>&lt;38</td>
<td></td>
</tr>
</tbody>
</table>

Some facts about Neonatal deaths

There are certain facts related to neonatal deaths listed as under:

- 10-15% of the babies are preterm
- 25-30% are low birth weight (< 2500 grams)
- Two third Early Neonatal Deaths occur in the first twenty four hours of birth
- Two third Neonatal Deaths occur in the first week of birth
- Two third Infant Deaths occur in the first 28 days of birth
- Neonatal deaths occur mainly at home

Refer Fig. 1.2 for timing of neonatal deaths

Fig. 1.2: Timing of Neonatal Deaths
The figure 1.2 shows that:

- More than half of deaths of children who die in the first five years of life occur in the first month after birth
- 73.3% of neonatal deaths occur in the first week of life
- 39.5% on the Day 1
- 6.7% on Day 2

Hence, it is very important that the focus of care should be on first day and the first week. The presence of Skilled Birth Attendant (SBA) is very essential to reduce the mortality among neonates.

### 1.4.2 Causes of Neonatal and Perinatal Mortality

Causes of child mortality in India are respiratory infections (mostly pneumonia), diarrhoea, measles, malaria or malnutrition and often a combination of these illnesses.

As per WHO 2012 estimates, the causes of Child Mortality in the age group 0-5 years in India are depicted in figure 1.3.

![Fig. 1.3: Causes of child mortality in India](image)

The above mentioned pie diagram shows that out of total, 55% of infant deaths occur during the newborn period. Most of these deaths take place due to birth asphyxia, prematurity and infections. Some of the causes of neonatal deaths are attributable to birth trauma, low birth weight, intra ventricular hemorrhage and necrotizing enterocolitis.

Almost eight million low birth weight (LBW) infants are born in India each year, an incidence of nearly 30 percent to 40 percent of the global burden – the highest of any country. Three-fourths of neonatal deaths occur in LBW babies, who are at an 11-13 times higher risk of mortality during the neonatal period compared to normal birth weight babies. LBW babies continue to suffer higher morbidity and mortality beyond the neonatal period, and a growing body of evidence from the country suggests that full term LBW babies are at a high risk of developing a variety of adult onset diseases. Majority of LBW infants in India
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are full term, with the prematurity rate varying from 11-14 percent. Over 80 percent of LBW babies weigh between 2000-2499 gm, and approximately three percent weigh less than 1500 gm. Community-based studies show that most LBW babies can survive in home settings with simple, low-cost interventions delivered by community health workers.

Neonatal infections (pneumonia, septicemia, meningitis, and diarrhoea) are the most common causes of mortality in neonates, accounting for almost half of deaths. Staphylococcus Aureus, Klebsiella and Escherichia Coli are the three principal organisms of sepsis. The treatment of neonatal sepsis in home settings with oral Clotrimoxazole and intramuscular injection Gentamicin by village health workers has been shown to reduce sepsis associated neonatal deaths by 76 percent. Sepsis-causing organisms in hospitals show a widespread resistance to commonly used antibiotics.

Asphyxia is the second most common cause of neonatal deaths. Upto 2-4 percent of babies suffer from significant asphyxia at birth in homes. Studies conducted in the country have shown that resuscitating asphyxiated neonates at birth using room air is as effective as using oxygen. In operational research settings, community based health workers and traditional birth attendants have demonstrated the effective use of bag-and-mask ventilation for neonatal resuscitation of home-delivered babies.

1.5 PHYSIOLOGICAL ASPECTS

The first 24 hours of life of newborn constitute a highly vulnerable time, during which neonate must make major physiologic adjustments to extra uterine life. In this section you will learn about various physiological features of neonates which make them susceptible to certain problems such as hypothermia; feeding problems viz. regurgitation, poor fat absorption; physiological jaundice; hypoglycemia, hemorrhagic diseases of newborns, fluid and electrolyte imbalance, susceptibility to infections.

Thermal Adaptation

In newborn, temperature regulation mechanism is not completely developed. Neonate responds readily to alteration in environmental temperature. At birth heat loss occurs due to evaporation, conduction, convection and radiation. Larger surface area, decreased brown fat, thinner skin, blood vessels close to the skin surface results in heat loss. Newborns are susceptible to hypothermia and hyperthermia. As a nurse you must know about the mechanism of heat loss, concept of warm chain, signs and symptoms, prevention and management of hypothermia and hyperthermia in newborns in order to carryout appropriate interventions promptly and thus prevent complications.

You will learn about thermal protection and Kangaroo Mother Care in Unit 3 of Block 2.

Gastrointestinal Changes

– The newborn’s intestinal tract is proportionately longer than the adults:
– Elastic tissue and musculature are not fully developed.
– Neurologic control is variable and inadequate.
– Most digestive enzymes are present except pancreatic amylase and lipase. Protein and carbohydrates are easily absorbed but fat absorption is poor.
– Imperfect control of the cardiac and pyloric sphincters causes mild regurgitation or vomiting.
– Irregularities in peristaltic motility slows gastric emptying.
– Increased peristalsis in the lower ileum result in one to six stools per day.

These physiological aspects of neonate should be considered by neonatal nurses while providing feeding to neonates. You will learn about infant feeding in Block 2 Unit 4.

**Hepatic Function**

Hepatic function is limited because of lack of gastrointestinal tract activity and limited blood supply. This leads to:

– Increased ability to conjugate bilirubin and they are susceptible to physiological jaundice.
– Decreased ability to regulate blood glucose concentration and thereby resulting in neonatal hypoglycemia.
– Deficient production of prothrombin and vitamin K thus predisposing neonates to haemorrhagic diseases.

Neonatal Nurses should understand these salient physiological aspects of newborn related to hepatic function to recognize neonatal jaundice, hypoglycemia and haemorrhagic disorders. You will understand about this in detail in Unit 3 of Block 3.

**Renal function**

Low arterial blood pressure and increased renal vascular resistance lead to:

– Decreased ability to concentrate urine because of low tubular resorption rate and low levels of anti diuretic hormone.
– Limited ability to maintain water balance and acid base mechanism.
– Slower excretion of electrolytes especially sodium and the hydrogen ions results in accumulation of these substances, which predisposes the neonate to dehydration, acidosis and hyperkalemia.

These physiological handicaps necessitate monitoring of fluid and electrolyte status in newborn and observe for any deviation to carryout appropriate intervention timely. You will learn in detail about assessment of fluid and electrolyte status and nurse’s responsibilities in maintaining fluid and electrolyte balance in neonates in Block 3 Unit 2.
Table 1.3 shows the various Physiological Handicaps and Associated Problems of newborn.

Table 1.3: Physiological Handicaps and Associated Problems in the Newborn

<table>
<thead>
<tr>
<th>Body System/Aspect</th>
<th>Physiological Handicaps</th>
<th>Physiological Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Thermal regulation</td>
<td>Larger surface area, decreased brown fat, thinner skin, blood vessels close to skin surface</td>
<td>Heat loss</td>
</tr>
<tr>
<td>2) GI changes</td>
<td>Non Presence of Pancreatic Amylase and Lipase</td>
<td>Poor absorption of Protein and Carbohydrates</td>
</tr>
<tr>
<td></td>
<td>Imperfect control of cardiac and pyloric sphincters</td>
<td>Causes mild regurgitation or vomiting</td>
</tr>
<tr>
<td></td>
<td>Irregular peristalsis</td>
<td>Slow gastric emptying</td>
</tr>
<tr>
<td></td>
<td>Increased peristalsis in the lower ileum</td>
<td>One to six stools per day</td>
</tr>
<tr>
<td>3) Hepatic function</td>
<td>Decreased ability to conjugate bilirubin</td>
<td>Neonatal Jaundice</td>
</tr>
<tr>
<td></td>
<td>Decreased ability to regulate blood glucose concentration</td>
<td>Hypoglycemia</td>
</tr>
<tr>
<td></td>
<td>Deficient production of prothrombin</td>
<td>Hemorrhagic Disease of Newborn (HDN)</td>
</tr>
<tr>
<td>4) Renal function</td>
<td>Low tubular resorption rate</td>
<td>Decreased ability to concentrate urine</td>
</tr>
<tr>
<td></td>
<td>Low levels of ADH</td>
<td>Decreased ability to concentrate urine</td>
</tr>
<tr>
<td></td>
<td>Slower exertion of electrolytes</td>
<td>Dehydration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Acidosis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hyperkalemia</td>
</tr>
</tbody>
</table>

1.6 NATIONAL HEALTH PROGRAMMES AND POLICIES RELATED TO NEWBORN CARE

Several initiatives have been undertaken by the Ministry of Health and Family Welfare (MoHFW) to reduce maternal and newborn mortality and morbidity. The provision of Maternal and Child Health Services in India dates back to pre-Independence era as in 1880 with establishment of Dufferin Fund Committee and training schemes for Midwives, doctors and other health workers in the field of Maternal and Child Health. After Independence the state and central government worked hand in hand to provide the facilities by developing health programmes for mothers and children. The various programmes are as follows:

Various child health programmes have been implemented in India to improve health status of neonates. In 1977, Maternal and Child health programme (MCH) became an integral part of the Family welfare programme. In 1978, diarrhoeal disease control programme was launched and in 1990, Universal Immunization
programme (UIP) was introduced to protect children including neonates and infants against vaccine preventable diseases. Acute Respiratory tract Infections (ARI) control programme was also started in 1990. All these programmes were then merged into Child Survival and Safe Motherhood programme (CSSM).

1) Child Survival and Safe Motherhood (CSSM): It is a package of services for improving the health status of women and children, reducing the maternal, infant and child mortality rates. It was started in August 1992 with the aim of:

- Eliminating Neonatal Tetanus
- Reduction of Measles Incidences
- Eradicating poliomyelitis
- Reducing the Perinatal mortality
- Reducing the Infant Mortality
- Reducing the Under 5 Mortality

The programme has two components:

Safe Motherhood which was initiated in states where infant and maternal mortality rates were high to ensure safe motherhood initiative and maternal care, early identification and treatment of maternal complications and family planning.

Child Survival Programme stresses on exclusive breast feeding of the infants and aims at reducing the infant and child mortality and morbidity by immunization, control of Vitamin A deficiency, control of acute respiratory infections and management of diarrhoea.

2) Reproductive and Child Health Programme (RCH): Family welfare programme was re-oriented and renamed as RCH programme in April 1996 to provide complete services to women and children in terms of better quality, coverage, effectiveness and access. It covers the services offered by CSSM and family welfare programme as well as looks into management of the reproductive infections and adolescent reproductive health.

RCH package of services:

For mothers:

- Registration of pregnancies
- Two tetanus toxoid immunization doses during pregnancy
- Three antenatal checkups including BP to rule out complications
- Iron and folic acid tablets for preventing and treatment of anemia in pregnant women
- Encourage safe and hygienic deliveries
- Encouraging hospital deliveries
- Referral of the obstetric emergencies
- Three postnatal checkups after delivery
- Motivation for family planning

For children:

- Essential newborn care like keeping the baby warm, checking the baby’s weight and giving the mothers first milk
- Special care to LBW, premature babies
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- Referral for infants with complications
- Encouraging exclusive breast feeding for first six months and weaning after 6 month
- Administering BCG, DPT, Polio and Measles immunization as per the present schedule
- Administer Vitamin A to prevent blindness
- Inform parents about ORT and correct management of diarrhoea
- Educate about ARI. Refer acute cases of ARI to health centres
- Treat Anemia

For eligible couples:

- Encourage contraceptive methods of Family planning in eligible couples to prevent unwanted pregnancies
- Educate women about safe services of medical termination of pregnancies (MTP) who desire abortions

Other Services:

- Find people suffering from Reproductive tract infections and Sexually transmitted diseases since these lead to infertility, affect the health of the diseased couples and children and hence, should be referred to health centers
- Preparing the adolescents for the future parenthood by counseling about family life, reproductive health along with the involvement of parents and health workers since this is a sensitive issue

3) The National Rural Health Mission (NRHM), The flagship programme of Government of India (GOI) has provided a thrust for reduction of child and maternal mortality and to reduce the fertility rates. The main strategy for reduction of Maternal and Neonatal mortality focuses on safe/institutional deliveries at functional health facilities in the governmental and non-governmental sectors.

At the national level, the targets are as under:

- Reduction of MMR to < 100 per 100000 live births
- Reducing IMR to < 27 per 1000 live births
- Reduction in NMR to < 18 per 1000 live births
- Reducing TFR to 2.1

Various programmes and policies launched under NRHM are:

1) Reproductive, maternal, newborn, child and adolescent health (RMNCH+A)

A strategic approach launched under NRHM, RMNCH+A aims to address the major causes of mortality among women and children as well as the delays in accessing and utilizing health care services. It proposes the spread of health care across the various life stages, thus generating a “continuum of care”.

The goals of RMNCH+A are:

- Reduction of Infant Mortality Rate (IMR) to 25 per 1,000 live births by 2017
• Reduction in Maternal Mortality Rate (MMR) to 100 per 100,000 live births by 2017

• Reduction in Total Fertility Rate (TFR) to 2.1 by 2017

The targets of RMNCH +A are:

• Increase facilities equipped for perinatal care by 100%

• Increase proportion of all births in government and accredited private institutions at annual rate of 5.6% from the baseline of 61% (SRS 2010)

• Increase proportion of pregnant women receiving antenatal care at annual rate of 6% from the baseline of 53% (CES 2009)

• Increase proportion of mothers and newborns receiving postnatal care at annual rate of 7.5% from the baseline of 45% (CES 2009)

• Increase proportion of deliveries conducted by skilled birth attendants at annual rate of 2% from the baseline of 76% (CES 2009)

• Increase exclusive breast feeding rates at annual rate of 9.6% from the baseline of 36% (CES 2009)

• Reduce prevalence of under-five children who are underweight at annual rate of 5.5% from the baseline of 45% (NFHS 3)

• Increase coverage of three doses of combined diphtheria-tetanus-pertussis (DTP3) (12–23 months) at annual rate of 3.5% from the baseline of 7% (CES 2009)

• Increase ORS use in under-five children with diarrhoea at annual rate of 7.2% from the baseline of 43% (CES 2009)

• Reduce unmet need for family planning methods among eligible couples, married and unmarried, at annual rate of 8.8% from the baseline of 21% (DLHS 3)

• Increase met need for modern family planning methods among eligible couples at annual rate of 4.5% from the baseline of 47% (DLHS 3)

• Reduce anaemia in adolescent girls and boys (15–19 years) at annual rate of 6% from the baseline of 56% and 30%, respectively (NFHS 3)

• Decrease the proportion of total fertility contributed by adolescents (15–19 years) at annual rate of 3.8% per year from the baseline of 16% (NFHS 3)

• Raise child sex ratio in the 0–6 years age group at annual rate of 0.6% per year from the baseline of 914 (Census 2011)

The Health Care facilities under RMNCH +A are provided according to various life stages as:

1) Adolescents:
   • Adolescent nutrition; iron and folic acid supplementation
   • Facility-based adolescent reproductive and sexual health services (Adolescent health clinics)
   • Information and counseling on adolescent sexual reproductive health and other health issues
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2) Pregnancy and Child Birth:
- Delivery of antenatal care package and tracking of high-risk pregnancies
- Skilled obstetric care
- Immediate essential newborn care and resuscitation
- Emergency obstetric and newborn care
- Postpartum care for mother and newborn
- Postpartum IUCD and sterilisation
- Implementation of preconception and prenatal diagnostic techniques (PC&PNDT) Act

3) New Born and Child Care:
- Home Based Care and Referral
- Facility Based Care
- Child Nutrition and Essential Micronutrient Supplementation
- Integrated Management of Neonatal and Childhood Illnesses (or IMNCI)
- Immunization
- Child health screening and early intervention services (Rashtriya Bal Swasthya Karyakram)

4) Throughout Reproductive years:
- Door step distribution of contraceptives
- Promotion of spacing methods like Interval IUCD
- Sterilization Services
- Comprehensive abortion care
- Management of Sexually Transmitted Diseases (STD) and Reproductive Tract Infections (RTI).

The approach also focuses on provision of care to the tribal and urban disadvantaged poor for equality in health care services with strengthening of the available resources to ensure the availability of the healthcare facilities.

2) Janani Suraksha Yojana (JSY)

It is a safe motherhood intervention under the National Rural Health Mission (NRHM). It is being implemented with the objective of reducing maternal and neonatal mortality by promoting institutional delivery among poor pregnant women. The scheme is under implementation in all states and Union Territories (UTs), with a special focus on Low Performing States (LPS).

It was launched in April 2005 by modifying the National Maternity Benefit Scheme (NMBS). The NMBS came into effect in August 1995 as one of the components of the National Social Assistance Programme (NSAP). The NMBS provides financial assistance of Rs. 500/- per birth up to two live
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births to the pregnant women who have attained 19 years of age and belong to below poverty line (BPL) households. When JSY was launched the financial assistance of Rs. 500/- was made available uniformly throughout the country to BPL pregnant women under NMBS, was replaced by graded scale of assistance based on the categorization of States as well as whether beneficiary was from rural/urban area. States were classified into Low Performing States and High Performing States on the basis of institutional delivery rate i.e. states having institutional delivery 25% or less were termed as Low Performing States (LPS) and those which have institutional delivery rate more than 25% were classified as High Performing States (HPS).

3) Janani Shishu Suraksha Karyakaram (JSSK)

Government of India has launched Janani Shishu Suraksha Karyakaram (JSSK) on 1st June, 2011.

**The following are the Free Entitlements for pregnant women:**

- Free and cashless delivery
- Free C-Section
- Free drugs and consumables
- Free diagnostics
- Free diet during stay in the health institutions
- Free provision of blood
- Exemption from user charges
- Free transport from home to health institutions
- Free transport between facilities in case of referral
- Free drop back from Institutions to home after 48hrs stay

**The following are the Free Entitlements for Sick newborns till 30 days after birth:**

- Free treatment
- Free drugs and consumables
- Free diagnostics
- Free provision of blood
- Exemption from user charges
- Free Transport from Home to Health Institutions
- Free Transport between facilities in case of referral
- Free drop Back from Institutions to home

4) Facility Based Newborn and Child Care

Neonatal mortality is one of the major contributors (2/3) to the Infant Mortality. To address the issues of neonatal and early neonatal mortality, facility based newborn care services at health facilities have been emphasized. Setting up of facilities for care of Sick Newborn such as Special New Born Care Units (SNCUs), New Born Stabilization Units (NBSUs) and New Born Baby Corners (NBCCs) at different levels is a thrust area under NRHM.
Special Newborn Care Units (SNCU)

- States have been asked to set up at least one SNCU in each district. SNCU is 12-20 bedded unit and requires 4 trained doctors and 10-12 nurses for round the clock services.

Newborn Stabilization units (NBSUs)

- NBSUs are established at community health centres /FRUs. These are 4 bedded units with trained doctors and nurses for stabilization of sick newborns.

New Born Care Corners (NBCCs)

- These are 1 bedded facility attached to the labour room and Operation Theatre (OT) for provision of essential newborn care. NBCC at each facility where deliveries are taking place should be established.

5) **Integrated Management of Neonatal & Childhood Illnesses (IMNCI)**

It includes Pre-service and In-service training of providers, improving health systems (e.g. facility up-gradation, availability of logistics, referral systems), Community and Family level care.

6) **Facility Based Integrated Management of Neonatal and Childhood Illness (F- IMNCI)**

F-IMNCI is the integration of the Facility based Care package with the IMNCI package, to empower the Health personnel with the skills to manage newborn and childhood illness at the community level as well as at the facility. Facility based IMNCI focuses on providing appropriate skills for inpatient management of major causes of Neonatal and Childhood mortality such as asphyxia, sepsis, low birth weight and pneumonia, diarrhoea, malaria, meningitis, severe malnutrition in children. This training is being imparted to Medical Officers, Staff Nurses and ANMs at CHC/FRUs and 24x7 PHCs where deliveries are taking place. The training is for 11 days.

7) **Home Based New Born Care (HBNC):**

A new scheme has been launched to incentivize ASHA for providing Home Based Newborn Care. ASHA will make visits to all newborns according to specified schedule up to 42 days of life. The proposed incentive is Rs. 50 per home visit of around one hour duration, amounting to a total of Rs. 250 for five visits. This would be paid at one time after 45 days of delivery, subject to the following:

- recording of weight of the newborn in MCP card
- ensuring BCG, 1st dose of OPV and DPT vaccination
- both the mother and the newborn are safe till 42 days of the delivery, and
- registration of birth has been done

A comprehensive “Home Based Newborn Care Operational Guideline-2011” has been developed, published and disseminated in 2011 by Child Health Division, MoHFW, GOI to provide framework and guidance to enable a coherent home based new born care strategy and act a reference tool for
the states to plan necessary interventions. Care of the Newborn baby and mother by ASHA through regular home visits on 1st, 3rd, 7th, 14th, 21st, 28th and 42nd day for Home deliveries. 3rd, 7th, 14th, 21st, 28th and 42nd day for institutional deliveries.

8) Navjat Shishu Suraksha Karyakram (NSSK)

NSSK a programme aimed to train health personnel in basic newborn care and resuscitation, has been launched to address care at birth issues i.e. Prevention of Hypothermia, Prevention of Infection, Early initiation of Breast feeding and Basic Newborn Resuscitation. Newborn care and resuscitation is an important starting-point for any neonatal program and is required to ensure the best possible start in life. The objective of this new initiative is to have a trained health personnel in basic newborn care and resuscitation at every delivery point. The course has been developed for Medical Officers, Nurses and ANMs, who are posted at health centers (CHCs/FRUs/24x7 PHCs) and small hospitals (not referral hospitals) and are responsible for conducting deliveries and managing newborn babies. The training is for 2 days and is expected to reduce neonatal mortality significantly in the country.

Check Your Progress 2

1) Define Neonatal Mortality rate.

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2) Define Perinatal Mortality rate.

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3) Enlist the main causes of NMR in India.

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4) Enlist the Free Entitlements for Sick newborns under JSSK.

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1.7 ROLES AND RESPONSIBILITIES OF NURSE IN PERINATAL AND NEONATAL CARE

Neonatal nursing being the specialized branch of nursing, demands high standard of nursing care in taking care of newborns. Neonatal care unit places a great demand on nurses involved because emergency can happen at any time, decisions and actions have to be quick and precise. A neonatal nurse is expected to have a high sense of responsibility, devotion to work, keen sense of observation, alertness and readiness to take quick decision. Neonatal nurses who are able to carry out nursing care with knowledge, skill and confidence contribute significantly to the neonatal outcome. The following are the roles and responsibilities of nurse in newborn care:

- Nurses play an important role in perinatal and neonatal care at health care facilities from being skilled attendants/professionals at birth to managing sick neonates; from counseling mothers about breast feeding to advising home care of high risk neonates; from implementing Kangaroo Mother Care to stabilizing sick neonates.
- They monitor neonates during intrapartum, postpartum and neonatal period.
- Neonatal nurses perform various procedures including maintenance of equipments in nursery.
- The nurses’ ability to observe, report and record the symptoms of newborn such as colour, edema, presence of sclerema, rashes, respiratory rate, abdominal distension, apparent anomalies, cry activity, tremors and bulging fontanel etc. helps to reduce neonatal mortality and morbidity.
- Nurses working in neonatal care unit because of their round the clock contact with high-risk baby are in a good position to detect early signs and symptoms of distress. Early diagnosis and treatment may shorten the course of disease and improve the survival rate.
- Neonatal nurse is responsible for assessing, documenting, planning, implementing and evaluating care. Nursing assessment allows the nursing personnel to organize patient data into a standard nomenclature that can be used as a guide for decision-making.
1.8 LET US SUM UP

Skilled care at and around birth is imperative for saving newborn lives. Neonatal mortality rate accounts for about 40% of under-five mortality. Further reduction in under-five mortality would be depending on the attention given to neonatal health and survival. Almost one third of newborns weigh less than 2500 grams. This poses a special challenge for their survival and development.

The reasons for high neonatal mortality are not only medical but also have social and economic dimensions. Due attention to health system strengthening, attention to family and community practices and coordinated initiatives across several sectors to meet local specific imperatives are therefore needed for accelerating progress towards meeting the essential new born care. India is the world’s largest democracy, largest country in South East Asia, the second most populous country in the world and contributes to around 20% of global births. Focus on young infants is important since a significant proportion of child mortality is centered in the first few months of life.

High incidence of neonatal mortality rate and associated problems due to physiological handicaps poses a challenge for health personnel to provide competent nursing care during birth process and neonatal period which are imperative for saving newborn lives. In this unit significance of nursing care in early identification of complication and prompt interventions and improving neonatal outcome is highlighted.

1.9 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress 1

1) It is the period starting from birth upto 28 days of life of baby.
2) The internationally accepted definition of a low birth weight baby is one whose weight at birth is 2500 grams or less (WHO 1977). Further subdivisions with in this group include the very low birth (VLBW) baby weighing 1001-1500 grams and the extremely low birth weight (ELBW) who weighs 1000 grams or less.

Check Your Progress 2

1) Number of deaths among live births during the first 28 completed days of life per 1000 live births.
2) Number of deaths of fetuses weighing at least 500 g (or when birth weight is unavailable, after 22 completed weeks of gestation or with a crown heel length of 25 cm or more) plus the number of early neonatal deaths, per 1000 total births.
3) • Infection
    • Asphyxia
    • Preterm birth
    • Birth trauma
    • Low birth weight
Preventive and Promotional Aspects of Newborn

4)  • Free treatment
    • Free drugs and consumables
    • Free diagnostics
    • Free provision of blood
    • Exemption from user charges
    • Free Transport from Home to Health Institutions
    • Free Transport between facilities in case of referral
    • Free drop Back from Institutions to home.

1.10 REFERENCES


2) SRS 2010 Chapter 4

3) Brief note on Child Health, NRHM website,


6) Dr Vinod Paul, Presentation on Best practices for addressing neonatal mortality in urban areas, Sept 2012

UNIT 2  ANTENATAL, PERINATAL AND POSTNATAL CARE

Structure

2.0 Objectives

2.1 Introduction

2.2 Antenatal Care – Definition and Purposes

2.3 Assessment during Antenatal Period
   2.3.1 History Taking
   2.3.2 Examination of Mother
   2.3.3 Investigations

2.4 Antenatal Advices

2.5 Perinatal Care
   2.5.1 Care of Mother during Labour
   2.5.2 Care of Baby

2.6 Postnatal Care
   2.6.1 Mother
   2.6.2 Baby

2.7 Home Based Newborn Care (HBNC)

2.8 High Risk Pregnancy and its Implications on Newborn Outcome

2.9 Let Us Sum Up

2.10 Answers to Check Your Progress

2.11 References

2.0 OBJECTIVES

After completing this unit, you should be able to:

- Define antenatal care and its purposes;
- Discuss the initial and subsequent assessment during antenatal visits of pregnant woman;
- List the investigations required;
- Enumerate the antenatal advices given to the pregnant woman;
- Describe the perinatal care of mother and baby;
- Describe the care of mother and baby during postnatal period;
- Discuss home based newborn care; and
- Explain high risk pregnancy and its implications on newborn outcome.

2.1 INTRODUCTION

In the previous unit, you learnt about the significance of Newborn Care. This unit discusses the antenatal, perinatal and postnatal care. As you know, the
pregnancy period is a preparatory one both physically, in terms of foetal growth and maternal adaptation and psychologically in terms of anticipation of parenthood. So, it is important that as a nurse you provide the comprehensive care to the mother and baby before, during and after child birth.

Antenatal care refers to the care that is given to an expected mother from the time of the conception is confirmed until the beginning of labour. It aims to provide appropriate support for the woman and her family regarding the outcomes of pregnancy. Effective antenatal care (ANC) can improve the health of the mother and give her a chance to deliver a healthy baby. Regular monitoring during pregnancy can help detect complications at an early stage before they become life-threatening emergencies. It is essential to remember that one cannot predict which woman will develop pregnancy related complications. Hence, every pregnant woman needs special care. In this unit we will discuss about the antenatal, perinatal and postnatal care of the mother and her baby.

### 2.2 ANTENATAL CARE — DEFINITION AND PURPOSES

Antenatal care refers to the care given to an expectant mother from the time of confirmed conception until the beginning of labour.

**Purposes of Antenatal Care are as following:**

- promote, protect and maintain the health of the mother during pregnancy
- recognize deviation from normal and provide management or treatment as required
- remove anxiety and fear associated with pregnancy
- reduce maternal and infant morbidity and mortality
- teach mother nutrition, personal hygiene and newborn care
- explain mother the need of family planning

**Antenatal visits**

The first visit or registration of a pregnant woman for ANC should take place as soon as the pregnancy is suspected. Ideally, the first visit should take place in the first trimester (first three months of pregnancy), before or at the 12th week of pregnancy. However, even if a woman comes late in her pregnancy for registration, she should be registered, and care given to her according to the gestational age.

The first visit is recommended as soon as the pregnancy is suspected. This is meant for registration of the pregnancy and the first antenatal check-up. The second visit should be scheduled between the 4th and 6th month (around 26 weeks). The third one should be planned in the 8th month (32 weeks), and the fourth one in the 9th month (36 weeks).
2.3 ASSESSMENT DURING ANTENATAL PERIOD

2.3.1 History Taking

During the first visit, a detailed history of the woman needs to be taken. It will help to:

i) diagnose pregnancy (first visit only, if required);

ii) identify any complications during previous pregnancies that may have an impact on the present one;

iii) identify any medical or obstetric condition(s) that may complicate the present pregnancy (first and subsequent visits).

While taking history, the pregnant woman should be asked about her age, gravida and para, duration of marriage, religion, occupation, period of gestation, complaints, history of present illness, history of present pregnancy, obstetric history, menstrual history, past medical-surgical history, family history and personal history.

One has to also enquire about the symptoms that may cause discomfort during the present pregnancy.

Symptoms during the present pregnancy

It is important to ask the woman for symptoms that might be causing her some discomfort, and also for symptoms that are indications of a complication arising.

Symptoms indicating discomfort during pregnancy are as follows:

- Nausea and vomiting
- Heartburn
Preventive and Promotional Aspects of Newborn

- Constipation
- Increased frequency of urination

**Symptoms indicating that a complication may be arising are as follows:**

- Fever
- Palpitations, fatigue and breathlessness at rest
- Generalized swelling of the body; puffiness of the face
- Decreased or absent foetal movements
- Passing smaller amounts of urine
- Vaginal discharge
- Vaginal bleeding
- Leaking of watery fluid per vagina (P/V)

### 2.3.2 Examination of Mother

Examination of mother includes general physical examination, systemic examination and obstetrical examination. General physical examination should be done systematically, start by looking at the women’s face and then progress downward to finish with legs and feet.

Check the following during the general physical examination.

#### General physical examination

- **Build:** Obese/average/thin
- **Nutrition:** good/average/poor
- **Height:** Height of the woman is checked at the time of first visit, height over 160 cm and shoe size above 3 indicates normal pelvis. Height of 5ft or less is considered as short stature indicating small pelvis.
- **Weight:** Weight must be checked at every visit and rate of weight gain is assessed. Obesity is associated with an increased risk of gestational diabetes and pregnancy induced hypertension.
- **Pallor:** The sites to be noted are lower palpebral conjunctiva, dorsum of the tongue and nail beds.
- **Jaundice:** The sites to be noted are bulbar conjunctiva, under surface of the tongue, hard palate and skin.
- **Tongue, teeth, gums and tonsils:** Glossitis and stomatitis are suggestive of malnutrition.
- **Neck:** Neck veins, thyroid or lymph nodes are looked for any abnormality.
- **Oedema of legs:** Both legs are to be examined. The sites for evidence of oedema are over the medial malleous and anterior surface of the lower 1/3rd of tibia. Varicosity in the legs if any, to be noted.
- **Vital signs:** Temperature, pulse, respiration and blood pressure are taken to ascertain normality and provide a baseline reading for comparison throughout pregnancy. A blood pressure of 140/90 mm Hg at the first visit is indicative of hypertension.
Systemic examination

Systemic examination of lung, heart, liver and spleen is carried out.

**Obstetrical examination**

Obstetrical examination includes examination of breast, abdomen and vagina which is carried out during pregnancy.

**Breast:** Gentle examination of breast is done to note the presence of pregnancy changes but also the condition of nipples and the surrounding skin of the areola. Frequent examination of breast and nipples is not recommended due to fear of preterm labour pains.

- The breast should be gently palpated to feel any lumps.
- The nipple should be drawn forward to see if it is protractile.
- Breast changes due to pregnancy should be observed.

**Abdominal examination:** Tone of the abdominal muscles, presence of any incisional scar or herniation and skin conditions should be looked for. Fundus examination is carried out after 12 weeks of gestation when the uterus is palpable above symphysis pubis (Refer **Fig. 2.1**).

![Fig. 2.1: Approximate expected location of the normal height of the female during pregnancy](image)

**Vaginal examination:** Vaginal examination is done in the antenatal clinic when the woman first time attends the clinic to confirm the pregnancy, to corroborate the size of uterus with the period of amenorrhoea and to find out any pelvic pathology.

### 2.3.3 Investigations

Routine and special investigations are done during pregnancy.

**Routine investigations:** Routine investigations include

- Blood test for haemoglobin, hematocrit, ABO and Rh grouping, Venereal disease Research Laboratory (VDRL), Blood glucose test
- Urine test for protein, sugar and pus cells
- Cervical cytology study by Papanicolaou (PAP) stain
**Special investigations:** Special investigations include the following tests

- Serology test for Rubella, Hepatitis B and Human Immuno Deficiency Virus (HIV) screening

- Genetic screening in which maternal serum alfa fetoprotein (MSAFP) at 15-18 weeks for all the mothers to rule out Neural Tube Defect (NTD), Down’s Syndrome, or other chromosomal anomalies is performed.

- Ultrasound examination: Ultrasound examination is done in the first trimester either trans-vaginal or trans-abdominal.

Investigations like haemoglobin estimation at 18-20 weeks and urine examination for protein and sugar in every antenatal visit are repeated.

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<td>1) List down three points of importance of history taking in antenatal period.</td>
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<td>2) List down two symptoms indicating discomfort during pregnancy.</td>
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<td>3) List down three Symptoms indicating complication during pregnancy.</td>
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<td>4) Name three special investigations required in antenatal period by most women.</td>
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2.4 ANTENATAL ADVICES

Antenatal advices are very essential for the wellbeing of mother and the baby. The purposes of antenatal advices are to promote regular checkups during pregnancy, to maintain wellbeing of the mother and the baby and to remove any fear of unknown in antenatal mother by counselling her. Antenatal advices given are as follows:

- **Nutrition in Pregnancy**
  - Adequate nutrition is important for the health of the woman, her developing fetus and the reduction of minor disorders of pregnancy.
  - The intake of protein is important for the growth of new tissue. Prime sources are meat, fish and cheese, cheaper sources include peas, beans, lentils, milk and eggs.
  - Calcium and iron are vital in pregnancy. Calcium is found in milk and eggs. Iron is found in red meat, green vegetables and red fruits.
  - Vitamin C helps the absorption of iron and is found in fresh fruits and vegetables.
  - Fibre content of the diet helps to prevent constipation.
  - A certain amount of carbohydrate is required to provide energy.
  - Complex sugar intake and starches are taken as they are absorbed more slowly.

- **Iron and Folic Acid Supplementation**
  The need for increased requirement of iron during pregnancy and the danger of anaemia to pregnant women should be stressed. All pregnant women should be given one tablet of IFA (100 mg elemental iron and 0.5 mg folic acid) every day for at least 100 days, starting after the first trimester at 14–16 weeks of gestation.

- **Exercises**
  - Regular exercise such as walking should be continued as long as mother feels comfortable.
  - Mother should not try out strenuous sports during pregnancy.
  - Figure changes during pregnancy put extra strain on joints and muscles, which cause discomfort.

- **Rest**
  Adequate rest is important, advice regarding the use of extra pillows given to woman in late pregnancy to increase comfort and enable sleep. Swollen ankles may be relieved by sitting with the feet up and avoid prolonged standing.

- **Hygiene**
  Perspiration and vaginal secretions increase during pregnancy so a daily all-over wash is necessary. General advice includes keeping the breasts clean and nipples free from encrusted colostrum.
Preventive and Promotional Aspects of Newborn

- **Clothing**
  Loose cool clothing will be the most comfortable. Shoes need to be comfortable. A suitable well-fitted bra should be used in order to be comfortable and give support to the breasts.

- **Teeth**
  Dental decay may occur during pregnancy because of fetal demands for calcium.

- **Travel**
  Airlines asks for doctor’s certificate stating that a pregnant woman is fit to travel. They prefer not to take ladies beyond 32nd week. Long unbroken journey should be avoided. If travel is essential, taking extra fluids and making breaks can ease any discomfort.

- **Alcohol and smoking**
  Moderate to high levels of alcohol have been found to give rise to fetal problems. Alcohol consumption should be discontinued before and during pregnancy. Smoking causes intra uterine growth retardation, preterm labour and an increase in prenatal mortality rate. The mother is at increased risk of other infection and thrombo-embolic disorders.

- **Sexual intercourse**
  Sexual intercourse is absolutely safe and normal unless specific problem exists. If a mother has a history of abortion she should avoid intercourse in the early months. After an episode of preterm labour, intercourse should be avoided in the late months.

- **Drugs**
  Many drugs are known to have an adverse effect on pregnancy. Oral contraceptive pill should be discontinued 3 to 6 months before a woman tries to become pregnant. Medication of any kind should be avoided unless prescribed by doctor. Folic acid (0.5mg) can be given to all women planning for pregnancy, three months prior to avoid NTD.

- **Infection** - any infection such as urinary, vaginal or respiratory tract or sexually transmitted diseases occurring in either partner should be treated.

- **Danger signs of pregnancy**
  Abnormal symptoms may be reported by the woman. Mother should be encouraged to report and seek advice if any of the following warning symptoms occur:
  - Vaginal bleeding.
  - Persistent abdominal pain.
  - Reduced/ no fetal movement.
  - Frontal or recurrent headaches.
  - Sudden swelling of feet, fingers and face.
  - Rupture of membranes and leaking of clear water per vagina.
- Vaginal discharge with itching or odour.
- Premature onset of contractions.

**Injection Tetanus Toxoid (Inj. TT) administration**

Getting two doses of Inj. TT is important to prevent neonatal tetanus (tetanus of the newborn). The first dose of TT should be given just after the first trimester, or as soon as the woman registers for ANC, whichever is later. This means that Inj. TT is NOT to be given in the first trimester of pregnancy. The second dose is to be given one month after the first dose, but at least one month before the EDD.

**Birth preparedness and complication readiness**

The woman should be explained that why delivery at a health facility is recommended. She should be informed that any complication can develop during delivery; complications are not always predictable; they can cost the life of the mother and/or the baby. A health facility has staff, equipment, supplies and drugs available to provide the best care, if needed.

The woman and her family/caretakers should be informed about potential danger signs during pregnancy, delivery and the postpartum period. She must be told that if she has any of the following during pregnancy, delivery or postpartum/post-abortion, she should immediately visit a hospital or health centre, WITHOUT WAITING, be it day or night. These are:

- Any bleeding P/V during pregnancy, and heavy (>500 ml) vaginal bleeding during and following delivery
- Severe headache with blurred vision
- Convulsions or loss of consciousness
- Labour lasting longer than 12 hours
- Failure of the placenta to come out within 30 minutes of delivery
- Preterm labour (labour starting before 8 gestational months)
- Premature or pre-labour rupture of membranes (PROM)
- Continuous severe abdominal pain
- High fever with or without abdominal pain, and feels too weak to get out of bed
- Fast or difficult breathing
- Decreased or absent foetal movements
- Excessive vomiting, wherein the woman is unable to take anything orally, leading to a decreased urinary output

**Infant and young child feeding**

Pregnancy is the ideal time to counsel the mother regarding the benefits of breastfeeding her baby. Mother should be advised that breastfeeding should ideally be initiated within half an hour of a normal delivery (or within one to two hours of a caesarean section, or as soon as the mother regains consciousness, in case she undergoes a caesarean section). She should also be advised on exclusive breastfeeding for the first six months of baby’s birth.
Advice for an institutional delivery

Every pregnant woman should be advised and encouraged to go in for an institutional delivery. There are situations when complications arise and a home delivery may be risky and potentially life-threatening. Under such conditions, it should be explained to the woman why the delivery needs to be at the health facility only and she should be strongly advised to deliver in an institutional setting only. Such conditions/complications are as follows:

- Severe anaemia
- Pre-eclampsia/eclampsia (in either the previous pregnancy or in the present one)
- APH
- PPH in the previous pregnancy
- More than 5 previous births
- Transverse foetal lie or any other obvious mal-presentation within one month of the EDD
- Previous caesarean section
- Previous assisted vaginal delivery
- Multiple pregnancies
- Age less than 16 years
- Previous documented third-degree tear
- PROM, with no labour pains even after 8 hours of rupture.

Check Your Progress 3

1) Identify the important areas in which antenatal advices are given.
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2) How many doses of injection tetanus toxoid are required during pregnancy?
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2.5 PERINATAL CARE

In this section we shall focus on Perinatal Care which includes the care of the mother during and after labour and the care of the baby.

2.5.1 Care of Mother during Labour

Labour is defined as the process by which the fetus, placenta and the membranes are expelled through the birth canal (Cassidy, 1999). It is important to understand labour and its mechanism in order to be vigilant in providing perinatal care to mother during labour and hence, avoiding complications.

Labour is said to be normal when:

- It occurs at term
- Fetus presents by Vertex
- Onset is spontaneous
- Completed within 18 hours
- No complication occurs.

Factors responsible for the onset of labour:

It occurs due to change in hormonal factors like oxytocin, progesterone, oestrogen and prostaglandins. Pressure on cervix, over distension of uterus is normally responsible for the onset of labour. Abnormal conditions like febrile illness, eclampsia, fear and shock during pregnancy can induce early labour pains.

Events during labour can be divided in four stages:

- **First stage** is that of dilatation of cervix. It begins with regular rhythmic contractions, ends with fully dilated cervix, generally lasts for 13 hours in primigravida and 7.5 hours in multigravida.
• **Second stage** is of expulsion. It begins with full dilatation of cervix and ends with the expulsion of the fetus, generally lasts for 1 hour in primigravida and 0.5 hour in multigravida.

• **Third stage** is of expulsion of placenta and membranes. It starts with the birth of the baby and ends with the complete expulsion of the placenta and membrane, generally lasts for 10 minutes in primigravida and multigravida.

• **Fourth stage** is one hour following the expulsion of placenta and membranes.

**Premonitory signs of labour**

There are some premonitory signs and symptoms of impending labour described below:

- **Lightening**: It is seen two to three weeks before the onset of labour, the lower uterine segment expands and allows the fetus to sink lower. With the descent of the foetus, engagement occurs. The fundus no longer presses the diaphragm and woman can breathe easily.

- **Cervical changes**: The cervix becomes soft and begins to efface and dilate slightly.

- **Show**: With the softening and effacement of the cervix the cervical mucus plug (operculum) is expelled resulting in a small amount of blood loss from the exposed cervical capillaries. This blood stained mucus discharge is termed as bloody show.

- **Frequency of Micturation**: Congestion of pelvis and pressure of gravid uterus leads to frequency of micturation.

- **Late pregnancy feeling**: Some woman experience a sudden burst of energy and a compulsion to clean everything or rearrange household things. This is often referred to as resting instinct.

One needs to differentiate between true and false labour pains. The comparison between the two is given below:

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<tr>
<th>SNo.</th>
<th>True Labour</th>
<th>False Labour</th>
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<tbody>
<tr>
<td>1</td>
<td>Contraction occur regularly</td>
<td>Contractions are irregular</td>
</tr>
<tr>
<td>2</td>
<td>Contraction increase in frequency,</td>
<td>Usually no change</td>
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<td></td>
<td>duration and intensity</td>
<td></td>
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<tr>
<td>3</td>
<td>Progressive effacement and dilatation of cervix</td>
<td>No increase in dilatation of cervix</td>
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<tr>
<td>4</td>
<td>Discomfort starts in the back and ache radiates</td>
<td>Not accompanied by back ache</td>
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<td></td>
<td>around to abdomen</td>
<td></td>
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<tr>
<td>5</td>
<td>Pain is not relieved by ambulation</td>
<td>May be reliev ed by ambulation</td>
</tr>
<tr>
<td>6</td>
<td>Show is usually present</td>
<td>Not present</td>
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**Physiological Changes in the First Stage of Labour**

There are some physiological changes seen in the first stage of labour. The changes are mainly fundal dominance, polarity, contraction and retraction, dilatation and
thinning of lower uterine segment, retraction ring, cervical effacement, show, formation of fore-water and rupture of membranes.

- **Fundal Dominance**: Each uterine contraction starts in the fundus near one of the cornua and spreads across and downwards. Each contraction is longest and intense in fundus. This pattern permits the cervix to dilate and fundus to expel the fetus.

- **Polarity**: A neuromuscular harmony prevails between the two poles or segments of the uterus through out labour. The upper pole contracts stronger and retracts to expel the fetus, the lower pole contracts slightly and dilates to allow expulsion to occur.

- **Contraction and Retraction**:
  - **Contraction**: is a temporary shortening and thickening of muscle fibres.
  - **Retraction**: is a permanent partial shortening of muscle fibres which has been in a state of contraction. In labour, the muscles of the upper segment contract and retract regularly, rhythmically and with increasing frequency, strength and duration. Each contraction has three phases: increment, acme and decrement.

- **Dilatation and Thinning of Lower Uterine Segment**: The thickening and shortening of the upper segment achieves dilatation and thinning of the passive lower segment.

- **Retraction Ring**: With progressive uterine contractions, the upper uterine segment becomes shorter and thicker and the lower uterine segment becomes thinner as it dilates. The Junction of the two segments is known as retraction ring.

- **Cervical Effacement**: It is the thinning of the cervix and the shortening of the cervical canal from its usual length of 2 to 3 cm to one, so it widens at the level of the internal os.

- **Show**: as a result of the dilatation of cervix, the operculum is expelled. This may occur a few hours before or within few hours after labour starts.

- **Formation of Forewater**: As the lower uterine segment stretches, the chorion becomes detached from it and the increased intra uterine pressure causes this sac of fluid to bulge through the dilated os. The bag of water seen in front of the well fitting head is called forewater and behind the hind-water.

- **Rupture of Membranes**: Ideally the rupture of membranes (ROM) occurs at the end of first stage of labour when cervix is fully dilated and no longer supports the bag of forewater. ROM may occur at any time during labour or even before labour starts.

**Check Your Progress 4**

1) Differentiate between true and false labour

<table>
<thead>
<tr>
<th>True Labour</th>
<th>False Labour</th>
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37
After understanding the Labour, its mechanism, normal signs and difference of true and false labour, we will see the care of the woman during the different stages of labour:

**Care of woman during first stage of labour**

- Confirm that the woman is having true labour pains.
- Labouring woman is welcomed in the labour room.
- Admission procedure is carried out like making admission slip, taking consent from her or her spouse, helping woman to change to hospital dress and safeguarding the personal belongings etc.
- Brief history is taken from her and also history from the OPD card reviewed, perineal hair can be clipped, shaving perineal area is not recommended due to the risk of infection. Enema is not given these days to the labouring woman due to associated infections and it may precipitate labour.
- Care of woman includes general and obstetrical examination, promotion of physical wellbeing, nutrition & hydration, bladder care and ongoing observation.

![Fig. 2.2: Pervaginal examination in labour](image)

1) **Examination (Refer Fig. 2.2)**

- The woman is examined and assessed for general condition. Note oedema, record pulse, blood pressure, test urine for sugar and protein.
- Palpate abdomen gently and with warm hands record fundal height, lie, presentation, position and level of head in fifths. Record duration and frequency of contractions.
- Record fetal heart rate and inform about fetal and maternal condition.
- Vaginal examination to confirm and diagnose labour and assess progress of labour. Record all information about maternal and fetal well-being in partogram.
2) **Promotion of physical wellbeing**

- The woman is allowed to ambulate if not contraindicated as in bleeding, rupture of membranes, pregnancy induced hypertension, cardiac disease or any medical problem. Ambulation may decrease the need for analgesics, shortens labour and decreases incidence of fetal heart rate abnormalities.
- Allow the mother to assume any comfortable position except dorsal recumbent which may result in supine hypotensive syndrome, leading to fetal distress.
- Encourage deep breathing during contraction.
- Massage back if she complains of back ache.
- Be with the woman, reassure her and encourage her to express her discomfort, fear and anxiety.
- Change the pad in excessive vaginal discharge.

3) **Nutrition and Hydration**

- The woman’s need for energy is met through nourishing clear oral fluids at frequent intervals.
- Solid foods are usually avoided since gastric emptying is prolonged during labour and also in anticipation of anaesthesia.
- Sometimes I/V fluids may be given to provide energy and prevent dehydration.
- If the mouth is dry provide mouth wash and sips of water.
- Maintain intake and output chart.

4) **Bladder Care**

To maintain empty bladder, the woman should be encouraged to pass urine every two to three hours during labour. The urine should be tested for the presence of glucose, ketones and proteins. A full bladder is associated with poor uterine contraction. It prevents descent of foetal head and can also cause injuries to bladder. Retention of urine frequently occurs in labour and catheterization may be required.

5) **Observation of labouring woman**

It is very essential to observe the reaction of woman to labour. Be with her during the progress of labour. She requires frequent observation of vital signs and progress of labour. Monitor her for the following:

- Temperature every 4 hours.
- BP, Pulse, and respiration every hour.
- Uterine contractions for frequency & duration are checked every 30 minutes.
- Provide sterile vaginal pad and if membranes are ruptured note the colour of liquor.
- Monitor fetal heart rate hourly to find out early signs of fetal distress.
Preventive and Promotional Aspects of Newborn

- Assess progress of labour like descent of head per abdomen, cervical dilatation and descent of head per vagina.

6) Promote rest and comfort

- Keep the woman informed about progress.
- Encourage mother to rest and let her relax her muscles in between contractions.
- Sips of water to provide moisture and relieve dryness of mouth.

7) Ambulation

If membranes are intact, woman can be asked to walk around. Ambulation can reduce the duration of labour, prevents veno-caval compression and descent of the head.

8) Preparation of delivery room

Delivery room should always be ready for conduction of labour. Safety of the labouring mother should always be ensured. If the woman is transferred from one bed to another it should be between contractions, supporting the mother adequately. Provide enough privacy. Maintain strict asepsis in the conduction of labour. Make sure that room is warm enough for the baby. Keep the radiant warmer switched on for 20-30 minutes prior to delivery. Ensure that the resuscitation trolley for the newborn is ready for use.

Care of woman during second stage of labour

- Assist the woman in her second stage of labour (dilatation of cervix to expulsion of fetus) in pushing efforts by giving prop up position with additional pillows. Encourage her to relax between contractions and push during contractions.
- Do maternal and fetal monitoring every 15 minutes.

Fig.2.3: Progress of labour during second stage
Conduction of labour

After being positioned for delivery, the perineum of the woman is cleaned and
delivery is conducted under strict aseptic conditions using universal precautions.
Refer Fig. 2.3 for progress of labour during second stage.

Fig. 2.4: Delivery of the baby

- **Steps to be observed during delivery process**

  There are certain steps to be observed during delivery process
  
  - **Control:** Control the head by flexing it as it is delivered to prevent
    perineal laceration.
  
  - **Cord:** Check that the cord is not around the neck, if so and it is loose,
    it can be slipped over the head, and if it is tight it should be clamped
    and cut. In case of normal cord, clamp the cord at 1-3 minutes.
  
  - **Airway:** Wipe out the secretions (mucus and liquor) from baby’s mouth.
    Do gentle suction if necessary.
  
  - **Rotation:** Wait for the natural rotation of the head.
  
  - **Shoulders:** Deliver the anterior shoulder first and then the posterior
    shoulder slowly.
  
  - **Syntocinon:** Give the mother IM syntocinon 1 ml when the baby’s anterior
    shoulder is delivered or after the expulsion of placenta to stimulate
    contractions and to prevent bleeding.
  
  - **Time:** Note the time of birth. Refer Fig. 2.4 for delivery of baby.
Care of woman during third stage and fourth stage of labour

Third stage of labour begins after the expulsion of fetus and ends with the expulsion of the placenta and membranes. Fourth stage of labour refers to period one hour after the delivery. Care of woman during third and fourth stage requires strict vigilance to prevent the complications important being postpartum haemorrhage. The care includes:

- Delivering the placenta (Refer Fig. 2.5).
- Watching the mother for bleeding in postpartum period.
- Monitoring vital signs of the mother every 15 minutes in the first hour following birth.
- Seeking assistance in case of spontaneous separation of placenta.

![Fig. 2.5(a): Mechanism of Placental separation](image)

![Fig. 2.5(b): Controlled cord traction for the delivery of placenta and membranes](image)
2.5.2 Care of Baby

The perinatal care of baby mainly includes care at birth. The first hour after birth has a major influence on the survival, future health and wellbeing of a newly born infant. The care given during this period is critical in helping to prevent complications and ensuring intact survival. A normal newborn weighs more than 2500 grams, breathes normally and regularly, has warm trunk and soles (temperature 36.5-37.4°C), pink in colour (no central cyanosis) with spontaneous body movements and actively sucks on breast.

The basic needs of a baby at birth

The four basic needs of ALL babies at the time of birth (and for the first few weeks of life) are:

- Warmth
- Normal breathing
- Mother’s milk
- Protection from infection

As these basic needs indicate, a baby’s survival is totally dependent upon her mother and other caregivers. Therefore, it is important to provide proper care to all the neonates immediately after birth. All newborns require essential newborn care to minimize the risk of illness and maximize their growth and development. This care will also prevent many newborn emergencies. For example, the umbilical cord may be the most common source of neonatal sepsis and also of tetanus infection, and good cord care can dramatically reduce the risks of these serious conditions. Breastfeeding has a significant protective effect against infections. Early breastfeeding and keeping the baby close to the mother also reduces the risk of hypothermia and hypoglycemia.

Immediate care of a normal newborn at the time of birth is as follows:

1) Call out the time of birth.
2) Deliver the baby onto a warm, clean and dry towel or cloth and keep on mother’s chest and abdomen (between the breasts).
3) Clamp and cut the umbilical cord in 1-3 minutes.
4) Immediately dry the baby with a warm clean towel or piece of cloth; wipe the eyes.
5) Assess the baby’s breathing while drying.
6) Wipe both the eyes (separately) with sterile cotton swabs/gauze.
7) Leave the baby between the mother’s breasts to start skin-to-skin care.
8) Place an identity label on the baby.
9) Cover the baby’s head with a cap. Cover the mother and baby with a warm cloth.
10) Encourage mother to initiate breastfeeding her baby.

The individual steps are briefly explained below:

1) **Call out the time of birth**  
   It is important to tell loudly the time of birth – this helps in accurate recording of the time and more importantly, alerts other personnel in case any help is needed.

2) **Receive the baby onto a warm, clean and dry towel or cloth on a warm dry surface**  
The baby should be delivered onto a warm and clean towel and kept on the mother’s chest/abdomen. If this is not possible, the baby should be kept in a clean, warm, safe place close to the mother.

3) **Clamp and cut the umbilical cord**  
The umbilical cord should be clamped after 1 to 3 minutes using a sterile, disposable clamp or a sterile tie and cut using a sterile blade about 3-5 cm away from the skin.

4) **Immediately dry the baby with a warm clean towel or piece of cloth; wipe the eyes**  
The baby should be thoroughly dried to prevent from getting cold. Blood or meconium on the baby’s skin should be wiped away; however, the white greasy substance covering the baby’s body (vernix) should not be wiped off. Because this vernix helps to protect the baby’s skin and gets reabsorbed very quickly.

5) **Assess the baby’s breathing while drying**  
   At the time of drying itself, the baby’s breathing should be assessed. A normal newborn should be crying vigorously or breathing regularly at a rate of 40-60 breaths per minute. If the baby is not breathing well, then the steps of resuscitation have to be carried out.

6) **Wipe both the eyes with sterile gauze**  
   Clean the eyes using sterile cotton swabs/gauze pieces. Use separate cotton swab/gauze for each eye. Wipe from the medial side (inner canthus) to the lateral side (outer canthus).

7) **Leave the baby between the mother’s breasts to start skin-to-skin care**  
   Once the cord is cut, the baby should be placed between the mother’s breasts to initiate skin-to-skin care. This will help in maintaining the normal temperature of the baby as well as in promoting early breastfeeding.
8) **Place an identity label on the baby**

This helps in easy identification of the baby, avoiding any confusion. The label should be placed on the wrist or ankle.

9) **Cover the baby’s head with a cap. Cover the mother and baby with a warm cloth**

Both the mother and the baby should be covered with a warm cloth, especially if the delivery room is cold (temperature less than 25°C). Since head is the major contributor to the surface area of the body, a newborn baby’s head should be covered with a cap to prevent loss of heat.

10) **Encourage the initiation of breastfeeding**

Breastfeeding should be initiated within one hour of birth in all babies.

**Priorities to be taken care of:**

Along with immediate care at birth one has to ensure warmth by maintaining warm chain. Normal breathing is to be established, in case if the baby is not breathing properly by taking appropriate measures. Breast feeding should be promoted within half an hour after birth and baby is to be protected from infection.

- **Ensuring warmth: “warm chain”**

A baby’s skin temperature falls within seconds of being born. If the temperature continues to fall, the baby will become ill and may even die. This is why a baby MUST be dried immediately after birth and delivered onto a warm towel or piece of cloth, and loosely wrapped before being placed (naked) between the mother’s breasts.

Keeping the baby between the mother’s breasts also ensures that the baby’s temperature is kept at the correct level for as long as the skin contact continues. This first skin-to-skin contact should last uninterrupted for at least one hour after birth or until after the first breastfeed. The mother and baby should be covered with a warm and dry cover, especially if the room temperature is lower than 25°C.

For maintaining the temperature, it is important to understand the concept of “Warm Chain”. It means that the temperature maintenance should be a continuous process starting from the time of delivery and continued till the baby is discharged from the hospital. The components of warm chain are summarized below:

i) **At delivery:**

‘Warm chain’ (Refer Fig. 2.6)

- Ensure the delivery room is warm (25°C), with no draughts.
- Dry the baby immediately; remove the wet cloth.
- Wrap the baby with clean dry cloth.
- Keep the baby close to the mother (ideally skin-to-skin) to stimulate early breastfeeding.
- Postpone bathing/sponging for 24 hours.
ii) After delivery:

- Keep the baby clothed and wrapped with the head covered.
- Minimize bathing especially in cool weather or for small babies.
- Keep the baby close to the mother.
- Use kangaroo care for stable LBW babies and for re-warming stable bigger babies.
- Show the mother how to avoid hypothermia, how to recognize it, and how to rewarm a cold baby.
- The mother should aim to ensure that the baby’s feet are warm to touch.

![Fig. 2.6: Maintenance of warmth](image)

- **Helping baby to establish normal breathing**

  The baby’s breathing should be assessed at the time of drying. If the baby is crying vigorously or breathing adequately (chest is rising smoothly at a rate of 40 to 60 times per minute), then no intervention is needed. However, if the baby is not breathing or gasping, then skilled care in the form of positive pressure ventilation might be required.

- **Initiating breastfeeding**

  During the initial skin-to-skin contact position after birth, the baby should be kept between the mother’s breasts; this would ensure early initiation of breastfeeding. Initially, the baby might want to rest and would be asleep. This rest period may vary from a few minutes to 30 or 40 minutes before the baby shows signs of wanting to breastfeed. After this period the baby will usually open his/her mouth and start to move the head from side to side; may also begin to dribble. These signs indicate that the baby is ready to breastfeed. The mother should be helped in feeding the baby once the baby shows these signs. Both the mother and the baby should be in a comfortable position. The baby should be put next to the mother’s breast with his mouth opposite the nipple and areola. The baby should attach to the breast by itself when it is ready. When the baby is attached, attachment and positioning should be checked. The mother should be helped to correct anything which is not quite right.

- **Prevention of infections: Clean Chain**

  Babies are securely placed in their mother’s womb. When they are born, they have to be protected from the adverse environment of the surroundings.
Cleanliness at delivery reduces the risk of infection for the mother and baby, especially neonatal sepsis and tetanus. Cleanliness requires mothers, families, and health professionals to avoid harmful traditional practices, and prepare necessary materials. Hand washing is the single most important step to be emphasized to both family members and health care workers. Similar to warm chain “Clean Chain” has to be followed both at the time of delivery and then till the time of discharge to protect the infant from infections. The components of clean chain are summarized below:

**Clean Delivery (WHO six Cleans)**

‘Clean Chain’
- Clean attendant’s hands (washed with soap).
- Clean delivery surface.
- Clean cord-cutting instrument (i.e. razor, blade).
- Clean string to tie cord.
- Clean cloth to wrap the baby.
- Clean cloth to wrap the mother.

**After delivery:**
- All caregivers should wash hands before handling the baby.
- Feed only breast milk.
- Keep the cord clean and dry; do not apply anything.
- Use a clean cloth as a diaper/napkin.
- Wash your hands after changing diaper/napkin. Keep the baby clothed.

**Immediate Cord Care**

The umbilical cord can be cut and clamped/tied while the baby is on the mother’s abdomen or on a warm, clean and dry surface. The steps of clamping, cutting the cord and its care after cutting are summarized below:

**Steps of immediate care of the umbilical cord**

1) Put the baby on mother’s abdomen or on a warm, clean and dry surface close to the mother.
2) Change gloves; if not possible, wash gloved hands.
3) Put ties (using a sterile tie) tightly around cord at 2 cm and 5 cm from the abdomen.
4) Cut between the ties with a sterile instrument (e.g. blade).
5) Observe for oozing blood. If blood oozes, place a second tie between the skin and first tie.
6) Do not apply any substance to the stump.
7) DO NOT bind or bandage stump.
8) Leave stump uncovered.

**Note:** Applying traditional remedies to the cord may cause infections and tetanus.
- **Eye Care**
  Eye care is given to protect a baby’s eyes from infection. The baby’s eyes should be wiped as soon as possible after birth. Both eyes should be wiped gently with separate sterile swabs soaked in warm sterile water.

- **Monitoring the baby**
  During the first hour after delivery, the baby (and the mother) should be monitored every 15 minutes. Both of them should remain in the delivery room for the first hour to facilitate monitoring.

  The two most important parameters that need to be monitored are:
  i) Breathing and
  ii) Temperature or warmth

  The health personnel should monitor all the parameters every 15 minutes for the first hour after birth of the baby.

**Check Your Progress 6**

1) What are the basic needs of a baby at birth?

2) Enumerate the steps of immediate care of a normal newborn at birth

3) Define warm chain

4) How is the warm chain maintained after delivery?
2.6 POSTNATAL CARE

Postnatal care includes systematic examination of the mother and the baby and appropriate advices given to the mother during the postpartum period.

2.6.1 Mother

The puerperium (postnatal period) is divided into immediate (the first 24 hrs), early (upto 7 days) and remote up to the six weeks. The first postnatal examination is done and the advice is given on discharge of the patient from hospital. The second routine postnatal examination is conducted at 6 weeks after delivery.

The postnatal advices include general advices related to health and wellbeing. Guidance related to family planning is given. The advices are given in the following areas:

- **Rest:** Take adequate rest. Rest is required for the mother to recover quickly. She has to lie down for 2 hours during day time.

- **Ambulation and exercises:** Walk as early as possible. Walking and moving about soon after delivery is not harmful for the mother. Doing light household work is allowed. Exercises as tolerated by postnatal woman can be allowed.

- **Weight lifting:** Mother should avoid heavy or load bearing work in the first six weeks after delivery.

- **Hygiene:** Mother should bathe regularly and use clean clothes to prevent infection.

- **Nutrition:** Mother needs to eat extra for herself and to make breast milk for the baby also. Healthy mother can produce better quality and quantity of milk.
  - Mother requires two balanced big meals and two small meals in a day to meet her nutritional requirement. She has to take at least 8-10 glasses of water and 2 glasses of milk in a day.
  - Mother needs to eat food prepared from locally available food. No special food is required for the mother.
  - No food is harmful to the mother or for the baby. There is no specific hot/cold food, or any food that mother should or should not eat, during breastfeeding.
  - Baby requires frequent feeding (every two-three hours and should be fed on demand) 8-10 times a day.
Preventive and Promotional Aspects of Newborn

- Mother should eat balanced diet and drink more fluids/water to have adequate breast milk.

**Management of ailments**

Usually all women continue to have vaginal bleeding/discharge for 1-2 weeks after delivery.

- Ask/ examine the colour of discharge, it changes from Red-to-Brown-to-Yellowish. Some also experience slight pain in the abdomen and genital region/pain during urination.

- Inform mother and the family about the danger signs in women after delivery. She should report immediately to the hospital in case of appearance of danger signs as follows:
  
  o heavy bleeding: if she needs to change pads every hour - two hours or passing blood clots of the size of a fist,
  
  o high fever,
  
  o convulsion/fits,
  
  o foul smelling discharge, and severe pain in the abdomen.

**Prevention of infection**

Many of the infections and diseases can be avoided by following some simple clean practices. Clean hands, clean bed and clean room can prevent many infections in the baby and mother.

  o Hand washing with soap is one of the most effective ways of preventing infection like diarrhoea.

  o The mother should be asked to wash hands before breastfeeding, cooking food, eating, after cleaning the urine/stool of the baby or changing nappies, after using toilet and additionally whenever she feels necessary.

  o Advise the mother to keep the baby’s room clean. Use clean clothes, blanket/sheets for the baby and mother.

  o Advice her to keep the nails clean and trimmed regularly.

  o All family members must follow clean practices.

Mothers who have delivered by caesarean section need to follow the advices of the doctor regarding rest, food, work etc.

2.6.2 Baby

- Rooming-in of the baby with the mother is initial and most important step to develop emotional relationship with each other.

- Exclusive breast feeding to the baby is the priority. Teaching mother to avoid giving honey, glucose water or tea and other pre-lacteal feeds to the baby. Also, guide the mother not to dispose off colostrum (milk secretion for the first three days of lactation) but to provide it to the baby since it contains energy, proteins and protective antibodies for the newborn.

- Noting the skin, eyes, feeding status, reflexes, temperature, stools and condition of umbilical stump. Be alert for the changes in any of these.
• Baby bath to be initiated and taught to the mother. It has to be however, delayed till next day of baby birth when the temperature has stabilized for the baby. Baby should be thoroughly dried and properly clothed. Soap to be used should be unmedicated. The room where the baby is given bath should be warm. During winters, sponge bath is preferable. Dip baths are not to be given till the cord had fallen. Baby should maintain warm and pink hands and feet. Skin massage can be given as required with olive oil or coconut oil.

• Eye care should be done regularly. They are to be cleaned with sterile cotton swabs that have been soaked in Normal Saline. Use one swab for each eye. The use of Kajal in eyes should be avoided.

• Cord care to be provided. It should be inspected regularly. Nothing to be applied to the tip and base of stump. Keep the cord dry.

• Clothing for the baby should be adequately fit, loose rather than tight, soft and made of cotton. Nappies should also be thick but soft and of a good absorbent material so that it readily soaks urine/stools.

• Monitoring for the development of jaundice, fever and infection of cord poor or refusal to feed, bleeding, vomiting, diarrhoea, excessive drooling/crying/choking on feeding, apnea, cyanosis, seizures and temperature fluctuations should be done.

• Weight should be checked periodically. Weight loss is common during first 2 to 3 days of life and then is gained again by the end of first week of birth.

• Protection of baby against chills, extremes of temperature, insects and mosquitoes should to be done.

2.7 HOME BASED NEWBORN CARE (HBNC)

Home Based Newborn Care refers to the care provided to the newborn at home after discharge from the hospital. When the newborn returns home along with the mother, although the newborn has crossed the critical first day, there is still the remainder of first week and month during which neonatal mortality could be as high as 54% and for which care has to be provided.

Objectives of HBNC

The main objective of HBNC is to decrease neonatal mortality and morbidity through:

The provision of essential newborn care to all newborns and the prevention of complications by the means of the following:

• Early detection and special care of preterm and low birth weight newborns

• Early identification of illness in the newborn and provision of appropriate care and referral

• Support to the family for adaptation of healthy practices and build confidence and skills of the mother to safeguard her health and that of the newborn

Activities in HBNC

• Care for every newborn through a series of home visits by a trained health worker like ASHA in the first 6 weeks of life.
Preventive and Promotional Aspects of Newborn

- Providing information and skills to the mother and family of every newborn to ensure better health outcomes.
- An examination of every newborn for prematurity and low birth weight.
- Extra home visits for preterm and low birth weight babies by the ASHA worker or ANM.
- Early identification of illness in the newborn and provision of appropriate care at home during home visits.
- Follow-up for sick newborns after they are discharged from facilities.
- Counselling the mother on postpartum care, recognition of postpartum complications and enabling referral.
- Counselling the mother for adaptation of an appropriate family planning method.

Check Your Progress 7

1) Define home based newborn care (HBNC)


2.8 HIGH RISK PREGNANCY AND ITS IMPLICATIONS ON NEWBORN OUTCOME

A pregnancy is considered high-risk when there are potential complications that could affect the mother, the baby, or both.

Reasons that a pregnancy may be considered high risk and the implications of the same on newborn outcome include following:

- **Maternal Age:** One of the most common risk factors for a high-risk pregnancy is the age of the mother-to-be. Women who are under 17 are at high risk for delivering preterm babies or have growth retardation leading to increased risk of Infant Mortality rate. Such babies also have high risk for complications like respiratory distress syndrome and intestinal problems.
  
  For women who are over 35 or 40 the risk of low birth weight, miscarriage, premature birth, multiple births, preeclampsia, gestational diabetes, increased chances of cesarean section and risk for genetic defects/chromosomal abnormalities like Downs Syndrome is high which further increases after age of 40.

- **Medical conditions that exist before pregnancy:** Conditions such as high blood pressure; respiratory, kidney, or heart problems; diabetes; autoimmune disease; sexually transmitted diseases (STDs); or chronic infections such as human immunodeficiency virus (HIV) can present risks for the mother and/or her unborn baby. A history of miscarriage, problems with a previous
pregnancy or pregnancies, or a family history of genetic disorders are also risk factors causing high-risk pregnancy.

**Malnutrition in the mother** can lead to anemia, poor fetal growth, poor brain development. **Asthma** is associated with fetal growth retardation. **Diseases of heart** like Rheumatic heart disease, congenital heart defect is associated with increased risk of abortion, perinatal asphyxia and prematurity. **Chronic Nephritis** leads to premature delivery and growth retardation with respiratory distress syndrome, congenital anomalies, seizures and septicemia. **Jaundice in mother** leads to abortions, still births, prematurity and higher perinatal mortality and morbidity. **Infections of genital tract** like mycoplasma and Chlamydia leads to low birth weight and prematurity. **Malaria** in mother is also an important cause of intrauterine growth retardation.

- **Medical conditions that occur during pregnancy**: Even if a woman is healthy when she becomes pregnant, it is possible to develop or be diagnosed with problems during pregnancy that can affect her and her baby. Two of the more common pregnancy-related problems are given below:

  o **Preeclampsia** is a syndrome that includes high blood pressure, urinary protein, and swelling; it can be dangerous or even fatal for the mother or baby if not treated.

    Preeclampsia can lead to prematurity, intrauterine growth retardation and perinatal mortality. It is associated with placental insufficiency, fetal hypoxia and intrauterine growth retardation. Babies can also develop asphyxia, polycythemia and hypoglycemia. Respiratory distress syndrome is also common due to meconium aspiration in the babies. With proper management, however, most women who develop preeclampsia have healthy babies.

  o **Gestational diabetes** is a type of diabetes that develops during pregnancy. The impact of Gestational Diabetes includes large, moon faced infants who are born preterm with birth asphyxia, birth injuries including cephalheminoma, subdural hemorrhage, facial palsy, clavicluar fracture and brachial plexus injuries. Hyaline membrane disease causes respiratory distress, hyperbilirubinemia, polycythemia, hypoglycemia, seizures, cyanosis and increased coagulation of blood. Congenital heart disease, neural tube defects, musculoskeletal abnormalities and renal agenesis are other common problems seen in babies.

    Women with gestational diabetes may have healthy pregnancies and babies if they follow the treatment plan from their health-care provider. Usually the diabetes resolves after delivery. However women with gestational diabetes are at increased risk of developing type 2- diabetes.

- **Pregnancy-related issues**: Often a pregnancy is classified as high risk because of issues that arise from the pregnancy itself and that have little to do with the mother’s health. These include following:

  o **Premature labor** is labor that begins before 37 weeks of pregnancy. Although there is no way to know which women will experience preterm labor or birth, there are factors that place women at higher risk, such as certain infections, a shortened cervix, or previous preterm birth.
Preventive and Promotive Aspects of Newborn

Premature labour causes babies to be born preterm. These babies have functional immaturity of various body systems. They are usually lethargic, have poor cough reflex, are at high risk for pulmonary aspiration, atelectasis, chronic pulmonary insufficiency, patent ductus arteriosus, thromboembolic complications, hypertension, hypothermia, infections, poor renal maturity, anemia, hypoglycemia, hypocalcaemia, hyponatremia and acidosis.

- **Multiple births** means when a woman is carrying more than one baby (twins, triplets, quadruplets, etc.). Multiple pregnancies, which are more common as women are using more infertility treatments, increase the risk of premature labor, polyhydramnios, placenta previa, gestational diabetes, and pregnancy-induced high blood pressure with increased risk for congenital anomalies like anencephaly, anomalies of rudiments and organs.

- **Placenta previa** is a condition in which the placenta covers the cervix. The condition can cause bleeding, especially if a woman has contractions. If the placenta still covers the cervix close to delivery, a cesarean section may be scheduled to reduce bleeding risks to the mother and baby.

- **Fetal problems**, which can sometimes be seen on ultrasound. Approximately 2% to 3% of all babies have a minor or major structural problem in development. Sometimes there may be a family history of fetal problems, but other times these problems are completely unexpected. The fetal problems arise congenitally and include Hirschprungs disease, abdominal wall defects, neural tube defects, hydrocephalus and congenital heart diseases causing increased infant mortality and morbidity.

### Check Your Progress 8

1) Define high risk pregnancy

2) List down any three conditions covered under high risk pregnancy
2.9 LET US SUM UP

In this unit you have been introduced to antenatal, perinatal and postnatal care given to the mother and newborn. You have learnt the definitions, objectives of antenatal care, assessment during antenatal period, antenatal advices, perinatal care of mother and baby, postnatal care of mother and baby, HBNC and high risk pregnancy and its implications on newborn outcome. The care provided to mother and baby can be summarized as presented in Fig. 2.7 on Page 59, which shows the continuum of care to be provided to mother & her baby before, during and after pregnancy. Hope this unit helped you to get acquainted with the Nursing Care to be provided in antenatal, perinatal and postnatal periods.

2.10 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress 1

1) Antenatal care refers to the care given to an expectant mother from the time of confirmed conception until the beginning of labour.

2) Purposes of Antenatal Care are to:

- promote, protect and maintain the health of the mother during pregnancy
- recognize deviation from normal and provide management or treatment as required.

Check Your Progress 2

1) Importance of history taking in antenatal period

   i) diagnose pregnancy (first visit only, if required);

   ii) identify any complications during previous pregnancies that may have an impact on the present one;

   iii) Identify any medical or obstetric condition(s) that may complicate the present pregnancy (first and subsequent visits).

2) Symptoms indicating discomfort during pregnancy are:

- Nausea and vomiting
- Heartburn
- Constipation
- Increased frequency of urination

3) Symptoms indicating that a complication may be arising are:

- Fever
- Palpitations, fatigue and breathlessness at rest
- Generalized swelling of the body; puffiness of the face
- Decreased or absent foetal movements
- Passing smaller amounts of urine
Preventive and Promotional Aspects of Newborn

- Vaginal discharge
- Vaginal bleeding
- Leaking of watery fluid per vagina (P/V)

4) Special investigations required during antenatal period by most women are:

i) Serology test for rubella, hepatitis B and Human Immuno deficiency virus (HIV) screening

ii) Genetic screening in which maternal serum alfa fetoprotein (MSAFP) at 15-18 weeks for all the mothers to rule out neural tube defect, Down’s syndrome, or other chromosomal anomalies is performed.

iii) Ultrasound examination: Ultrasound examination is done in the first trimester either trans-vaginal or trans-abdominal.

Check Your Progress 3

1) Areas in which antenatal advices given are:

Nutrition and Iron and Folic Acid supplementation, exercises, rest and sleep, hygiene including dental care, clothing, travel, alcohol and smoking, sexual intercourse, drugs, infection etc.

2) Two doses of tetanus toxoid are required in pregnancy, first dose after first trimester and second dose after one month of previous dose.

3) Danger signs in pregnancy are:

- Vaginal bleeding.
- Persistent abdominal pain.
- Reduced/ no fetal movement.
- Frontal or recurrent headaches
- Sudden swelling of feet, fingers and face.
- Rupture of membranes and leaking of clear water per vagina
- Vaginal discharge with itching or odour
- Premature onset of contractions

4) An institutional delivery is required in

- Severe anaemia
- Pre-eclampsia/eclampsia (in either the previous pregnancy or in the present one)
- APH
- PPH in the previous pregnancy
- More than 5 previous births
- Transverse foetal lie or any other obvious mal-presentation within one month of the EDD
Antenatal, Perinatal and Postnatal Care

- Previous caesarean section
- Previous assisted vaginal delivery
- Multiple pregnancies
- Age less than 16 years
- Previous documented third-degree tear
- PROM, with no labour pains even after 8 hours of rupture.

Check Your Progress 4

1) Difference between true and false labour

<table>
<thead>
<tr>
<th>True Labour</th>
<th>False Labour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractions occur regularly</td>
<td>Contractions are irregular</td>
</tr>
<tr>
<td>Contractions increase in frequency, duration</td>
<td>Usually no change</td>
</tr>
<tr>
<td>and intensity</td>
<td></td>
</tr>
<tr>
<td>Progressive effacement and dilatation of cervix</td>
<td>No increase in dilatation of cervix</td>
</tr>
<tr>
<td>Discomfort starts in the back and ache radiates</td>
<td>Not accompanied by back ache</td>
</tr>
<tr>
<td>around to abdomen</td>
<td></td>
</tr>
<tr>
<td>Pain is not relieved by ambulation</td>
<td>May be relieved by ambulation</td>
</tr>
<tr>
<td>Show is usually present</td>
<td>Not present</td>
</tr>
</tbody>
</table>

Check Your Progress 5

1) Observation of labouring woman includes:
   - Temperature every 4 hours
   - BP, Pulse, and respiration every hour
   - Uterine contractions for frequency, duration are checked every 30 minutes.
   - Provide sterile vaginal pad and if membranes are ruptured note the colour of liquor.
   - Monitor fetal heart rate hourly to find out early signs of fetal distress.
   - Assess progress of labour like descent of head per abdomen, cervical dilatation and descent of head per vagina.

Check Your Progress 6

1) The four basic needs of ALL babies at the time of birth (and for the first few weeks of life) are:
   - Warmth
   - Normal breathing
   - Mother’s milk
   - Protection from infection
2) The steps of immediate care of the newborn at birth are as follows:

1) Call out the time of birth.
2) Deliver the baby onto a warm, clean and dry towel or cloth and keep on mother’s chest and abdomen (between the breasts).
3) Clamp and cut the umbilical cord in 1-3 minutes.
4) Immediately dry the baby with a warm clean towel or piece of cloth; wipe the eyes.
5) Assess the baby’s breathing while drying.
6) Wipe both the eyes (separately) with sterile cotton swabs/gauze.
7) Leave the baby between the mother’s breasts to start skin-to-skin care.
8) Place an identity label on the baby.
9) Cover the baby’s head with a cap. Cover the mother and baby with a warm cloth.
10) Initiate breast feeding.

3) Warm chain refers to the temperature maintenance starting from the time of delivery and continued till the baby is discharged from the hospital.

4) The components of warm chain after delivery are:
   • Keep the baby clothed and wrapped with the head covered.
   • Minimize bathing especially in cool weather or for small babies.
   • Keep the baby close to the mother.
   • Use kangaroo care for stable LBW babies and for re-warming stable bigger babies.
   • Show the mother how to avoid hypothermia, how to recognize it, and how to rewarm a cold baby.
   • The mother should aim to ensure that the baby’s feet are warm to touch.

5) The components of clean chain, (WHO six Cleans) are:
   • Clean attendant’s hands (washed with soap).
   • Clean delivery surface.
   • Clean cord-cutting instrument (i.e. razor, blade).
   • Clean string to tie cord.
   • Clean cloth to wrap the baby.
   • Clean cloth to wrap the mother.

**Check Your Progress 7**

1) Home Based Newborn Care refers to the care provided to the newborn at home after discharge from the hospital.
Check Your Progress 8

1) A pregnancy is considered high-risk when there are potential complications that could affect the mother, the baby, or both.

2) Conditions in pregnancy considered as high risk are:
   - Maternal Age (under 17 or over 35)
   - Medical conditions that exist before pregnancy: Conditions such as high blood pressure; problems related to respiratory, kidney, or heart problems; diabetes; autoimmune disease; sexually transmitted diseases (STDs); or chronic infections such as human immunodeficiency virus (HIV)
   - Medical conditions that occur during pregnancy like pre-eclampsia, Gestational diabetes.
   - Pregnancy-related issues like premature labor, multiple births (twins, triplets, quadruplets, etc.), placenta previa and fetal problems etc.

Fig. 2.7: Continuum of care for Maternal and newborn survival
2.11 REFERENCES

- Bobak, Maternity Nursing, 4th edition, Mosby, St. Louies Missouri.
- [www.nipi.org.in/Items/Resources_OtherPublications_BrochureHB](http://www.nipi.org.in/Items/Resources_OtherPublications_BrochureHB).
UNIT 3 ORGANIZATION OF NEWBORN CARE FACILITIES

Structure

3.0 Objectives
3.1 Introduction
3.2 Levels of Newborn Care Services
   3.2.1 Level 1 Services at Subcenter/Primary Health Center
   3.2.2 Level 2 Services at CHC/FRU
   3.2.3 Level 3 Services at District Hospital
3.3 Organization of Newborn Care Services
   3.3.1 Design of Newborn Care Corner
   3.3.2 Design of Newborn Stabilization Unit
   3.3.3 Design of Special Newborn Care Unit
3.4 Infection Control in Newborn Unit
3.5 Let Us Sum Up
3.6 Answer to Check Your Progress
3.7 References

3.0 OBJECTIVES

After completing this unit, you should be able to:

- Describe the levels of newborn care services;
- Explain the organization of newborn care services;
- List the equipments necessary for newborn care unit;
- Discuss the manpower requirement of newborn care unit; and
- Brief the infection control measures in newborn care unit.

3.1 INTRODUCTION

In the previous two units you learnt about care of mother and baby. The care of newborn requires a particular setting/unit. This unit discusses the Organization of newborn health care facilities. Each year in India roughly 30 million women experience pregnancy and about 27 million have a live birth. India’s share of neonatal deaths in the world is around 30% of the global neonatal deaths. Every year about 12 lakh infants die within 1 year of birth and out of these about 9 lakh i.e. 2/3 of infant deaths take place within the first 4 weeks of life. Of these about 7 lakh deaths take place within a week of birth. In addition, millions of newborns suffer birth related ill health. Thus, birth related mortality and morbidity continues to take a huge toll on the life of newborns.

Hence, in the present scenario, the newborn care unit has become an essential part of any health facility where birth takes place. The newborn care unit can ameliorate complications and reduce the number of deaths among newborns. It provides good services not only to neonates who are born within the vicinity of
Preventive and Promotional Aspects of Newborn

the health facility but also from other places/hospitals. Organization of newborn care units is discussed in this unit.

In this unit, you shall learn about the organization of Newborn care units and infection control measures in Newborn care units.

### 3.2 LEVELS OF NEWBORN CARE SERVICES

Based on the health facility, newborn care services are provided at 3 levels.

#### 3.2.1 Level I

Newborn care services are provided in the Primary Health Center/Sub Center which has been identified as Maternal and Child Health level 1 centers. The **Newborn Care Corner Unit (NCCU)** i.e. a space within the delivery room where immediate care is provided to all newborns at birth is set up in this facility. This area is MANDATORY for all health facilities where deliveries are conducted.

#### 3.2.2 Level II

Newborn care services are provided at the Community Health Centers/First Referral Unit which have been identified as Maternal and Child Health level II Centers. In addition to Newborn Care Corner (NCCU) set up in labour room and Operation Theater in this center, **Newborn Stabilization Unit (NBSU)** i.e. a facility within or in close proximity of the maternity ward where sick and low birth weight newborns can be cared for short periods is set up. All First Referral Units (FRUs)/CHCs need to have a Neonatal Stabilization Unit, in addition to the newborn corner.

#### 3.2.3 Level III

Newborn care services are provided at the District Hospitals which have been identified as Maternal and Child Health level 3 Centers. In addition to Newborn Care Corner unit (NCCU) set up in labour room and Operation Theater, **Special Newborn Care Unit (SNCU)** i.e. a neonatal unit in the vicinity of Labor Room for providing Special Care (all care except assisted ventilation and major surgery) for sick newborns is also set up in these centres. Any facility with more than 3000 deliveries per year should have a SNCU.

### 3.3 ORGANIZATION OF NEWBORN CARE SERVICES

National Neonatology Forum (NNF) has recommended the following standards for organizing newborn care services at all 3 levels.

#### 3.3.1 Design of Newborn Care Corner

**Location and Size**

Newborn care corner is set up within the labour room of all health facilities for providing immediate newborn care to all newborns. It should be 20-30 sq ft in size with the clear floor area. It should be equipped with a radiant warmer and resuscitation kit. The area should be away from draughts of air and should have appropriate power connection for plugging in the radiant warmer. For FRUs (First Referral Units) and district hospitals, newborn corners are set up in operation
theatres where caesarean sections are conducted. It provides an acceptable environment for all infants at birth.

**Equipment required for the Newborn Care corner**

The table 3.1 lists the equipments required in the Newborn Care corner

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Item Description</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Open care system: radiant warmer, fixed height, with trolley, drawers, oxygen -bottles</td>
<td>E</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Resuscitator, hand-operated, neonate (500ml)</td>
<td>E</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Weighing Scale, spring balance</td>
<td>E</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Pump suction(foot operated)</td>
<td>D</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Room Thermometer</td>
<td>E</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Examination light (mobile) (220-12 V)</td>
<td>D</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>I/V Cannula (24 G, 26 G)</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Disposable mucus extractor (Dee Lee trap) (20ml)</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Towels for drying and wrapping the baby</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Sterile equipment for cutting and tying the cord</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Disposable feeding tube (7-8 F)</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Oxygen cylinder with flow meter and tubings</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Sterile Gloves</td>
<td>E</td>
<td></td>
</tr>
</tbody>
</table>

**Staffing required for the Newborn Care Corner**

One staff nurse or ANM is desirable in addition to the one conducting the delivery for providing appropriate care at birth.

**Services provided in the Newborn Care Corner**

Services provided in the Newborn Care Corner include:

- Essential care at birth
- Resuscitation
- Provision of warmth
- Early initiation of breastfeeding
- Weighing the neonate

**3.3.2 Design of Newborn Stabilization Units (in CHC/First Referral Units)**

**Location and Size**

All CHC/ first referral units must have clearly established arrangements for the prompt, safe and effective resuscitation of babies and for the care of sick newborns.
Most sick newborns can be stabilized at this level. For setting up a 4 bedded stabilization unit, where 4 radiant warmers can be kept, at least 200 sq ft of floor space (40-50 sq. ft. per bed) is required. The unit should be located within or in close proximity to the labor room. In addition, 2 beds in the postnatal ward should be dedicated for rooming in. The unit should have a 24 hour uninterrupted stabilized power and running water supply. The unit should be well lit, preferably with compact fluorescent light (CFL) panels. The floor surfaces should be easily cleanable, thus minimizing the growth of microorganisms. As with floors, the ease of cleaning, durability, and acoustical properties of wall surfaces needs to be considered.

**Equipment required for Newborn Stabilization Unit**

The **Table 3.2** lists the equipments required in the Newborn Stabilization Unit.

**Table 3.2 : Equipments in the Newborn Stabilization Unit**

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Item Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Open care system: radiant warmer, fixed height, with trolley, drawers, oxygen bottles</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>Resuscitator, hand-operated, neonate (500ml)</td>
<td>2</td>
</tr>
<tr>
<td>3.</td>
<td>Laryngoscope with two blades 0 and 1</td>
<td>2</td>
</tr>
<tr>
<td>4.</td>
<td>Electronic baby weighing scale up to 10 kg</td>
<td>&gt; 1</td>
</tr>
<tr>
<td>5.</td>
<td>Pump suction (foot operated)</td>
<td>1</td>
</tr>
<tr>
<td>6.</td>
<td>Clinical thermometer (digital, 32-34°C)</td>
<td>4</td>
</tr>
<tr>
<td>7.</td>
<td>Light examination, mobile (220-12 V)</td>
<td>4</td>
</tr>
<tr>
<td>8.</td>
<td>Hub Cutter, syringe</td>
<td>1</td>
</tr>
</tbody>
</table>

**Renewable Resources**

9. I/V Cannula (24 G, 26 G)

10. Extractor/mucus/20ml/sterile/disposable (Dee Lee)

11. Disposable feeding tube (7-8 F)

12. Oxygen cylinder, catheter (8 F)

13. Sterile Gloves

14. Disposable suction catheter (10F)

15. Cotton wool (500g)

16. Disinfectants like cidex 2%, bacillocid (10%), chlorhexidine (20%) etc

**Staffing required for Newborn Stabilization Unit**

One dedicated nursing staff needs to be available round-the-clock for newborn care in the stabilization unit. One medical officer, skilled in newborn care or pediatrician is required for clinical care and oversight.
Services provided in the Newborn Stabilization Unit

A Stabilization Unit at CHC/FRU or an equivalent facility provides the following services:

- Care at birth
- Provision of warmth
- Resuscitation
- Monitoring of vital signs
- Initial care and stabilization of sick newborns
- Care of low birth weight newborns not requiring intensive care
- Breast feeding and feeding support
- Referral services

Referral services

Each newborn stabilization unit accepting sick newborns and required to make neonatal referrals should have access to an appropriately staffed and equipped transport service.

3.3.3 Design of Special Newborn Care Unit (in District Hospital)

Location and Size: The Special newborn care unit should be located in a distinct area within the healthcare facility, with controlled access and environment. The unit should be in close proximity to the area of the hospital where births occur, preferably close to the labour room. If obstetric and neonatal services are on separate floors of the hospital, provision for quick access like a ramp or an elevator should be provided for service between the birthing unit and the care unit. Units receiving infants from other facilities should have ready access to the hospital’s transport receiving area. Transport of newborns within the hospital should be possible without using public corridors. It should provide effective circulation for staff, family, and equipment. Passage for accessing other services should not be through the unit.

Regarding the size of the unit, as a general guide for all deliveries occurring within the health facility, three beds for every 1,000 annual deliveries may be dedicated to the newborn care unit. This demand is for intramural deliveries (those occurring within the district hospital). Additionally, for newborns delivered outside the hospital (extramural) and being brought to the hospital for special care, an extra allowance of 30 per cent of the estimated beds should be considered. For example, if a hospital conducts 3,000 deliveries per year, the number of beds required would be:

- For intramural: $\frac{3}{1000} \times 3000 = 9$ beds
- For extramural: $30\% \times 9 = 3$ beds
- Total beds required = 12

The units providing special care should have a minimum of 8 beds and a maximum of 16 beds. Each newborn space shall contain a minimum of 100 square feet (Baby care area: 50 sq ft per bed and General support and ancillary areas: 50 sq ft per bed). The baby care area (50 sq ft per bed) may be divided into two
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interconnected rooms separated by transparent observation windows with the nurses’ work place in between. Distinct support space should be provided for all clinical services that are routinely performed in the SNCU.

The ancillary area should include space for the following:

- Gowning area at the entrance
- Hand washing stations
- Examination area
- Clean area for mixing intravenous fluids and medications
- Mother’s area for expression of breast milk, breastfeeding and learning mother crafts
- Side laboratory
- Boiling and autoclaving

**Gowning room:** The unit should provide clear floor space, excluding entry work area, for gownsing. A hands-free, elbow-operated hand-washing station for hand hygiene and areas for gownsing and storage of clean and soiled materials should be provided near the entrance. The room should have self-closing devices on all exits.

**Hand washing stations:** Hand washing stations should be so positioned that every newborn bed is within 20 feet (6 meters). Hand washing stations should be no closer than three feet (0.9 meters) from a newborn bed or clean supply storage. It should be a hands-free, elbow operated hand washing station. Hand washing sinks should be large enough to control splashing and signed to prevent standing or retained water. Preferably, the hand washing sink should be 24" wide × 16" front to back × 10" deep. Space for pictorial hand washing instructions should be provided above all sinks.

**Examination area:** This should include comfortable seating and allow complete visual and acoustic privacy.

**Mother’s area:** It should have comfortable seating and privacy should be provided within the unit to allow mothers to breastfeed comfortably. This area should have communication aides so that families can learn about newborn care practices.

**Clean utility/holding area(s):** Such areas should be there for storage of supplies frequently used in the care of newborns. Routinely used supplies such as diapers, linen, cover gowns, charts, etc., may be stored in this space. Space should also be provided for storage of syringes, needles, intravenous infusion sets and sterile trays.

**Soiled utility/holding room:** This is essential for storing used and contaminated material before its removal from the care area. Unless used only as a holding room, this room should contain a counter and a hands free hand washing station separate from any utility sinks. The ventilation system in the soiled utility/holding room should be engineered to have negative air pressure with all air being exhausted to the outside. The soiled utility/holding room should be so situated that it enables removal of soiled materials without passing through the baby care area.
**Staff work areas:** Along with the provision of charting space on each bedside, an additional separate area or desk for tasks, such as compiling records, completing requisitions, etc. should be provided. Dedicated space can also be allocated for electronic medical record keeping.

**Linen washing/laundry area:** If laundry facilities are not provided, a separate laundry room can serve the functions of laundry. Space should accommodate a washing machine with dryer. Placement of an automatic washing machine with dryer promotes the efficiency and effectiveness of the aseptic cleaning process.

**Staff support space:** Space should be provided within the unit to meet the professional, personal and administrative needs of the staff. These areas include doctors’ duty room, nurses’ changing room.

**Step down area (rooming in facility):** An additional five bed step down area where recovering neonates can stay with their mothers before discharge is of added advantage to a SNCU. This will relieve the pressure on the SNCU to some extent. The additional space requirement should be about 40-50 sq ft per bed. The space can be in the SNCU or in the vicinity or in the postnatal ward.

**Floor surfaces** – Floor surfaces should be easily cleanable and should minimize the growth of microorganisms. Materials should permit cleaning without the use of chemicals. At the same time, floors should be highly durable to withstand frequent cleaning and heavy traffic. Vitrified tiles are preferred. Other flooring that may be used includes Kota Stone or chip flooring; however, such flooring needs to be well-polished.

**Walls** - As with floors, the ease of cleaning, durability, and acoustical properties of wall surfaces must be considered. Although commonly used, vinyl wall covering contains PVC which degrades indoor air quality, and thus should be avoided. Walls should be glazetiled up to a height of at least seven feet.

**Water Supply** – The unit should have 24-hour uninterrupted running water supply. To ensure water supply, it is useful to have a separate overhead tank with a capacity of 1,000 to 2,000 litres.

**Electrical needs**

**Power supply:** The unit should have a 24-hour uninterrupted stabilized power supply. Back-up power supply is a must, with one or two outlets. To ensure this, a generator with 25-50 KVA capacity and a servo stabilizer (3 phase) of the same rating is needed. Monitors must have UPS.

**Electrical outlet for individual beds:** To handle equipment, 6-8 central voltage stabilized outlets are required per bed: 4 of them should be of 5 amperes and another 4 of 15 amperes. Two alternate sockets for mobile bed-side X-ray equipment or USG machine need to be planned.

**Lighting of the unit:** The unit should be well illuminated with adequate daylight. Panel of lights with cool white fluorescent tubes, preferably CFL or LED (light-emitting diodes) will be required for adequate illumination.
Lighting
Perception of skin tones is critical in a SNCU; light sources should provide accurate skin-tone recognition. Light sources should be as free as possible of glare or veiling reflections. No direct view of the electric light source or sun shall be permitted in the newborn space including direct procedure lighting. Any lighting used outside the baby area shall be located so as to prevent any newborn’s direct line of sight to the fixture. Lighting fixtures should be easily cleaned.

Temperature
The unit should be designed to provide an air temperature of 78.8°F to 82.4°F (26-28° C).

Ventilation
Ventilation in the unit should inhibit particulate matter from moving freely in the space and to minimize draughts on or near the newborn beds. General ventilation can be provided in two ways: exhaust only and supply-and-exhaust. Exhaust fans pull stale air out of the unit while drawing fresh air in through cracks, windows or fresh air intakes. Exhaust-only ventilation is a good choice for units that do not have existing ductwork to distribute heated or cooled air. Supply-and-exhaust ventilation is a good choice for units with heating or cooling ducts, as it is an inexpensive way of providing fresh air.

Equipments required for Special Newborn Care Unit
Equipments should be planned on the basis of the functional services to be provided by the unit. There must be access to equipments for:

- Providing radiant heat
- Monitoring of vital signs, including blood pressure and blood gases
- Fluid and drug treatment
- Providing venous access
- Portable X-ray facilities

Equipment for individual Care
Equipments required for SNCU are listed in Tables 3.3, 3.4, 3.5 and 3.6.

Table 3.3 : Equipments required for newborn care in SNCU

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Item Description</th>
<th>Essential</th>
<th>Desirable</th>
<th>Quantity for 12 bed unit</th>
<th>Installation Training</th>
<th>Civil/Mechanical</th>
<th>Electrical</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Open care system: radiant warmer, fixed height, with trolley, drawers, O₂-bottles</td>
<td>E</td>
<td>12</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>2.</td>
<td>Phototherapy unit, single head, high intensity</td>
<td>E</td>
<td>6</td>
<td>√</td>
<td>√</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>3.</td>
<td>Resuscitatory, hand-operated, neonates, (250-500ml)</td>
<td>E</td>
<td>2</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item No.</td>
<td>Item Description</td>
<td>Essential</td>
<td>Desirable</td>
<td>Quantity for 12 bed unit</td>
<td>Installation</td>
<td>Training</td>
<td>Civil/Mechanical</td>
</tr>
<tr>
<td>---------</td>
<td>----------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>4.</td>
<td>Resuscitator, hand-operated, neonate, (500ml)</td>
<td>E</td>
<td></td>
<td>4</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Laryngoscope set, neonate</td>
<td>E</td>
<td></td>
<td>6</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Pump, suction, portable, 220V</td>
<td>E</td>
<td></td>
<td>2</td>
<td>√ √ √</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Pump, suction foot-operated</td>
<td>E</td>
<td></td>
<td>2</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Surgical instrument, suture/SET</td>
<td>E</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Syringe pump, (10,20, 50 ml, single use)</td>
<td>E</td>
<td></td>
<td>3</td>
<td>√ √ √</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Oxygen hood, small and medium, set of 3 each including connecting tubes</td>
<td>E</td>
<td></td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Oxygen concentrator</td>
<td>E</td>
<td></td>
<td>4</td>
<td>√ √ √</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Thermometer, clinical, digital, 32-43ºC</td>
<td>E</td>
<td></td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Scale, baby, electronic, 10 kg (5g)</td>
<td>E</td>
<td></td>
<td>4</td>
<td>√ √ √</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Pulse oxymeter, bedside, neonatal</td>
<td>E</td>
<td></td>
<td>6</td>
<td>√ √ √</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Stethoscope, binaural, neonate</td>
<td>E</td>
<td></td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>Light examination, mobile, 220-12V</td>
<td>E</td>
<td></td>
<td>6</td>
<td>√ √ √</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>Hub cutter, syringe</td>
<td>E</td>
<td></td>
<td>2</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>Tape, measure, vinyl-coated, 1.5m</td>
<td>E</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>Basin, kidney, stainless steel, 825ml</td>
<td>E</td>
<td></td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21.</td>
<td>Tray, dressing, SS, 300x200x30mm</td>
<td>E</td>
<td></td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td>Stand, infusion, double hook, on castors</td>
<td>E</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23.</td>
<td>Indicator, TST control spot/PAC-300</td>
<td>D</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24.</td>
<td>Irradiance meter for phototherapy units</td>
<td>D</td>
<td></td>
<td>2</td>
<td>√ √ √</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25.</td>
<td>Monitor, vital sign, NIBP, HR, SPO₂, ECG, RR, Temp</td>
<td>D</td>
<td></td>
<td>1</td>
<td>√ √ √</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26.</td>
<td>ECG unit, 3 channel, portable/SET</td>
<td>D</td>
<td></td>
<td>2</td>
<td>√ √ √</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27.</td>
<td>Infantometer, plexi, 3½ft/105cm</td>
<td>E</td>
<td></td>
<td>1</td>
<td>√ √ √</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28.</td>
<td>X-Ray, mobile</td>
<td>D</td>
<td></td>
<td>1</td>
<td>√ √ √</td>
<td></td>
<td></td>
</tr>
<tr>
<td>29.</td>
<td>Transport incubator, basic, with battery and O₂, w/o ventilator</td>
<td>D</td>
<td></td>
<td>1</td>
<td>√ √ √</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30.</td>
<td>Autoclave, steam, bench top, 20L, electrical</td>
<td>D</td>
<td></td>
<td>1</td>
<td>√ √ √</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31.</td>
<td>Laundry washer dryer, combo, 5 kg</td>
<td>D</td>
<td></td>
<td>√ √ √</td>
<td>√ √ √</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 3.4: Equipments required for disinfection in SNCU

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Item Description</th>
<th>Essential</th>
<th>Desirable</th>
<th>Quantity for 12 bed unit</th>
<th>Installation</th>
<th>Training</th>
<th>Civil/Mechanical</th>
<th>Mechanical</th>
<th>Electrical</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Drum, sterilising, 165mm diameter</td>
<td>D</td>
<td></td>
<td>4</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Electric Steriliser</td>
<td>D</td>
<td></td>
<td>1</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Washing machine with dryer</td>
<td>E</td>
<td></td>
<td>Adequate</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Gowns for staff and mothers</td>
<td>E</td>
<td>Adequate</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>5.</td>
<td>Washable slippers</td>
<td>E</td>
<td></td>
<td>Adequate</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

### Table 3.5: Laboratory equipments required for newborn care in SNNU

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Item Description</th>
<th>Essential</th>
<th>Desirable</th>
<th>Quantity for 12 bed unit</th>
<th>Installation</th>
<th>Training</th>
<th>Civil/Mechanical</th>
<th>Mechanical</th>
<th>Electrical</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Centrifuge, hematocrit, benchtop up to 12000 rpm, including rotor</td>
<td>E</td>
<td></td>
<td>1</td>
<td>√</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Microscope, binocular, with illuminator</td>
<td>D</td>
<td></td>
<td>1</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Bilirubinometer, total bilirubin, capillary based</td>
<td>D</td>
<td></td>
<td>1</td>
<td>√</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Glucometer with Dextrostix</td>
<td>E</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 3.6: Equipment's used in Special Neonatal Care Unit

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Item Description</th>
<th>Essential</th>
<th>Desirable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Adapter, Meconium Aspirator, disposable (for suction pump)</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Line, Infusion Pump, sterile, disposable</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Multistix, urine, 5 parameter: Gluc, Prot, Eryt, Sp. Grav., pH</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Cuvettes, Glu, Box of 200</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Cuvettes, Hb, box of 200</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Vacuum tube, EDTA, 3 ml, set of 100</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Vacuum tube, EDTA, 6 ml, set of 100</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Vacuum tube, serum, 3 ml, set of 100</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Vacuum tube, holder, set of 100</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Vacuum tube, needle, 22 G, set of 100</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Lancet, safety, sterile, single-use,[PAC-200] [1.8 mm]</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Capillary tubes, box, 100</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Sealing Compound, Capillary tubes, pck 500g</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Mask, Surgical, disposable, box 100</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Cap, Surgical, disposable box of 100</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>Item Description</td>
<td>Quantity</td>
<td></td>
</tr>
<tr>
<td>-----</td>
<td>------------------------------------------------------</td>
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<td></td>
</tr>
<tr>
<td>16</td>
<td>Cord Clamp, disposable, set of 100</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Extractor, mucus, 20 ml, sterile, disposable, Dee L ee</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Tube, Suction, CH10, L30cm, sterile, disposable</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Tube, Suction, CH12, L30cm, sterile, disposable</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Tube, feeding, CH05, L40cm, sterile, disposable</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Tube, feeding, CH06, L40cm, sterile, disposable</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Tube, feeding, CH07, L40cm, sterile, disposable</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Syringe, disposable, 1ml, sterile, Box-100</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Syringe, disposable, 2ml, sterile, Box-100</td>
<td>E</td>
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</tr>
<tr>
<td>25</td>
<td>Syringe, disposable, 5ml, sterile, Box-100</td>
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<td>26</td>
<td>Syringe, disposable, 10 ml, sterile, Box-100</td>
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<tr>
<td>27</td>
<td>Syringe, disposable, 20 ml, sterile, Box-100</td>
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<tr>
<td>28</td>
<td>Needle, disposable, 22G, sterile, Box-100</td>
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<td>29</td>
<td>Needle, disposable, 24G, sterile, Box-100</td>
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<tr>
<td>30</td>
<td>Needle, disposable, 26G, sterile, Box-100</td>
<td>E</td>
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</tr>
<tr>
<td>31</td>
<td>Needle, scalp vein, 21G, sterile, disposable</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Needle, scalp vein, 25 G, sterile, disposable</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>Gloves, exam, latex, medium, disposable, Box-100</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>Gloves, surg, 7 sterile, disposable, pair</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Infusion set, pediatric, with chamber 150 ml, sterile, disposable, with 22G needle</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>Cotton Wool, 300g, roll, non-sterile</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>Compress-gauze, 10x10cm, n/sterile, PAC-100</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>Compress gauze, 10x10cm, sterile, PAC-3</td>
<td>E</td>
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<tr>
<td>39</td>
<td>Tube Connection, 2.2 mm, length, box of 100</td>
<td>E</td>
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<tr>
<td>40</td>
<td>Connector, 3 way, stop cock valve, sterile, disposable</td>
<td>E</td>
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<tr>
<td>41</td>
<td>Disinfectant, chlorhexidine, 20%</td>
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<tr>
<td>42</td>
<td>Disinfectant, bleach percentage</td>
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<tr>
<td>43</td>
<td>Disinfectant, hand soap</td>
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<td>44</td>
<td>Antiseptic, Betadine</td>
<td>E</td>
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</tr>
<tr>
<td>45</td>
<td>Tape, adhesive, 2.0x2.3cmx3cm</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>Scalpel blade, sterile, disposable, no. 22 box of 100</td>
<td>E</td>
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</tr>
<tr>
<td>47</td>
<td>Umbilical Venous Catheter No.5 and 6</td>
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<tr>
<td>48</td>
<td>Disinfectant Bacillocid</td>
<td>D</td>
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</tr>
<tr>
<td>49</td>
<td>Blood Transfusion Set</td>
<td>D</td>
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</tr>
<tr>
<td>50</td>
<td>Nasal Prongs, disposable set of 3</td>
<td>D</td>
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</tr>
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<td>51</td>
<td>Endotracheal Tubes</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>52</td>
<td>Electrodes, Neonatal, box of 200 sets of three electrodes for ECG recorder and monitoring</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>53</td>
<td>Sterilization indicator TST control spots</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>54</td>
<td>Paper Sheets, Crepe, for sterilization pack</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>55</td>
<td>Tape adhesive, for sterilization pack</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>56</td>
<td>Slide-microscope, 76x28mm, Box-100(2x50)</td>
<td>D</td>
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<tr>
<td>57</td>
<td>Cover Glass, Microscope slides, Box-100</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>58</td>
<td>Jar, staining</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>59</td>
<td>Counting chamber, glass, WBCs</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>Solution, stain, gram,100ML</td>
<td>D</td>
<td></td>
</tr>
</tbody>
</table>
Staffing

At least two dedicated staff nurses per shift are necessary for a 12-bedded unit. Thirty per cent extra staffing is recommended to account for nights off and leave vacancies. There should be an adequate number of doctors to be able to take a round of the newborns once in each shift (every eight hours) and to be on call round-the-clock. Dedicated support staff should be there to clean the nursery at least once every shift and more often, depending on the need.

For a 12-bed unit, the recommended staffing is:

- Staff Nurses: 10
- Physicians: 3
- Support Staff: 4

3.4 INFECTION CONTROL IN NEWBORN UNIT

To prevent infection in newborn unit, the prescribed procedures are to be followed before entering the newborn unit. Specific procedures such as cleaning, disinfection and sterilization should be carried out correctly in order to prevent/control infection in the newborn care unit. You will learn in detail about the infection control in newborn unit in the next unit i.e. Block 1 Unit 4.

<table>
<thead>
<tr>
<th>Check Your Progress 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Explain the reason for setting up the newborn unit near the labour room/OT.</td>
</tr>
<tr>
<td>.............................................................................................................</td>
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<tr>
<td>.............................................................................................................</td>
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<td>.............................................................................................................</td>
</tr>
<tr>
<td>2) What are the essential requirements of newborn care corner?</td>
</tr>
<tr>
<td>.............................................................................................................</td>
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<td>.............................................................................................................</td>
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<td>.............................................................................................................</td>
</tr>
<tr>
<td>3) List the services provided in the Newborn Stabilization Unit.</td>
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</table>
3.5 LET US SUM UP

This unit provides specific guidance for setting up newborn care services for different levels of health services. All health facilities where deliveries are conducted must have skilled staff and facilities for care at birth to all newborns and to provide resuscitation of those who require it. In addition CHC/FRUs should be equipped to provide initial care and stabilization of sick babies, and care of most low birth weight newborns that do not require intensive care. Every district hospital or sub-district hospital that conducts more than 3000 deliveries should have a Special Newborn Care Unit that is equipped to provide special care to most sick newborns (except those requiring mechanical ventilation or surgical interventions). There should be agreed procedures for transport of sick newborns from one level of facility to another. SNCU within the district hospitals must have continuous availability of qualified medical and nursing staff, and resources to meet the needs of all sick babies. In addition this unit explains the manpower necessary for newborn unit. It also briefs about the infection control, which is given in detail in the next unit (Unit 4 in Block 1).

3.6 ANSWERS TO CHECK YOUR PROGRESS

Check Your Progress 1

1) Reason for setting up the newborn unit near the labour room / OT is as follows:
   • To provide continuous safe care of the newborn.
   • To avoid the risk of moving the infant a long distance within the hospital.
   • A separate room for mothers to express their milk.
   • A treatment room during special procedures.
   • Contingency rooms for shifting the unit in case of temporary closure of the unit due to epidemics.
   • Provision for keeping symptomatic high-risk babies along with their mothers with good nursing care.

2) Essential requirements of Newborn Care Corner are as follows:
   • Open care system: radiant warmer, fixed height, with trolley, drawers, O2-bottles
   • Resuscitator, hand-operated, neonate, 500ml
   • Weighing Scale, spring balance, Pump Suction
   • Room Thermometer, Examination light
   • I/V Cannula 24 G, 26 G
   • Extractor, mucus, 20ml, ster, disp, Dee Lee
   • Towels for drying and wrapping the baby
   • Sterile equipment for cutting and tying the cord
   • Tube, feeding (7-8 F)
   • Sterile Gloves
3) A Stabilisation Unit at CHC/FRU or an equivalent facility provides the following services:

- Care at birth
- Provision of warmth
- Resuscitation
- Monitoring of vital signs
- Initial care and stabilization of sick newborns
- Care of low birth weight newborns not requiring intensive care
- Breast feeding and feeding support
- Referral services.

3.7 REFERENCES

1) www.nnfi.org Norms for accreditation of Level III special care Neonatal units.

2) www.nnfi.org Norms for Accreditation of Level II special care neonatal units.

3) www.nnfequipments.org.

4) www.gujhealth.gov.in/Portal/Tender/1/17_FBNC_guidelines_Part_2.pdf

5) www.nnfi.org/index.php?option=com_banners&task=click&bid...

6) www.nipi.org.in/Items/Resources_OtherPublications_BrochureSNCU.pdf

UNIT 4  PREVENTION OF INFECTION IN NEWBORN UNIT

Structure

4.0 Objectives
4.1 Introduction
4.2 Definition of Terms
4.3 General Principles of Infection Prevention
4.4 Source of Infection in Newborn Unit
4.5 Infection Prevention Practices after Birth
4.6 Basic Requirements and Guidelines for Asepsis in a Newborn Care Unit
  4.6.1 Basic Requirements for Asepsis
  4.6.2 Guidelines to be Followed in Newborn Unit
4.7 Disinfectants/Germicides used in Newborn Unit
  4.7.1 Types of Disinfectants/Germicides used in Newborn Unit
  4.7.2 General Instructions for using Disinfectants in Newborn Unit
  4.7.3 Cleaning/Disinfection/Sterilization of Newborn Unit
4.8 Waste Management
4.9 Post Exposure Prophylaxis
4.10 Surveillance
4.11 Let Us Sum Up
4.12 Answers to Check Your Progress
4.13 References

4.0 OBJECTIVES

After reading this unit you should be able to:

• List the sources of infection and the tips for its reduction in newborn unit;
• Enlist the infection prevention practices after birth;
• Enumerate the basic requirements for asepsis in newborn unit;
• Describe the guidelines to be followed for asepsis in newborn unit;
• Discuss the various types of disinfectants/germicides used in newborn unit;
• Explain waste management; and
• Discuss post exposure prophylaxis & surveillance.

4.1 INTRODUCTION

After understanding the importance and set up of newborn care unit, the nurse must be able to maintain the unit properly and prevent infection.

This unit describes prevention of infection in newborn care unit. Neonatal infections have been the major cause of neonatal deaths in our country. Newborn babies are more susceptible to infections because their immune system is immature.
Preventive and Promotional Aspects of Newborn

Normally the newborn is free from harmful organisms initially up to few hours after birth. Health personnel working in the hospitals tend to transmit organisms during routine procedures which leads to infection in newborns. Hence, it is important to know the infection control measures to promote health and minimize infections to the newborns.

Prevention of infection is more cost effective than treating infections in neonates.

4.2 DEFINITION OF TERMS

1) Asepsis: Asepsis is combination of efforts made to prevent the entry of microorganisms into an area of body where they are likely to cause infection.

2) Cleaning: Cleaning is the process that physically removes all visible blood, body fluids or any other material eg. Dust or soil from skin or inanimate objects.

3) Disinfection: Disinfection is the process that eliminates most but not all disease causing microorganisms from inanimate objects.

4) Sterilization: Sterilization is the freeing of an article from all living organisms including viable spores. In other words, it is the destruction of all forms of microbial life. It is accomplished by physical and chemical processes eg. steam under pressure, dry heat, ethylene oxide, hydrogen peroxide gas, liquid chemicals etc.

4.3 GENERAL PRINCIPLES OF INFECTION PREVENTION

By practicing infection prevention measures the baby, mother and care provider can be protected from infections. The spread of infection can also be prevented by means of the following:

- Provide routine care to the newborn baby.
- Consider every person (including the baby and staff) as potentially infectious.
- Wash hands or use an alcohol based hand rub.
- Wear protective clothing and gloves.
- Use antiseptic technique.
- Handle sharp instruments carefully and clean them. If necessary sterilize or disinfect instruments and equipment.
- Routinely clean the newborn special care unit and dispose off waste.
- Isolate babies with infections to prevent nosocomial infections.

4.4 SOURCE OF INFECTION IN NEWBORN UNIT

The source of infection in newborn unit could be any of the following:

- Personnel working in the unit
- Infected newborns
Prevention of Infection in Newborn Unit

Tips for reduction of sources of infection

- Newborn care unit should be located in a low-traffic area with restricted access.
- It is to be ensured that babies receive immunizations such as rubella, measles, hepatitis B-virus, mumps and influenza.
- Persons with skin infections should not be allowed to come into direct contact with babies. Care providers indirect contact to be avoided & to be minimal.
- Persons with acute infections should not be allowed to enter the new born unit.
- Number of individuals handling the baby should be limited.

Nosocomial infection

Nosocomial infections are infections that are acquired in the health care facility. If nosocomial infection occurs, strict control measures should be put in place and monitored to resolve the problem.

Measures to control nosocomial infections are as follows:

1) Isolate the baby by placing the baby and her / his mother in a private room.
2) Leave the door open, if necessary to ensure that the baby and mother are not neglected;
3) If a private room is not available, place all babies with the same infection in one room, but no other baby with a different infection should be placed, in the same room.
4) When entering the room with the baby:
   - Wear clean examination gloves, and change gloves after contact with infectious material (e.g. faecal material, gauze used to wash pustules or blisters);
   - Wear a clean gown if contact with the baby or infectious material is anticipated.
5) Before leaving the room:
   - Remove the gown;
   - Remove gloves;
   - Wash hands with an antibacterial soap or alcohol-based handrub;
   - Avoid touching potentially contaminated surfaces or objects, and ensure that clothing does not come in contact with potentially contaminated surfaces or objects.
   - Restrict transfer of baby to other areas of the health care facility unless absolutely necessary. During transfer, maintain infection prevention precautions.
Preventive and Promotional Aspects of Newborn

- Reserve non-critical care equipment (e.g. stethoscope, thermometer) for use only with the infected baby, if possible, and carefully clean and disinfect equipment shared among infected and non-infected babies.

4.5 INFECTION PREVENTION PRACTICES AFTER BIRTH

Cleanliness at delivery and essential newborn care reduces the risk of infection for the mother and the baby, especially neonatal sepsis and tetanus. Breast feeding has a significant protective effect against infections.

The following are the practices of infection prevention after birth:

- Routine care of the newborn baby should be given.
- Six hours after birth or after the baby’s temperature is stable, the baby’s skin should be cleaned with cotton cloth soaked in warm water to remove blood or other body fluids and then dried. Delay bathing until at least the second day of life.
- The buttocks and perineal area of the baby should be cleaned each time the baby’s napkin is changed or as often as required, using cotton soaked in warm, soapy water and the area has to be dried.
- Ensure that the mother knows correct positioning and attachment for breast feeding to prevent mastitis and nipple damage.

Remember: Hand washing is the single most important behaviour to emphasize for both family members and health care providers.

4.6 BASIC REQUIREMENTS AND GUIDELINES FOR ASEPSIS IN A NEWBORN CARE UNIT

4.6.1 Basic Requirements for Asepsis

The following are the basic requirements for asepsis in a newborn care unit:

- Running water supply
- Strict hand washing
- Promotion of breast milk feeding
- Avoiding over crowding
- Adequate disposables
- Rational admission policy
- Rational antibiotic policy
- Good house keeping and asepsis

Other basics are as follows:

- Keep separate spirit and betadine swab containers, stethoscope, tape measure and thermometer for each baby.
**Prevention of Infection in Newborn Unit**

- Change intravenous sets daily or as per set routine.
- Feeding tubes as long as baby can keep.
- Do not keep fomites eg. files, X-ray films, pens etc. on the baby cot.
- Change antiseptic solution in suction bottles and sterile water in oxygen humidification chambers every day.
- Sterilize the bottles / chambers daily by dipping in 2% glutaraldehyde for 4 to 6 hours.

### 4.6.2 Guidelines to be Followed in Newborn Unit

**a) Entry:** There should be a strict restriction to enter into the newborn unit. Only health care providers (doctors, nursing staff) and parents should be allowed. No visitors or attendants should be allowed to enter into the newborn unit.

**b) Foot wear:** Shoes, socks and woolens should be removed and nursery slippers should be worn before entering the newborn unit. Changes of slippers though do not help in controlling of infection but it does prevent unwanted entries.

**c) Hand washing:** It is very simple, cheap and the single most important step of preventing nosocomial infections in newborn unit.

**Hands and Arms should be thoroughly washed upto elbows with soap and water for at least two minutes before entering the newborn unit and for 15 seconds in between handling the babies.**

**Tips for hand washing:**

1) Prior to hand washing rings, bangles, threads and all the accessories worn over the forearm and hands should be removed.

2) Using plain water and soap, hands must be thoroughly washed up to the elbow for atleast 2 minutes in the following sequence:
   - Palms and fingers and web spaces
   - Back of hands
   - Finger and knuckles
   - Thumbs
   - Finger tips
   - Wrists and forearm up to the elbow.

Refer **Fig. 4.1** for steps of hand washing.

3) A plain, anti-microbial soap is recommended in any convenient form (bar, leaflets, liquid and powder).

4) Hands must be washed for at least 30 seconds before touching next baby after handling an infected neonate. If the baby is uninfected, alcohol based hand rubs (sterillium or 70% alcohol) can be used as a substitute for hand washing before touching another newborn.

5) Rinsing hands with sterillium or alcohol is not a substitute for proper hand washing before entering the unit.

6) In settings where hand washing facilities are inadequate or inaccessible, alcohol based hand rubs can be used.
7) The hands should be dried with single use autoclaved sterile towel or disposable paper towel.

8) Nails should be trimmed short and should be devoid of nail polish.

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**Fig. 4.1: Six Steps of hand washing**

Scrupulous hand washing before feeding or giving any nursing care to babies and napkin changing or bathing babies must be followed in the newborn unit.

d) **Masks and sterile gown**

Use them for all invasive procedures. e.g. Lumbar puncture, blood exchange transfusion etc. Wearing of sterile gown after hand washing and prior to entering main unit is preferable.

e) **Sterile gloves**

1) Always use sterile gloves for all invasive procedures and for administration of parenteral medications.
2) Wash gloved hands to remove blood stains and secretions from the gloves and then discard them in a container of polar bleach. Wash hands again.

3) If gloves are being recycled, they should be cleaned, dried and packed for reautoclaving. Use disposable gloves if available.

4) If single use disposable surgical gloves are reused, do not process them more than three times, because invisible tears may occur.

5) Do not use gloves that are cracked or peeling or have visible holes or tears.

f) Newborn equipment

Each baby in the unit should have separate kit containing day to day requirements such as thermometer, measuring tape, linen etc. and these should not be swapped between the babies without proper disinfection.

4.7 DISINFECTANTS/GERMICIDES USED IN NEWBORN UNIT

4.7.1 Types of Various Disinfectants/Germicides used in Newborn Unit

Types of various disinfectants/germicides used in newborn unit are given in the Table 4.1.

<table>
<thead>
<tr>
<th>Name</th>
<th>Composition</th>
<th>Indications and directions for use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacillocid</td>
<td>100g has - 1.6 dihydroxy, 2.5 dioxyhexane (chemically bound formaldehyde) - Glutaraldehyde - alkyl urea derivative - benzalkonium chloride</td>
<td>11.2g 5g 3g 5g</td>
</tr>
<tr>
<td>Korsolex</td>
<td>100g has - 1.6 dihydroxy, 2.5 dioxyhexane (chemically bound formaldehyde) - polymethylol urea formaldehyde derivative - Glutaraldehyde</td>
<td>8.2g 17.6g 7g</td>
</tr>
<tr>
<td>Cidex</td>
<td>- Glutaraldehyde - Activator</td>
<td>2%</td>
</tr>
<tr>
<td>Savlon</td>
<td>- Centrimide solution - Chlorhexidire gluconate - Isopropyl alcohol</td>
<td>15% 7.5% 7%</td>
</tr>
</tbody>
</table>
## 4.7.2 General Instructions for Using Disinfectants in Newborn Unit

1. Follow manufacturer’s instructions.
2. Check expiry date before using.
3. Use recommended dilution.
4. Label containers – date of issue and expiry.
5. Empty container after use.
6. Wash and disinfect container before re-use.
7. Do not refill container without disinfecting container between each use.
8. Topping up is not allowed.
9. Do not use the same container to store other solutions.
10. Do not leave disinfectant container open at anytime.
11. Wash and clean articles before disinfecting.

### 4.7.3 Cleaning/Disinfection/Sterilization of Newborn Unit

Regular and thorough cleaning will decrease microorganisms on surfaces and help prevent infection. The environmental control programme should include specific procedures for cleaning and disinfection (or sterilization) of patient care areas, equipment and supplies. Nurse should ensure that these procedures are carried out correctly.

<table>
<thead>
<tr>
<th>Sterillium</th>
<th>Betadine</th>
<th>Formalin</th>
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</thead>
<tbody>
<tr>
<td>100g has - 2-propanol - 1-propanol - Ethyl-hexadecyl dimethyl/ ammonium ethyl sulfate</td>
<td>- Povidone iodine</td>
<td>- Formaldehyde aqueous solution</td>
</tr>
<tr>
<td>45g</td>
<td>7.5%</td>
<td>40%</td>
</tr>
<tr>
<td>30g</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.2g</td>
<td></td>
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</tbody>
</table>

- Rub 2-3 ml on hands for 30 sec and allow it to dry for disinfection of hands.
- Used for skin preparation, application on wounds. Leave to dry for 60 seconds.
- Use for fumigation which is defined as periodic disinfection by exposure to fumes of vaporized disinfectant.
- For routine fumigation dissolve 30 ml of 40% formalin in 90 ml of water.
- For intensive fumigation, dissolve 90 ml of 40% formalin in 90 ml of water.
- Solution is put in OTICARE, which is put on for 30 min with fans and air conditioner switched off.
- Room is closed for 6 hours
- In case room is needed earlier, use 4-6 oz of ammonium hydroxide in OTICARE after emptying it of formalin.
- If no OTICARE is available, add 10g of potassium permanganate or 35 ml of 40% formalin for fumigation. This method takes 10 hours. (Do not add formalin to potassium permanganate as this may cause exposure)
By using bacillocid solution the walls of the unit should be cleaned at least once daily. If bacillocid solution is not available, other disinfectants and soap & water can be used. The floor should be mopped and cleaned with a wet cloth at least 1-2 times in each shift. The various disinfectants used for general house keeping and various equipments are given in Table 4.2.

Table 4.2: House Keeping and Disinfection Routines

<table>
<thead>
<tr>
<th>Name</th>
<th>Disinfection Method</th>
<th>Frequency</th>
<th>Other Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A.</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1. Floors</td>
<td>Chlorophore cleanser</td>
<td>Thrice in each nursing shift and as required</td>
<td>Do not sweep or do dry dusting. Do not use cidex. All holes and crevices in the floors, walls, ceilings should be sealed.</td>
</tr>
<tr>
<td></td>
<td>Pesticide spray</td>
<td>Once a week</td>
<td></td>
</tr>
<tr>
<td>2. Walls</td>
<td>Pesticide spray</td>
<td>Once daily (weekly spraying)</td>
<td>Fumigation to be done if infection incidence rises.</td>
</tr>
<tr>
<td></td>
<td>2% Bacillocid</td>
<td>Once in 2 wks</td>
<td></td>
</tr>
<tr>
<td>3. Fans</td>
<td>Wet mop with water</td>
<td>Once in 2 wks</td>
<td></td>
</tr>
<tr>
<td>4. Air conditioner • Window type • Central</td>
<td>2% Bacillocid spray</td>
<td>Once a week around window a/c Once in 2 wks for central a/c</td>
<td>Before restarting a/c after a long period of non-use, call technician for cleaning after dismantling.</td>
</tr>
<tr>
<td>5. Refrigerator</td>
<td>Defrosted and cleaned with soap solution</td>
<td>Once in 2 wks</td>
<td></td>
</tr>
<tr>
<td>6. Sinks</td>
<td>Cleansing solution (e.g. Vim)</td>
<td>Daily in morning shift</td>
<td>Tile under the sink should also be cleaned daily.</td>
</tr>
<tr>
<td>7. Buckets</td>
<td>Soap and water</td>
<td>Daily in morning shift</td>
<td>After cleaning and drying, line with polythene sheets daily, which can be changed after emptying as required. Buckets should be demarcated into 3 types based on their use. Big blue ones-for laundry Items, Medium ones for garbage and disposables (biohazard items), Small one for hand towels, Garbage should be removed twice in each shift and as required.</td>
</tr>
<tr>
<td>8. Entrance and laminar flow room</td>
<td>Wet mopping with plain water, 2% Bacillocid spray</td>
<td>Daily twice a week</td>
<td>Switch off fans and air conditioner. Close room for 1 hour.</td>
</tr>
<tr>
<td><strong>B.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Baby linen, cotton, gauze, liquid paraffin</td>
<td>Wash and autoclave</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Baby blanket, blanket cover</td>
<td>Dry-cleaned/ washed and autoclaved</td>
<td>• As required</td>
<td></td>
</tr>
<tr>
<td>3. Feeding utensil(Paladai)</td>
<td>Boiled for 15 min</td>
<td>• Before each use</td>
<td></td>
</tr>
<tr>
<td>Item Description</td>
<td>Sanitization Method</td>
<td>Frequency</td>
<td>Notes</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------------</td>
<td>------------------------------</td>
<td>------------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>4. Swab containers, injection and medicine trays</td>
<td>Soap/cleansing solution</td>
<td>Daily morning shift</td>
<td>Use separate swab containers once for each baby</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Should be closed properly after opening.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Broken ones should be replaced.</td>
</tr>
<tr>
<td>5. Steel drums</td>
<td>Autoclaved</td>
<td>Every 48 hours</td>
<td></td>
</tr>
<tr>
<td>6. Sets for procedures</td>
<td>Autoclaved</td>
<td>After each use, Every 72 hours if</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>not used</td>
<td></td>
</tr>
<tr>
<td>7. Cheatle forceps</td>
<td>Autoclaved</td>
<td>Daily</td>
<td>Put in sterile autoclaved bottle containing 5% savlon or dry sterile</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>cotton.</td>
</tr>
<tr>
<td>C.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Stethoscope</td>
<td>70% isopropyl/</td>
<td>Daily</td>
<td>Separate stethoscope for each baby.</td>
</tr>
<tr>
<td></td>
<td>alcohol or sterilium</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Measuring tape</td>
<td>70% isopropyl/</td>
<td>Daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>alcohol or sterilium,</td>
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<tr>
<td></td>
<td>immersed in 2% cidex</td>
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<tr>
<td></td>
<td>for 4-6 hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Probes of radiant warmer, incubator, pulse oximeter, HP monitor, skin</td>
<td>70% isopropyl/</td>
<td>Daily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>thermometer, sphygmanometer</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>cuffs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Laryngoscope</td>
<td>70% isopropyl/</td>
<td>Daily</td>
<td>Pay special attention to bulb. Never use Glutaraldehyde (cidex) as</td>
</tr>
<tr>
<td></td>
<td>alcohol or sterilium</td>
<td></td>
<td>its residual may be harmful to baby.</td>
</tr>
<tr>
<td>5. Skin thermometer</td>
<td>Wet mop</td>
<td>Daily</td>
<td></td>
</tr>
<tr>
<td>6. Syringe pumps</td>
<td>Soap and water;</td>
<td>Daily in morning shift</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2% cidex (if blood stained)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Oxygen hood</td>
<td>Soap and water</td>
<td>Daily in morning shift</td>
<td>Dry with autoclaved linen.</td>
</tr>
<tr>
<td>8. Face mask</td>
<td>Clean with detergent,</td>
<td>Daily and after each use</td>
<td></td>
</tr>
<tr>
<td></td>
<td>immerse in Cidex for 20 min.</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Rinse in distilled water,</td>
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<td></td>
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<tr>
<td></td>
<td>Dry with autoclaved linen,</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wrap in autoclaved linen and</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>affix date.</td>
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<td></td>
</tr>
</tbody>
</table>
## Prevention of Infection in Newborn Unit

### D.  
1. **AMBU bag and reservoirs**  
   - Ventilator tubings, oxygen tubings, nebulizer tubings etc.  
   - Water traps  
   - Humidifier bottles  
   - Bottle and tubings of suction machine  
   
   Clean with detergent after dismantling, Immers in Korsolex or Cidex for 4 hours, Rinse in distilled water, Dry and reassemble, Wrap in autoclaved linen and affix date of cleaning.  
   
   Weekly for AMBU bag and reservoir. Daily for others  
   
   - Change ventilator circuit and oxygen tubing daily.  
   - Change water in ventilator humidifier and oxygen circuit humidifier daily. Use distilled water.  
   - Never put water chamber in cidex.  
   - Put 100 ml of savlon in suction bottle till blue line. After each suctioning rinse connector with diluted savlon.  
   - Discard suction catheter after singe use.  
   - Cover connector with autoclaved linen after use.  
   - Take care that open end of suction circuit does not fall on the floor.  

2. **Ventilator body and display**  
   - Wet mop  
   - Daily  
   - Wash filter under running water in each nursing shift.  

3. **Weighing machine**  
   - 2% Bacillocid mopping  
   - Daily morning shift and SOS  
   - Whenever weighing a baby, spread an autoclaved linen underneath (separate for each baby). Do not lay baby directly on the machine.  

4. **Radiant warmer**  
   - 2% Bacillocid mopping  
   - Daily  

5. **Incubator**  
   - Detergent and water when occupied by baby  
   - 2% Bacillocid when unoccupied  
   - Daily  
   - Do not keep the baby in the same incubator for more than a week at a stretch. Shift to a sterile one.  

6. **Pulse Oxymeter**  
   - Wet mop with plain water  
   - Daily  

7. **Phototherapy Units**  
   - Wet mop  
   - Daily  
   - Should be enveloped in clean polythene which should be daily wiped.  

8. **Biliblanket**  
   - Wet mop with plain water/Dettol  
   - Daily/Weekly  
   - Change envelop before using for another baby.  

### Remember  
- Always discard disposable items after single use.  
- Terminal disinfection is done after discharge or death of a baby.  
  - Preferably all items of the baby e.g. blanket, measuring tape, stethoscope etc. should be put in a closed chamber (e.g. an incubator not in use for baby care) and fumigated with 40% formalin.  
  - If it is possible, immerse all items except blanket and stethoscope in Korsolex or Cidex solution.  
  - Use 70% isopropyl alcohol or Sterillium for stethoscopes.
Preventive and Promotional Aspects of Newborn

Every newborn unit should have a housekeeping schedule. The cleaning schedule should be displayed in a visible area having the details on exactly what needs to be done and how often should be provided. The following general guidelines for housekeeping should be followed:

1) Clean from the top to the bottom (e.g. of walls and window coverings) so that the dirt that falls during cleaning is removed.
2) Always wear heavy rubber or latex utility gloves.
3) Ensure that a fresh bucket containing disinfectant solution is available at all times.
4) Immediately clean up spills of blood or body fluids using disinfectant solutions.
5) Wrap or cover clean linen and store them in an enclosed cart or cabinet to prevent contamination with dust.
6) After each use, wipe off beds, tables and procedure trolleys using disinfectant solution.

Fumigation

Fumigation of the unit should be carried out using ecoshield (silver nitrate) at least once a month. In case of a fatality, the unit should be fumigated as early as possible. A proper record of fumigation frequency should be maintained. In addition, a proper record of frequency of disinfection of various regularly used items should be maintained.

Culture

Sterile swabs for culture and sensitivity should be sent from floor, wall, baby trolley and incubator. It should be sent weekly and before and after every round of fumigation. This helps to determine the flora of the unit and their sensitivity patterns.

4.8 WASTE MANAGEMENT

Proper management of hospital waste is important to keep the environment clean. To keep the environment clean, in each unit of ward, the waste should be disposed off in a proper way as per following bio-medical guidelines which would maintain cleanliness of the environment.

1) Separate contaminated waste e.g. items soiled by blood, pus and other body fluids from non-contaminated waste.
2) Use a puncture proof container for contaminated sharps, and dispose off the container when two-thirds full.
3) The following are different colour drums with different color polythene for different type of waste, to be disposed off in a different way.

Black drums / Bags

Left over food, fruit feeds, vegetables, waste paper, packing material, empty box, bags etc. This waste is disposed off by routine municipal council committee machinery.

Yellow drums/Bags

Infected bio-degradable (non-plastic) waste
Infected bio-degradable waste consists of human anatomical waste, blood, body fluids, placenta etc. This type of waste requires incineration.

**Blue drums / Bags**

**Infected non-bio-degradable (plastic) waste**

Infected non-bio-degradable waste consists of used disposable syringes, needles (first destroy the needle in the needle destroyer), used sharps, blades and broken glass etc. Patients IV set, BT set, ET tube, catheter, urine bag etc. should be cut into pieces and dropped in blue bag. This waste will be autoclaved to make it non-infectious. This is then shredded and disposed off.

**Guidelines for disposal of Sharps**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong> Put on disposable latex or vinyl gloves (if available). Gloves will not prevent the wearer from being injured but will form a clean barrier between the hands and the syringe.</td>
<td>Do not attempt to recap the needle – this is how most accidental needle-stick injuries happen. The cap is usually bright orange and can be disposed off separately. Do not break, bend or otherwise try to render the syringe useless.</td>
</tr>
<tr>
<td><strong>Step 2</strong> Bring your rigid-walled, puncture-resistant, sealable sharps container to the syringe.</td>
<td>Take the sharps container to the syringe, do not walk with the needle/syringe.</td>
</tr>
<tr>
<td><strong>Step 3</strong> Place the container on the ground or flat surface beside the syringe.</td>
<td>Do not hold the sharps container or ask another person to hold it as you are disposing off the syringe.</td>
</tr>
<tr>
<td><strong>Step 4</strong> Pick up the syringe by the middle of the barrel.</td>
<td>The safest method of picking up a syringe is by hand. Staff can also chose to wear thin, disposable gloves that do not hinder dexterity. Do not crack the plastic barrel or flick the syringe.</td>
</tr>
<tr>
<td><strong>Note</strong> Do not use a dustpan &amp; brush to “sweep up” the syringe as the sweeping movement can cause the syringe to flick into the air and cause further risk.</td>
<td>Plastic tweezers are <strong>not</strong> recommended as they may also cause the needle/syringe to flick (commonly bright coloured and found in many “sharps disposal kits” sold at pharmacies etc).</td>
</tr>
<tr>
<td><strong>Step 5</strong> Place the syringe in the container sharp end first.</td>
<td>Keep the sharp end of the needle facing away from you at all times.</td>
</tr>
<tr>
<td><strong>Step 6</strong> Securely place the lid on the container and ensure it is sealed. Hold the container from the top when carrying.</td>
<td>Place the sealed container into your sharps disposal bin or contact your local council or health department regarding safe ways to dispose off your sharps container.</td>
</tr>
<tr>
<td><strong>Step 7</strong> Remove gloves carefully so that no contaminated fluid on the glove comes into contact with your hand. Wash your hands with running water and soap.</td>
<td>Other items that have come into contact with blood (i.e. gloves) should be disposed off in the same container as the used syringe or placed into double plastic container.</td>
</tr>
</tbody>
</table>
4.9 POST EXPOSURE PROPHYLAXIS

Post-exposure prophylaxis (PEP) means taking antiretroviral medications as soon as possible after exposure to HIV, so that the exposure will not result in HIV infection. These medications are only available with a prescription. PEP should begin as soon as possible after exposure to HIV but certainly within 72 hours. Treatment with 2 or 3 antiretrovirals should continue for 4 weeks, if tolerated. PEP has been standard procedure since 1996 for healthcare workers exposed to HIV. Workers start taking medications within a few hours of exposure. Usually the exposure is from a “needle stick,” when a health care worker accidentally gets jabbed with a needle containing HIV-infected blood.

The following actions are recommended immediately following any exposure to blood/body fluids regardless of whether or not the Source is known to pose a risk of infection for HIV, HBV and/or HCV. Any additional facility specific instructions for post-exposure management should also be followed.

- Free bleeding of puncture wounds should be encouraged. However, there is no documented evidence to support that squeezing the wound will further reduce the risk of transmission of bloodborne infection.
- The site of exposure (e.g., wound or non-intact skin) should be immediately washed well with soap and water but without scrubbing.
- Clothing contaminated by blood/body fluids should be removed.
- After mucosal surface exposure, the exposed mucous membranes should be flushed well with water. Eyes should be irrigated with water.
- Antiseptics, bleach and skin washes should not be used as there is no evidence of their efficacy and their effect on local defense mechanisms is unknown.
- Workers need to comply with Occupational Health and Safety requirements in their work place.
- The exposure incident must be reported immediately to the appropriate administrative personnel of the unit, where the exposure occurred.
- The forms and requisitions that must be completed, as well as instructions as to how and where to report incidents should be itemized or included in a directive/policy or package for potentially exposed workers.
- The exposure report should include the following details as well as any other information requested in an exposure report form. These exposure details should also be included in the health care worker’s confidential medical file as per following details:
  i) Date, time and location of the exposure.
  ii) Job/duty being performed at the time of exposure.
  iii) Details of exposure incident (e.g., instruments used, severity of exposure, source).
  iv) Precautions taken while performing the job.
  v) Witnesses.
  vi) Factors that may have contributed to the exposure incident.
vii) If Exposed, was the Health Personnel previously vaccinated against HBV.

viii) HBsAg and anti-HBs results from previous vaccination.

ix) Action taken after exposure.

x) Results of initial and follow-up testing of Source and Exposed.

- The facility’s Occupational Health Unit or equivalent must be notified of the exposure incident. If this service is not immediately available, if possible, leave a message indicating the name of the exposed worker and Source as well as a contact number for a return call.

- Initial assessment of an exposure in a timely manner (within 30 minutes of the event) is necessary by an emergency room physician, an occupational medicine physician, an occupational health nurse or another health care professional educated in the assessment of exposure.

Refer Fig 4.2 for management of blood/body fluid exposure. Refer Fig.4.3 for determination of HIV status code.
Preventive and Promotional Aspects of Newborn

Fig. 4.3: Determination of status code

- Basic regimen is recommended for HIV SC1 and extended regimen is recommended for SC2 described in Table 4.3.

**Table 4.3: Basic and extended regimens following exposure to HIV infection**

<table>
<thead>
<tr>
<th>Regimen</th>
<th>Dose (for 28 days)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preferred Basic Regimens</strong></td>
<td></td>
</tr>
</tbody>
</table>
| Zidovudine* (Retrovir) + Lamivudine (Epivir) | 300 mg bid or 200 mg tid  
300 mg qd or 150 mg bid |
| Zidovudine-Lamivudine* (Combivir) | 1 tablet (300/150 mg) bid |
| Zidovudine* (Retrovir) + Emtricitabine (Emtriva) | 300 mg bid or 200 mg tid  
200 mg qd |
| Tenofovir DF (Viread) + Emtricitabine (Emtriva) | 300 mg qd  
200 mg qd |
| Tenofovir DF-Emtricitabine (Truvada) | 1 Tablet (300/200 mg) qd |
| Tenofovir DF (Viread) + Lamivudine (Epivir) | 300 mg qd  
300 mg qd or 150 mg bid |
| **Alternative Basic Regimens** | |
| Stavudine# (Zerit) + Emtricitabine (Emtriva) | 40 mg bid (30 mg bid if < 60 kg)  
200 mg qd |
| Didanosine (Videx) + | 400 mg qd or 200 mg bid  
(250 mg qd or 125 mg bid if < 60 kg) |
| Lamivudine (Epivir) | 300 mg qd or 150 mg bid |
| Didanosine (Videx) + | 400 mg qd or 200 mg bid  
(250 mg qd or 125 mg bid if <60 kg)  
200 mg qd |
| Emtricitabine (Emtriva) | |

Abbreviations: qd = once daily; bid = twice daily; tid = three times daily
* Should be taken with food
# Stavudine dose can be decreased to 20-30 mg twice daily if toxicity occurs
4.10 SURVEILLANCE

Every health care facility should adopt waste management policies and procedures (Management Plan) for dealing with infectious and non-infectious waste and it should be current and accessible to all employees. Every hospital should have infection control committee consisting of doctors, nurses and other health care personnel involved in patient care to ensure the proper management of waste (infectious and non-infectious) from the place of its generation to disposal. Surveillance is essential to ensure that all employees in the hospital are complying with the waste management regulations. Training must be provided for all employees potentially involved in the handling of infectious waste. Infection control committee should have regular inspection for the following:

- Segregation of infectious waste (i.e. sharps, blood saturated gauze) from other wastes (i.e. paper towels, tissue) at the point of origin.
- The infectious waste separated from other hazardous waste (e.g., toxic, radioactive etc).
- Is infectious waste contained and stored in a manner and location which affords protection from the public, animals, and the elements? Is the storage area marked with a biohazard sign?
- Are all non-sharp infectious wastes placed in approved infectious waste bags and contained in leak proof, disposable, or reusable containers which are clearly labeled with the words Infectious Waste or the biohazard symbol?
- Are sharps contained for storage, transportation, treatment and disposal in leak proof, rigid, puncture-resistant containers which are taped closed or tightly lidded to preclude content loss?
- Is the infectious waste storage area well lighted and ventilated, and the floors constructed of an impervious material to prevent saturation of liquid or semi-liquid substances?
- Are infectious waste containers removed from the facility within seven days after becoming full?

Check Your Progress 1

1) List the sources of infection in newborn unit.

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2) Enumerate the general principles of infection prevention in newborn unit.

3) List the steps of hand washing.

4) What are the general instructions to be followed before using disinfectants?

4.11 LET US SUMUP

In this unit on prevention of infection in newborn unit you read about the sources of infection and the tips for its reduction.

The sources of infection could be personnel working in the nursery, infected newborn, fomites-equipment, environment and invasive procedures.

The unit explains the tips for reduction of source of infection which includes that the Newborn care unit should be located in a low-traffic area with restricted access and it is to be ensured that the care providers indirect contact with newborn babies is minimal and the babies receive immunizations such as rubella, measles, hepatitis B-virus, mumps and influenza. Also, it tells you about the principles of infection and its prevention, basic requirements for asepsis in newborn unit, running water supply, Strict hand washing, Promotion of breast milk feeding, Avoid over crowding, Adequate disposables, Rational admission policy, Rational antibiotic policy, Good house keeping and asepsis.

In addition to above all, the various types of disinfectants/germicides used in newborn unit, the instructions for using it and the cleaning/disinfection/sterilization of house keeping, patient care area, equipment and supplies were also discussed in this unit.
Check Your Progress 1

1) Sources of infection in newborn unit.

The source of infection in newborn unit could be

- Personnel working in the unit
- Infected newborns
- Fomites – equipment
- Environment
- Invasive procedures.

2) General principles of infection prevention

By practicing infection prevention measures the baby, mother and care provider can be protected from infections. The spread of infection can also be prevented by following:

1) Provide routine care to the newborn baby.
2) Consider every person (including the baby and staff) as potentially infectious.
3) Wash hands or use an alcohol based hand rub.
4) Wear protective clothing and gloves.
5) Use antiseptic technique.
6) Handle sharp instruments carefully and clean and if necessary sterilize or disinfect instruments and equipment.
7) Routinely clean the newborn special care unit and dispose off waste.
8) Isolate babies with infections to prevent nosocomial infections.

3) Steps of hand washing:

1) Prior to hand washing rings, bangles, threads and all the accessories worn over the forearm and hands should be removed.

2) Using plain water and soap, hands must be thoroughly washed up to the elbow for atleast 2 minutes in the following sequence:
   - Palms and fingers and web spaces
   - Back of hands
   - Fingers and knuckles
   - Thumbs
   - Finger tips
   - Wrists and forearm upto the elbow.

3) A plain, non anti-microbial soap is recommended in any convenient form (bar, leaflets, liquid and powder).

4) Hands must be washed for atleast 30 seconds before touching next baby after handling an infected neonate. If the baby is uninfected, alcohol
based hand rubs (sterillium or 70% alcohol) can be used as a substitute for hand washing before touching another newborn.

5) Rinsing hands with sterillium or alcohol is not a substitute for proper hand washing before entering the unit.

6) In settings where hand washing facilities are inadequate or inaccessible, alcohol based hand rubs can be used.

7) The hands should be dried with single use autoclaved sterile towel or disposable paper towel.

8) Nails should be trimmed short and should be devoid of nail polish.

4) General instructions to be followed before using disinfectants in new born unit:
   - Follow manufacturer’s instructions.
   - Check expiry date before using.
   - Use recommended dilution.
   - Label containers – date of issue and expiry.
   - Empty container after use.
   - Wash and disinfect container before re-use.
   - Do not refill container without disinfecting container between each use.
   - Topping up is not allowed.
   - Do not use the same container to store other solutions.
   - Do not leave disinfectant container open at anytime.
   - Wash and clean articles before disinfecting.

4.13 REFERENCES


2) “Prevention of infection”, Essential newborn nursing for small hospitals in resource restricted countries, Learner’s guide, Dept. of Pediatrics, AIIMS 71-83.


6) www.dhhr.wv.gov › ... › STD, HIV, Hepatitis › Needlestick