SCHOOL OF SCIENCE AND TECHNOLOGY

MATERNAL AND CHILD HEALTH NURSING

BSN 4417

BANGLADESH OPEN UNIVERSITY

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BSN 4417

Published by:
Publishing, Printing and Distribution Division
Bangladesh Open University, Gazipur-1705

July 2005

Computer Composed and DTP Layout by:
Md. Jakir Hossin

Cover Designed by:
Md. Monirul Islam

Cover Graphics:
Abdul Malck

Printed by:

ISBN 984-34-4019-6

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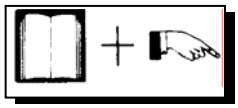
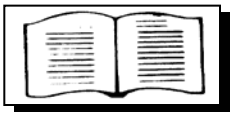
Lesson 1: Importance of Maternal and Child Health, Safe Motherhood, Role of Midwife in Safe Motherhood Initiatives

1.1. Learning Objective



On completion of this lesson you will be able to -

- define maternal and child health
- describe the importance of maternal and child health
- define safe motherhood and
- explain role of midwife in safe motherhood.



1.2. Maternal and Child Health

Maternal and child health refers to the promotive, preventive, curative and rehabilitative health care of mothers and children up to preschool age. It includes maternal health, child health, family planning etc.

1.3. Importance of Maternal and Child Health

Most developing countries in the world women in the childbearing age and children under 15 constitute two-third (⅔rd) of whole population. In Bangladesh, 48.5% of the total population of female and 46% of the total female population is within the reproductive age (15-49 years).

Maternal mortality rate is considered as one of the major indicator of maternal and child health service globally.

From recent studies on maternal death (WHO and UNICEF), around 6,00,000 maternal death occurs in each year globally and of them 99% occur in developing countries.

In Bangladesh about 6,00,000 of the 4 million women become pregnant every year and 10-15% women suffer from various delivery complications such as fistulae, prolapse, pelvic inflammatory disease, hemorrhoids perineal term, urinary incontinence etc.

According to Bangladesh Demographic and Health Survey Report 1996-to- 1997, 71% mothers do not receive antenatal care. Most of the deliveries are conducted at home and conducted by untrained Dai.

For the above reason, and for reduction of maternal, infant, prenatal mortality morbidity and promotion of reproductive health, MCH care is very much important.

1.4. Safe Motherhood

Safe motherhood means creating the circumstances within which a woman is enabled to choose whether she will become pregnant and if she does, ensuring that she -

- Receives care for prevention and treatment of complication of pregnancy,
- Has access to trained birth assistance,
- Has access to emergency obstetric care if she needs it, and care after birth.

So that she can avoid death or disability from complications of pregnancy and childbirth.

1.5. Role of Midwife in Safe Motherhood Initiative

In safe motherhood programme, role of midwife is very much important. She can take very active part for success of safe motherhood programme. She provides various important activities, these are follows-

- **Antenatal Service** – Midwifes visit pregnant women at least three time during pregnancy. During these visits, they can identify the risk factors of pregnancy and educate mothers on nutrition, personal hygiene and vaccination.

- **Safe Delivery** – Midwife conducts non-risk deliveries.

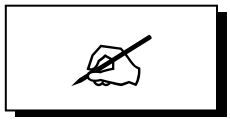
- **Post Natal Care -** Follow up of post natal mothers at home, referring them to the nearly health centres for complication and motivate mothers for breast feeding.

- **Immunization -** Children are given BCG, DPT, OPV and measles vaccine. Future mothers are given TT injection.

- **Vitamin A Capsule Distribution -** Vitamin A capsule is routinely distributed to children twice a year to prevent night blindness.

- **Distribution of ORS -** ORS is distributed. Parents are taught to prepare ORS at home.

- **Health Education -** Education on general health, personal clean liness, immunization, risk factors sexually transmitted diseases AIDs family planning, nutrition, breast-feeding, weaning food to children, and additional food to mothers.



1.6. Exercise

1.6.1. Multiple choice questions

Tick (√) the correct answer

1. How many percentage mothers do not receive antenatal in Bangladesh.

a. 7 0%
b. 71%
c. 72%
d. 73%.

2. Vitamin A capsule should be given to children

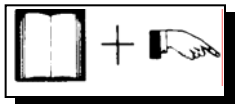
a. Once a year
b. Twice a year
c. Three times a year
d. Four times a year.

1.6.2. Short questions

1. What is maternal and child health?
2. What are importance of maternal and child health?
3. What is safe motherhood?
4. What are roles of midwife in safe motherhood?

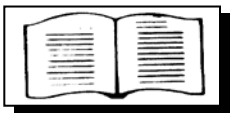
Lesson 2: Global and National Picture on MMR and IMR. National MCH Programme for Reduction of MMR and IMR

2.1. Learning Objectives



On completion of this lesson you will be able to -

- define maternal death
- define MMR and IMR
- describe causes of MMR and IMR
- take preventive measures for MMR and IMR.



2.2. Maternal Death

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

Source: Ninth Revision of International Classification of Diseases (ICE-9), World Health Organization.

2.3. MMR (Maternal Mortality Rate)

The total number of death of women due to complications of pregnancy, childbirth, and within 42 days of delivery from 'puerperal causes' per thousands live birth, in an area during a calendar year.

$$MMR = \frac{\begin{array}{l}Total\ no.\ of\ female\ death\ due\ to\ complications\ of\ pregnancy,\\ childbirth\ or\ within\ 42\ days\ of\ delivery\ from\ 'puerperal\ causes'\\ in\ an\ area\ during\ a\ calendar\ year.\end{array}}{Total\ number\ of\ live\ births\ in\ the\ same\ area\ and\ year.} \times 1000$$

It is expressed as rate per 1000 live births.

In western countries, MMR is less than 0.5.

MMR in Bangladesh in estimated as 3.6 (1997) per 1000 live birth and targeted to reduce to 3 with in 2002.

2.4. Causes of Maternal Death in Bangladesh

A. Obstetric Cause

- Toxaemia of pregnancy e.g. pre-eclamptic toxaemia (PET) and eclampsia.
- Hemorrhage – APH, PPH
- Infection
- Obstructed labour
- Septic abortion
- Puerperal sepsis
- Poor Antenatal care.

B. Non-Obstetric Cause

- Severe anemia
- Cardiac, Hepatic, Renal Infections
- Malignances
- Accidents.

C. Social factor

Early childbirth, parity, too closes pregnancy, malnutrition, poverty, Illiteracy Ignorance, lack of maternity services, poor environmental sanitation poor communication and transport facilities.

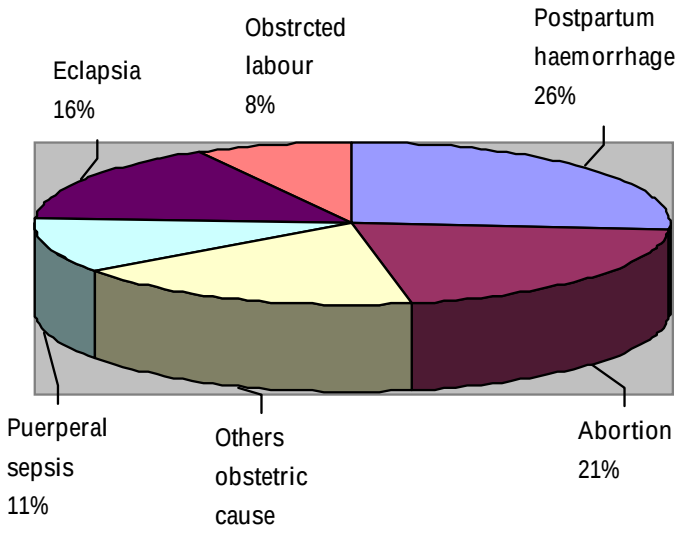


Fig.: Causes of maternal death in Bangladesh.

2.5. IMR (Infant Mortality Rate)

It is the ratio 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.

$$IMR = \frac{No\ of\ deaths\ in\ a\ year\ of\ children\ less\ than\ of\ age\ 1\ year}{No.\ of\ live\ births\ in\ the\ same\ year} \times 1000$$

In Bangladesh IMR = 57/ 1000 live birth (both sex).

Male – 58/ 1000 live births.

Female – 56/ 1000 live births.

2.6. Causes of Infant Mortality

Major Cause

A. Neonatal mortality (0-4 weeks)

- Prematurity
- Low birth weight
- Birth injury and asphyxia
- Congenital anomaly
- Hemolytic disease of the newborn
- Enteritis and other diarrhoeal disease.

B. Post Natal Mortality

- Lower respiratory tract infection e.g. bronchitis and borne chitty pneumonia.
- Gastrointestinal and diarrhoeal diseases.
- Communicable diseases- whopping cough, measless influenza, Chicken pox, diphtheria.
- Accidental injury.
- Malnutrition
- Congenital anomaly.

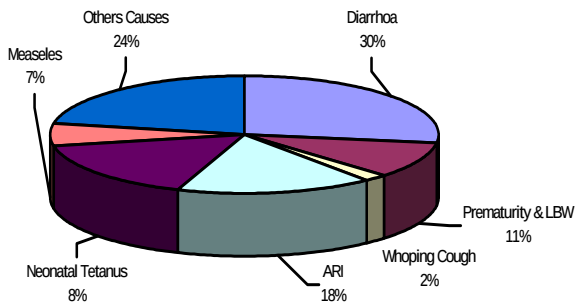


Fig.: Causes of infant mortality in Bangladesh.

2.7. National MCH Program for Reduction of MMR and IMR

A. The main MCH problems in Bangladesh.

- Malnutrition
- Infection
- Uncontrolled reproduction.

Measure to be taken to Solve these Problem

Direct	Indirect
Food supplementation	Immunization
Food fortification	Safe water supply
Food enrichment	Family planning
Distribution of iron and folic acid	Health education
Nutrition education	Food hygiene
	Primary health care (PHC)

B. MCH Based Family Planning

MCH centres are located where mothers are attended for antenatal check up delivery care and after deliver care. Their husbands and children accompany them to the centre. During this period, they can be better motivated towards family planning.

Family planning will be highly effective if based at MCH centres. Because these centres are attended by mothers before, during and after delivery.

Mothers are directly exposed to the risks of childbirth, so family planning motivation is more important for them.

C. MCH Care within Essential Service Package (ESP)

ESP is the most important health package of the population in both rural and urban Bangladesh.

It aims at safe pregnancy and delivery including fertility regulation; treatment of abortion and avoiding unwanted pregnancy. It also includes child health care and reproductive health care.

Programme area covered by ESP are as follows -

A. Child Health Care

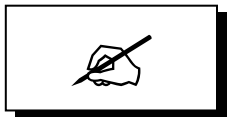
- Control programme for diarrhocal disease, ARI, CDD Vaccine preventable disease (EPI).
- For preventing malnutrition take extensive and intensive programme.
- Other preventive and curative care.

B. Reproductive Health Care

- Prevention, control and treatment of RTI/ STD/ AIDS/ HIV.
- Care for safe pregnancy.
- Avoiding unwanted pregnancies.
- Menstrual regulation.
- Managing maternal and adolescent health.
- Involvement of female education complement and empowerment programme.

C. Communicable disease control programme

- TB, Leprosy, Malaria, Kalaozar, STD, RTI, HIV, AHD etc.
- It provides information, education and communication.
- Improving the health of individuals and the nation.



2.8. Exercise

2.8.1. Multiple choice questions

Tick (√) the correct answer

1. MMR per 1000 live birth in Bangladesh is

a. 3
b. 3.2
c. 3.4
d. 3.6.

2. The main MCH problems in Bangladesh

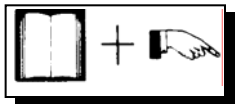
a. Malnutrition
b. Infection
c. Uncontrolled reproduction
d. All above.

2.8.2. Short questions

1. What is maternal death?
2. How would you meansure MMR?
3. What are causes of MMR in Bangladesh?
4. What is IMR?
5. What are causes of infant mortality?
6. What are main problem of MCH program in Bangladesh? How would you overcome it?

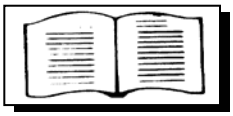
Lesson 3: MCH Services Delivery System in Bangladesh

3.1. Learning Objectives



On completion of this lesson you will be able to -

- understand the aims of MCH services
- explain the importance of MCH services and
- describe the MCH services in Bangladesh.



3.2. The aims of an MCH service are as follow

A. Every expectant mothers maintains good health. Every expectant mothers be prepared physically and psychologically to look after her child. Every expectant mothers goes through normal delivery. Every expectant mothers bears a healthy child.

B. Every child grows up in healthy surroundings. Every child receives proper nourishment. Every child receives adequate protection from diseases.

C. Communicable diseases are controlled in the vulnerable groups by preventive measures and health education.

D. Early detection and treatment of illness in Children before they become serious or chronic.

E. Maintenance of statistical data on morbidity and mortality.

3.3. Importance of MCH Service

1. The child bearing mothers 22.3% and under five children 15-20% entities more than 40% of total populations.

2. 19% of total population is women (15-49 years).

3. Mothers and children are more vulnerable or high-risk group.

4. The maternal mortality and infant (under five Children) mortality rate in very high in developing countries. In Bangladesh MMR=3.0/ 1000 live birth and IMR = 57/ 100 live birth.

5. By improving the health of mothers and children, we can improve the health of total population.

For these above reasons maternal and child health (MCH) services are very important in Bangladesh.

3.4. MCH Services in Bangladesh

Government and nongovernmental organization provide MCH care in Bangladesh.

The government organizations under the Ministry of Health and Family Welfare provide health and it has been also serving maternal and child health care at different levels Union, Thana, District and national levels.

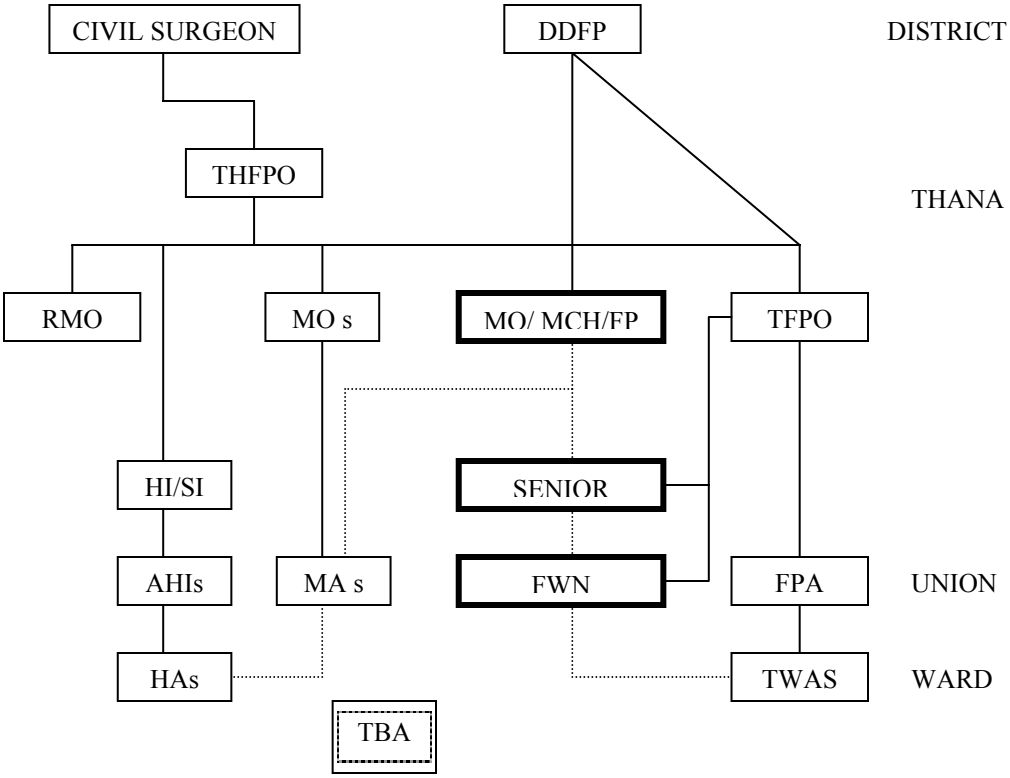


Fig.: Organizational structure of MCH services in Bangladesh.

At Community or Village Level

a. Health assistant (HA) and family welfare assistant (FWA). They delivered health and family planning services. FWA distributes contraceptives and carry out motivational work for family planning.

b. Traditional birth attendants and pallichickitshocks village doctors. A large number of TBA and pallichickitshocks work in the community. They provide perinatal care to pregnant women, attend deliveries at home and also provide postnatal care.

At Union Level

Organizational structure: Union is the first level of health facilities. At the union level, there are union sub-centre (USC) and family welfare centre (FWC). The USC under the health division and FWC under the family planning division. Both are linked with thana health complex.

At Upazila Level or Thana Level

Every upazila or thana health complex comprise an MCH unit and provide care for pregnant women, under five children and family planning services. Also responsible for motivation and data collection activities.

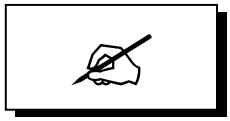
At District Level

There are two sets of facilities

a. MCWC (Maternal and Child Welfare Centre) - Provides all essential care for pregnant women and under 5 children and family planning needs for non-pregnant women.
b. District General Hospital.

MCH Service at the National Level

At the national level, all hospitals attached to medical colleges, provide gynae, obstetric and pediatric services and the family planning model clinic, provide contraceptives services.



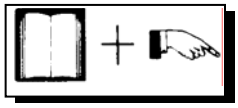
3.5. Exercise

3.5.1. Short questions

1. What is MCH care?
2. Describe in brief MCH program in Bangladesh.
3. Write down the aims and objective of MCH services.
4. Why MCH services is important in our country.

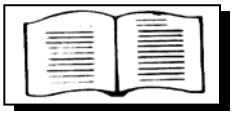
Lesson 4: Impact of Women States and Education on Maternal Health

4.1. Learning Objectives



On completion of this lesson you will be able to -

- importance of female education
- education can help to make a wise decision
- education can reduce MMR and IMMR.



4.2. Introduction

Female education is the key factor to improve the overall health and hygienic conditions of any country (Masud, 1999), The 'World Health Organization' (WHO) is one of the organs of United Nations Organization has stressed much for the primary care especially on women health.

Female education would reduce the morbidity, infant mortality rate, crude birth rate and crude death rate. It also increases the overall longevity and expectancy of life. Most of the mothers in developing countries are not aware of nutrition. The health of the mother and foetus during pregancy depends mostly on nutrition. Female education can be help the people to make a wise decision concerning their health, their family and the quality of life at the community level.

Healthy Mother and Healthy Nation

Healthy mother can deliver a healthy child. Birth weight of newborn baby does not only indicate mother's better health and nutrition, it also indicates the future health status of both mother and the child (Deller, 1995). Education on nutrition has a very strong effect on a maternal and child health. Women suffer more than men in case of iron deficiency anemia. There is a large gap of iron deficiency anemia in women and men that is of 458 million adult women and 238 million men (world development report, 1993). Women's nutritional problems are the worst in the developing countries, where prevalence of anemia, protein-energy malnutrition and vitamin-A deficiency are the highest. Anemia and Protein-Energy Malnutrition (PEM) affects larger number of women and require more continuous intervention. In case of pregnancy and lactating mother folic acid and vitamin-B, vitamin-C are the essential requirement for the growth of foetus and newborn. People do not know that only regular supply of ferrous sulfate tablets can prevent or anemia among pregnant and lactating women (Jamison, 1990).

Women in developing countries suffer from a broad array of reproductive health problems, which have an adverse impact on their health, marital and economic condition. In Bangladesh, 25% of the 3000 women surveyed showed symptoms of pelvic tract infection and two thirds of these had clinical or laboratory evidence of an infection. The study further indicated that more than 50% of the female bad been suffering from moderate to severe degree of malnourishment when more than 70% are illiterate (world development report, 1993). It is due to the lack of health education that most of the female in developing countries face multiple disease like general weakness, malnutrition, anemia, sex and skin disease, peptic ulcer, tuberculosis, pelvic infection, respiratory tract infection etc. (Tomkins 1989). The female education includes-counseling about sexuality, contraception, abortion, infection in pelvic organ, pregnancy, iron deficiency anemia, malnutrition, importance of breast-feeding and its advantages etc.

Due to the lack of sufficient knowledge of maintenance of female health, women who are the most vital part of any nation cannot contribute to the society though they have all the potentialities to serve the nation. To reduce protein energy malnutrition some measures like more food availity to households production, employment opportunities for women, decreasing the time and energy cost of women's home production should be taken into consideration (ICDDRB, 2000). Poor health and nutrition reduce the gains of schooling in three areas, enrollment, ability to learn and participation by girls. Children who enjoy better health and nutrition during early childhood are more likely to be ready to get enrolled in the schools earlier. It is clear that the factors like malnutrition, anaemia, infection etc. are the main causes of morbidity and mortality of mother and child. These cause can be romoved by proper female health education, thus female health education can contribute to enhance the overall condition of the women folk of the under developed countries. Moreover, female health education changes behavior pattern of mother and helps to promote health, prevents illness, cures disease and facilitates rehabilitation.

World development report (1993), on female health and development exhibited the relationship between different income groups of people of several countries. The result of the study has been shown in Table 1.

The report indicates that female education is directly related with the child and maternal mortality. The table clearly shows that child and maternal mortality is directly related to the female education. In case of developing countries like Ghana, Pakistan, India the rate of female education is lower which causes greater child and maternal mortality. On the other hand, the developed countries like Canada, USA, Germany have higher rate of

female education and the rate of child and maternal mortality is much lower than developing countries.

Table Health, welfare of women of different countries of the world

	Health and Welfare						
	Under-5 mortality rate (per 1,000 live births)		Life expectancy at birth (year)				Maternal mortality (per 1,000 live births)
	Female	Male	Female		Male		
	1991	1991	1970	1991	1970	1991	1988
China and India	96w	104w	54w	58w	53w	61w	308w
Other low-income	75w	80w	57w	60w	57w	64w	115w
Low-income economies	135w	148w	47w	57w	46w	54w	487w
Ethiopia	185	204	44	50	43	47	
Uganda	175	195	51	47	49	46	550
Bhutan	200	188	41	49	39	47	1,305
Nepal	139	125	42	53	43	54	833
India	125	123	49	60	50	60	
Ghana	122	140	51	57	48	53	1,000
Pakistan	139	137	47	59	49	59	270
Sri-Lanka	19	25	66	74	64	69	80
Middle-income economies							
Thailand	30	40	61	72	56	66	37
Philippines	53	68	59	67	56	63	
Malaysia	15	21	63	73	60	68	26
High income economies							
Canada	8	10	76	81	69	74	
United states	9	13	75	79	67	72	
Germany	8	10	74	79	67	73	

Table Health, education of women of different countries of the world

	Education							
	Percentage of cohort persisting to grade- 4				Females per 100 males			
	Female		Male		Primary		Secondary	
	1970	1986	1970	1986	1970	1990	1970	1990
China and India						78w		65w
Other low-income						79w		65w
Low-income economies	65w	66w	74w	70w	61w	78w	44w	66w
Ethiopia	57	56	56	56	46	64	32	67
Uganda					65		31	
Bhutan					5	59	3	41
Nepal					18	47	16	
India	42		45		60	71	39	55
Ghana	77		82		75	82	35	63
Pakistan	56		60		36	52	25	41
Sri-Lanka	94	97	73	99	89	93	101	105
Middle-income economies								
Thailand	71		69		88	95	69	97
Philippines		90		94	63	72	39	51
Malaysia					88	95	69	104

High income economies								
Canada	95	97	92	93	95	93	95	96
United states					95	95		
Germany	97	99	96	97	96	96	93	98

4.3. Exercise

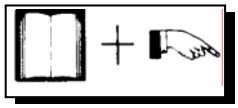
4.3.1. Short questions

1. What is importance of female education?
2. How can education help of make a wise decision?
3. How can education reduce MMR and IMMR?

Unit 2: Review of Maternity Cycle

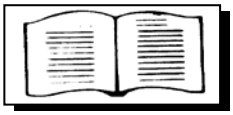
Lesson 1: Review of Maternity Cycle – Pregnancy: Physical and Physiological Changes in Pregnancy

1.1. Learning Objectives



On completion of this lesson you will be able to -

- know the maternity cycle
- recognize the physical (anatomical) and physiological changes that a women undergoes during the cycle
- tell in which stage of cycle a pregnant woman is.



Maternity Cycle

The stages in maternity cycle are -

1. Fertilization
2. Antenatal or prenatal period (pregnancy period)
3. Intranatal period (delivery period)
4. Post-natal period (period after delivery)
5. Interconceptional period (period between delivery of baby to conception for next baby).

Pregnancy

It occurs when the liberated ripe ovum is fertilized by a spermatozom. Pregnancy is a physiological condition of a woman during her reproductive period (16-45 years) in which development of fertilized ovum occurs within the maternal body. Average duration of pregnancy is 40 weeks.

- Early pregnancy (1^{st} to 12 weeks) 1^{st} trimester
- Mid pregnancy (13^{th} to 28^{th} weeks) 2^{nd} trimester
- Late Pregnancy (29^{th} to 40 weeks) 3^{rd} trimester.

A. Physical Changes in Pregnancy

During pregnancy there is progressive and gradual physical changes in the genital organ and all the systems of the body as the mother adapts to the increasing demands of the foetus.

a. Uterus

The uterus grows enormously, give nourishment and protection to the growing, so increase in weight and size. The non-pregnant uterus measures 7.5 cm in length and weighing 50 gm, at term its weight 900 – 1000 gm and length become 35 cm. Changes occurs in all three parts of the uterus – body, isthmus and cervix. The shape also changes several times. Non-pregnant uterus is pyriform, it becomes globular at 12 wks. It is pyriform or oval by 28 weeks and again becomes spherical beyond 36^{th} weeks.

The uterus enlarges by muscle hypertrophy and limited hyperplasia, 6 times more than normal. There is simultaneous increase of the supporting fibrous and elastic tissues and the vascular system, arteries, venous and also lymphatic channels.

Isthmus: Elongated 3 times and become softer. It begins to merge with the uterine body after 12 weeks until it incorporated into the uterine cavity.

b. Cervix

- Softening of the cervix as early as 6 weeks (Goodell's sign). This softening helps cervix during labour
- Hypertropy and Hyperplasia of elastic and connective tissue.
- Increased vascularity (so blue coloured)
- Hypertropy of gland and cervical canal.

c. Vulva and Vagina

- Increased vascularity, soft, relaxed and blue coloured.
- Increased secretion (copious and tenacious due to effect of progesterone) giving rise to physiological leucorrhoea during pregnancy.
- Acidic secretion due to more lactic acid generation.

d. Ovary

Oestrogen and progesterone secreted from the corpus luteum maintains the environment for the growing ovum and its size increased (upto 3^{rd} month maximum in 8^{th} weeks) regresses when placenta is fully formed.

e. Breast: Change in breast best seen in a primae gravide-

- Increased size, vascularity increases with superficial dilated veins.
- Formation of primary and secondary areola
- Montgomery's tubercle (Hypertrophied areola)

- Consistency – more lobulated
- Striae graviderum over breast
- Secretion of colostrum starts after 12 weeks

f. Abdominal Wall

- Muscles are streched and umbilicus is flattened out.
- Skin is stretched formation of striae gravidarum
- Pigmentation from pubis to umbilicus – lineanigra

g. Pelvic Joints

- Softening and slight relaxatoin of ligaments of sacroiliac joint – due to release of hormone relaxin.

h. General Change

- Pregnancy cloasma on cheek and forehead
- Pigmentation over nipples and external genitalia
- Linea nigra over abdomen – which after delivery becomes whitish mark called striae albicens.
- Striae gravidarum over abdomen and breast.

B. Physiological Changes in Pregnancy

a. Weight gain and H_2O Metabolism

- The total weight gain varies between 7 – 17 Kg (average 11 kg or 24 lb)

  Weight gain – 1st trimester – 1 kg
  – 2nd trimester – 5 kg
  – 3rd trimester – 5 kg
  ] Average

- Retention of Na, K and Cl – due to increase oestrogen, progesterone and aldosteran, causes retention of H_2O.

- Falling of wt or stationary of wt – suggestive of intra-uterine growth retradation or IU death, so weight should check regularly.

b. Heart and Circulation

- Due to elevation of diaphragm the heart is pushed upward and outwards with slight rotation to left.

- Cardiac output starts to increase from 10th week of pregnancy reaches peak at about 24-30 weeks and remain so till term. Cardiac output return to non-pregnant level by 6 weeks of post-partum.

- Blood pressure remains almost within normal values (systolic 110-120 and diastolic 65-80 mmHg) inspite of increase are cardiac output, because the high level of progesteron diminishes peripheral vascular resistance.

c. Metabolic Change

- BMR increased by 30% higher than non-pregnant state.
- Proteins – positive nitrogenous balance throughout pregnancy.
- Carbohydrate metabolism – Insulin secretion increased and sensitivity of insulin receptors decreased.

Effect is – Maternal fasting hypoglycaemia and postprandial hyperglycaemia and hyperinsulinemia. Oral glucose tolerance test may show an abnormal pattern. Glomerular filtration of glucose is increased to exceed the tubular absorption threshold (normal 180 mg %) so glycosuria is detected in 50% of normal pregnancy women.

- Fat metabolism – Increased absorption of fat in later month of pregnancy. Average of 3-4 kg fat is stored, mostly in abdominal wall, breasts, hips and thigh. Plasma lipids increase during later half of pregnancy.

- Iron metabolism – Iron is absorbed in ferrous form from the duodenum and jejunum and is released with circulation as transferring. Total iron required during pregnancy is approximately 1000 mg, and is needed mostly during the last 12 weeks. In pregnancy there is inevitable iron deficiency state in mother, but normal Hb is maintained in the fetus.

d. Systemic Changes

i. Respiratory System

Breathing becomes diaphragmatic. A state of hyperventilation occurs leading to increase in tidal volume and therefore respiratory minute vol by 40%. The women feel shortness of breath.

Acid base balance: acid base balance change due to hyperventilation. Arterial PCO_2 fall from 38 to 32 mmHg and PO_2 rises from 0.5 mmHg to 105 mmHg. It helps transfer CO_2 from foetus to mother and O_2 from mother to foetus.

Pregnancy is in a state of respiratory alkalosis compensated by a mild acidosis, as the pH rises by 0.02 units and there is a base excess of 2m Eq/L.

ii. Urinary System

Kidney: Dilatation of renal pelvis. GFR increased by 50%.

Ureter: Becomes atonic.

Bladder: Increased frequency of micturation at 6-8 weeks. It subsides after 12 weeks. Reappears in late pregnancy. Stress incontinence may occur, sphincter weakness of urethra.

iii. Alimentary System

Regurgitation of acid content of stomach (cardiac splinter relaxed) into oesophagus may cause oesophagitis (chemical) and heart burn. Fullness of stomach (delayed gastric emptying decreased gastric secretion). Constipation (decreased muscle tone)

iv. Liver and Gall Bladder

Liver functions are depressed. Atonic gall bladder and higher blood cholesterol level during pregnancy – favours stone formation.

v. Nervous System

- Nausea, vomiting, mental irritability, sleeplessness.
- Generalized neuritis – Vit B1 deficiency.
- Carpel tunnel syndrome – pain and paraesthesia in hand and anus, due compression of median nerve under the carpel ligament.
- Sciatica – Due to compression of lumbo sacral trunk by foetal lead or prolapsed inter vertebral disk.

vi. Calcium Metabolism and Locomotor System

- Calcium demand increase– daily need 1 – 1.5 gm during pregnancy.
- Osteo malacia, oesteoprosis or both – if there is Ca deficiency.
- Increased mobility of pelvic joints (softing of ligaments) lead to backache and weddling gait.
- Increased lordosis – enlarged uterus.

e. Estimation of Expected Date of Delivery (EDD)

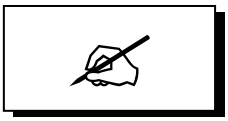
- From menstrual history – count from 1st day of last menstrual period to 9 months ± 7 days.
- By ultrasonogram – Biparietal diameter of foetal skull.

f. Signs and Symptoms of Pregnancy

Symptoms - Amenorrhoea

- Morning sickness – nausea ± vomiting
- Enlargement and feeling of fullness of breast.
- Increased frequency of micturation etc
- Quickening (between 18-20th week)
- Skin changes.

Signs
- Due to change in the uterus. Softening of uterus.
- Softening of cervix
- Signs due to change in the skin and breast etc.



1.2. Exercise

1.2.1. Multiple choice questions

Tick (√) the correct answer

1. Oestrogen and progesterone are secreted from

a. Ovary
b. Corpus luteum
c. Uterus
d. Vagina.

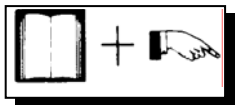
2. After pregnancy, cardiac output starts to increase from

a. 10th week
b. 11th week
c. 12th week
d. 12th week.

1.2.2. Short questions

1. What are stages of maternity cycle?
2. What is pregnancy? What are changes occur i pregnancy?

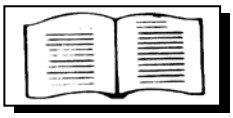
Lesson 2: Care During Antenatal Period- Antenatal Assessment, Advices, Preparation for Labour and Delivery



2.1. Learning Objective

On completion of this lesson you will be able to -

- know how to make assessment of a pregnant mother and advice her
- make the mother aware and mentally prepared for the process of delivery.



Maternity Care

In a narrow sense, consists of care of the pregnant women (Antenatal) safe delivery (internatal) postnatal care, care of the newborn, and the maintenance of lactation. In the wider sense it begins much earlier in the measures aimed to promote the health and well being of the young couple, which are potential parents, also helps them to develop. The right approach to family life and to the place of the family in the community. It should also give guidance in parents-craft and in problems associated with infertility and family planning.

Antenatal Care

It is a systematic supervision-examination advice and care provided to the women during pregnancy to bring the mother and child to labour in the best possible condition.

Aims of Antenatal Care

i. To screen the high risk cases.

ii. To prevent or detect and treat at the earliest any unwanted complication.

iii. To ensure continuous medical surveillance and prophylaxis.

iv. To educate mother about the physiology of pregnancy and labour to remove fear.

v. To discuss with the couple about the place, time and mode of delivery provisionally and care of new born.

vi. To motivate the couple about the need of family planning.

The specific objective of care is to ensure a normal pregnancy with delivery of a healthy baby from a healthy mother.

Antenatal visits: Ideally

i. Every 4 weeks (once in a month) until 24th week
ii. Every fortnight (once in 2 week) until 36th week
iii. Every week until the onset of labour.

If not possible at least 3 visit are required.

1st Visit: Between 6th and 16th weeks of pregnancy.

2nd Visit: Between 32nd and 36th weeks of pregnancy.

3rd Visit: About 38th and 39th weeks of pregnancy.

Procedure at the 1st visit

A. History taking……

Name…….....

Age ……...

Address…….....……..

1. General (Medical history)

   Any serious illness: cardiac or renal disease, diabetes, previous surgical/gynaecological operation etc.
2. Family history- Hypertension, diabetes etc.
3. Past obstetric history-

   -Previous pregnancy and labour, abortion

   -Premature labour, IUD, PPH, Eclampsla etc.
4. H/O present pregnancy

   -LMP, Cycle- normal / irregular, use of oral pills

B. Examination

i. General examination

   Height, Weight, Development, deformity, heart, lung, anaemia, oedema, BP etc.

ii. Obstrical examination

   Inspection of vulva, vagina, breast abdomen. Foetal Heart sound,

   P/V examination, position of uterus.

C. Routine Investigation

i. Blood-Hb%, blood grouping, ESR, CP

ii. Serological test-VDRL for syphilis, Rubella antibody. Titre, HBsAg for Hepatitis B.

iii. Urine for sugar, albumine β HCG.

D. Advice to the Mother

i. Diet Daily Requirement: 2 liter of water, 2 pint of milk, vegetable to prevent constipation (Protein=100 gm, Fat=100 gm, CHO= less, Iron=3 mg, Ca=1.5 mg, Vit D= 800 IU, Vit A=8000 IU, Total Calories=2400 Cal/day.

   If anaemic patients than ferrous sulphate 200 mg t.d.s. and folic acid 0.5 mg.

ii. Rest: 2 hours at noon and 8 hours at night. If sleepless, than Diazepam 5 mg at night.

iii. Exercise: Getting out of house in open air

iv. Travel: Avoid jerky travel by rickshaw or bus

v. Regulation of bowel: Regular bowel movement is facilitated by regulation of diet, plenty of fluids, vegetables and milk.

vi. Coitus: Avoid in 1st trimester and near term for infection

vii. Care of breasts and nipple

viii. Clothing: loose clothing's

ix. Maintenance of hygiene, oral and dental hygiene.

x. Immunization: Injection tetanus toxoid against tetanus (give I/M at 6 weeks interval. 1st one given between 16-24 and booster dose given in last trimester.

E. Subsequent Visits

i. Record BP, fundal height

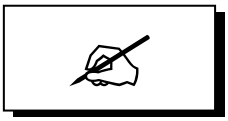
ii. Urine test for albumin/ Sugar

iii. HB%

iv. After 32 weeks- presentation

v. Ultrasonogram for foetal well being.

Antenatal care does not mean only palpation and other examination. Mental preparation is important as physical or material preparation. Sufficient time and opportunity must be given to the expectant mothers to have free and frank talk on all aspects of pregnancy and delivery.

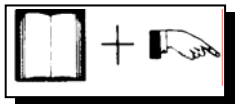


2.2. Exercise

2.2.1. Short questions

1. What is maternity care?
2. What is antenatal care? What are the aims of its?
3. What are procedures for antenatal care?

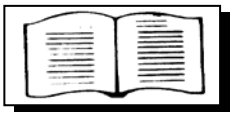
Lesion 3: Intranatal Care Stage of Labour, Monitoring and Conduction of Labour, Complication, Identification and Management



3.1. Learning Objective

On completion of this lesson you will be able to -

- know about the stage of normal labour and the event in each stage
- explain how to monitor the labour
- describe how to conduct the labour and
- identity the complications that may arise during the process of labour and manage them.



Normal Labour or Child Birth

Definition

Series of events that take place in the genital organs in an effort to expel the viable products of conception out of the womb through the vagina into the outer world is called labour.

Or

It is the expulsion of mature foetus presenting by vertex per vaginally. Spontaneously without any undue delay without any artificial aid and followed by expulsion of placenta.

Intranatal Care

Childbirth is a normal physiological process, but complication may arise. The basic principles of intranatal care that need to be kept in mind are-

i) Thorough asepsis for prevention of infection.

ii) Delivery with minimum injury to mother and the infants.

iii) Readiness to deal with complications such as prolong labour, antepartum hamorrhage, convulsion, mal presentation, prolapse of cord etc.

iv) Care of baby at delivery.

Stages of Normal Labour

1st stage: Beginning of labour pain to face dilatation of cervix.

2nd Stage: Starts from dilatation of the cervix and ends with the expulsion of the foetus from the birth canal.

3rd Stage: Begins after expulsion of the foetus and ends with expulsion of the placenta and membrane.

Duration of Stage of Normal Labour

Stage	Primi	Multi
1st stage	8-12 hrs	6-8 hrs
2nd t stage	1-2 hrs	30 minutes
3rd stage	15-30 minutes	15-30 minutes

Changes during different stage of labour

1st stage

- Intermittent pain, which gradually increase in frequency and intensity.
- Pain corresponds with uterine contractions.

P/V changes

- Dilatation of cervical os
- Taken up cervical ring (effacement)
- Formation of fore water bag and blood stained mucosal secretion.

2nd Stage

- Bag of membrane rupture wholly
- Bearing down pain
- Displacement of pelvic floor by foetal head
- Expulsion of foetus

3rd Stage

- Expulsion of placenta

Mechanism of normal labour: Movement taking place during labour. Engagement → Descent → Flexion → Internal rotation → Extension → Restitution → External rotation → Lateral flexion and birth of the baby.

Management of 1st Stage of Labour

- History: LMP, EDD, Obs history
- Assessment of BP, anemia, oedema.
- Abdominal examination- for presentation, position and engagement, auscultation and records of foetal heart rate.
- P/V examination for degree of dilation of cervix, effacement, condition of membrane, level of presenting part.

- Shaving of local part.
- Reassurance to the mother.
- Care of bowel and bladder: Enema with soap, catheterization.
- Nutrition, fluid or food if evidence of dehydration.
- Relief of pain.
- Careful watch of FHS and mother general condition.
- Careful watch of progress of labour.

Management of 2nd Stage Labour

- Labour monitoring labour chart.
- Patient is placed in lithotomy position and doctor is dressed.
- Vulva and surrounding parts are cleaned.
- Patient is encouraged to push down.
- If head progresses slowly it is allowed to distened the perineum till "crowning" if perineum threatens to tear episiotomy should be given.
- After delivery of head: mouth nasopharynx are aspirated. Then deliver the Ant. shoulder following post. Trunk is delivered by lateral flexion.

While lifting baby head towards mothers abdomen.

Cord is clamped and cut in between two clamps.

Management of 3rd Stage

The placental separation and descent into vagina is allowed to occur spontaneously. Then the patients are asked to bear down simultaneously with the hardening of the uterus. As the placenta passes through the introitus, it is grasped by the hands and taken out by the gentle traction. The uterus is massaged Ergometrine or methergin is given intramuscularly, placenta, membrane and cord is examined, vulva, vagina and perineum inspected. Maternal condition and vaginal bleeding watched for 1 hour after delivery.

Common Complication (especially in 3rd stage)

i. Haemorrhage (PPH)- shock
ii. Acute inversion of uterus
iii. Rupture of uterus
iv. Retained placenta

v. Sepesis of birth canel

vi. Embolism pulmonary by blood thrombosis and air.

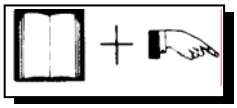
3.2. Exercise

3.2.1. Short questions

1. Define childbirth.
2. What the stages of childbirth?
3. Write down the changes during different stages of labour.
4. How would you manage labour.

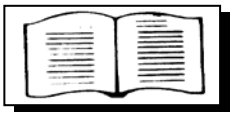
Lesson 4: Post-natal Care Immediate and Late Care of the Mother and the Newborn

4.1. Learning Objective



On completion of this lesson you will be able to -

- describe post natal care of the mother which include
- explain the care of the new born-which include.



Postnatal Care: Care of the mother and the newborn after delivery is known as post natal or post partal care. Broadly this care falls into two areas-

i. Care of the mother

ii. Care of the newborn.

A. Care of the mother

The objectives of postnatal care are-

i. To prevent complications of postnatal period.

ii. To provide care for the rapid restoration of the mother to optimum health.

iii. To cheek adequacy of breast-feeding.

iv. To provide family planning services.

v. To provide basic health education to mother and family.

Complications of Post-Partal Period

i. Puerperal sepsis- Infection of genital tract within 3 weeks after delivery. There is rise of temperature and pulse rate with foul smelling, locahia and pain in lower abdomen, Prevented by attention to asepsis before and after delivery.

ii. Thrombophlebitis- Infection of veins of legs.

iii. Secondary haemorrhage- Bleeding from vagina from 6 weeks after delivery to end of preperium- 6 weeks.

iv. Others UTI, Mastitis etc.

Restoration of Mother to Optimum Health Para– The board area are-

1. Physical-
   a) Postnatal examination-cheek temperature, pulse, respiration, lochial discharge, urine and bowel etc.

b) Anaemia, routine Hb% should be done.

c) Nutrition – The nutritional needs must be adequately met.

d) Postnatal exercise – To bring abdominal and pelvic muscle back to normal as soon as possible.

2. Psychological – This requires support of her husband and family.
3. Social – To familiarize and raise the child in a wholesome family.

Breast-feeding

It is very important to advice the mothers to avoid the feeding bottles. No other food is required to be given until 6 month after delivery.

Family planning

Every attempt should be made to motivate mothers to adopt a suitable method for spacing the next birth or for limiting the size as the case may be.

Basic Health Education

- Hygiene
- Feeding for mother and infant and proper nutrition
- Pregnancy spacing
- Importance of regular health cheek up
- Birth registration.

***B. Care of Child* (Neonatal care)**

The objective of neonatal care are-

1. Establishment and maintenance of cardio-respiratory function.
2. Maintenance of body temperature.
3. Avoidance of infection.
4. Establishment of satisfactory feeding regimen.
5. Early detection and treatment of congenital acquired disorders.

Immediate Care

a. Clearing the airway – establishment of cardio respiratory function is most important. Positioning the baby with his head low may help in drainage of secretion. This process can be assisted by gentle suction to remove mucous and amniotic fluid.

b. APGAR Score – The APHAR score is taken at 1 minute and at 5 minute. It requires observation of heart rate, respiration, muscle tone, reflex response and colour of the infant. Each sign is given a

score of 0, 1 or 2. It provides an immediate estimation of the physical condition of the baby. A score below 5 needs prompt attention.

c. Care of cord – The umbilical cord is cut and tied with sterile thread.

d. Care of the eye – Before the eyes are open the lid margins of the newborn should be cleaned with sterile wet swabs, one for each eye form inner to outer side.

e. Care of the skin – The first bath is given with soap and warm water to remove vermix and meconium and blood clots.

f. Maintenance of the body temperature – The normal temperature of the newborn is between 35.5 to 37.5^0 C.

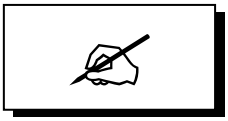
g. Breast-feeding– Breast-feeding should be initiated within an hour of birth. It also helps to established "bonding" between mother and child. The first milk called the colostrum is most suitable for the baby during this period.

On Examination

Measurement of birth weight, length (height) and head circumference are the reliable means by which the health and the maturity of a baby is evaluated.

Late Neonatal Care

The remaining three weeks of the neonatal period carry the common and serious hazards of infection and failure of satisfactory nutrition. Diarrhoea and pneumonia take a heavy toll of life in infants exposed to an unsatisfactory environment.



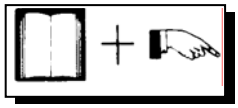
4.2. Exercise

4.2.1. Short questions

1. What is postnatal care?
2. What are the complications of postnatal care?

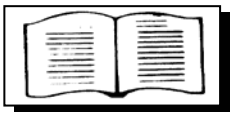
Lesson 5: Post-natal Check-Up, Postnatal Complications and Management

5.1. Learning Objectives



On completion of this lesson you will be able to -

- disuse about the importance of postnatal check-up
- describe puerperium and
- explain postnatal and puerperal complications and management.



Postnatal Checkup

The importance of post natal check up is-

1. To help in the prevention and early detection of complication.
2. To help in restoring women's health through rest and improved nutrition.
3. To provide opportunity for counseling on family spacing and limitation of family size.
4. To help in guiding women towards rational health practices.
5. To provide opportunity in educating and encouraging women for breast feedings.

Puerperium

It is the period following childbirth during which the body tissues specially pelvic organs revert back to pre pregnant state.

Duration – Generally 6 weeks or 40 days

Immediate – within 24 hours

Early – up to 7 days

Remote – up to 6 weeks.

Changes During Puerperium

i. Temperature: Immediately after delivery most women feel chill or shivering. This is due to strain during labour.

ii. Pulse: For the 1st few hours after normal delivery the pulse rate is likely to be raised.

iii. Outset of lactation: Up to the 3rd day only a little colostrums is secreted. By 3rd or 4th day the breast become tense and tender. There may be slight rise of temperature (milk fever–100-101^{0}F). Baby's sucking relieves this.

iv. Urinary system
   - Poly urea – many patients in puerperium have polyurea.
   - Difficulty to pass urine – It occurs due to small injury.
   - Retention of urine – This may be due to difficult labour, epidural anaesthesia or perineal stitches.

v. Constipation – This is due to increased progesterone which causes paralysis of smooth muscles of the gut.

vi. Lochia – This is the vaginal discharge during puerperium containing blood, mucus, shreads of epithelium, membranes, continuing for 1st three or four weeks of puerperium.

vii. Psychological change

Complication of Puerperium/ Post-Partal Period

a. Puerperal pyrexia due to sepsis or UTI

b. Sub involution

c. Venous thrombosis

d. Pulmonary embolism

e. Breast engorgement, acute mastitis, abscess, cracked nipple or retracted nipple.

f. Puerperal Psychosis

g. Secondary PPH

h. Prolapse of pelvic organ

i. Retroversion of uterus

j. Chronic backache.

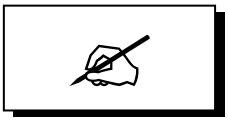
Management of Postnatal Complications

Puerperal sepsis can be prevented by attention to asepsis before and after delivery. Specific treatment has to be given if there is any complication.

a. Puerperal sepsis – treatment
   i. Triple antibiotic (Ampicilin + Gentamycin + Metronidazole)
   ii. Isolation of the patient
   iii. Analgesic for pain
   iv. Adequate fluid intake.

b. Sub involution – treatment
   i. Antibiotic as in puerperal sepsis
   ii. Exploration of uterus for retained products
   iii. Pessary in retroversion or prolapse.

c. Treatment of other complications
   i. Careful monitoring
   ii. Care of bowel
   iii. Maintenance of feeding and nutrition
   iv. Sedative / anti depressent drugs
   v. Advice for breast feeding
   vi. Advice for family planning.

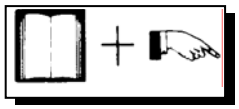


5.2. Exercise

5.2.1 Short questions

1. What are importances of postnatal checkup?
2. What are changes during pueperium?
3. What are complications and management of pueperium?

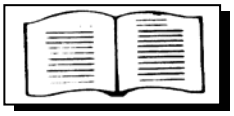
Lesson 6: Planning of Standard Maternity Unit / Hospital



6.1. Learning Objective

On completion of this lesson you will be able to -

- know the standard maternity center facilities and equipment for planning a maternity unit.



Maternity Unit/ Hospital

In planning the layout for maternity facilities, knowledge of the workload envisaged is critical. Facilities should cater for all abnormal deliveries taking place in a catchment area with a total population of for example 100,000 people, together with a fair proportion of women with pregnancy complications and other who are self-referrals.

It is assumed that the crude birth rate is 40 per 1000 population that 5% of all deliveries will be assigned or operative and at least half of the operative deliveries would be caessarean sections. Then on these assumptions each year there would be in that area some 4000 deliveries, of which 200 would be operated and 100 caesarean sections. Some normal deliveries and all operative deliveries would be conducted at the maternity unit of the hospital, where at least 2 caesarean sections will be required each week.

The numbers need to be modified according to the actual population to be served.

Maternity center facilities and equipment

A. Space requirement

a. Maternity ward –
   - Three 8-bedded rooms plus toilets room and bathrooms.
   - Doctor's rooms
   - Nursing bay and station
   - Equipment and Medicine store
   - Room for cleaners
   - Pantry and ward kitchen
   - Corridor space and trolley bay.

b. Labour / Delivery suite
   - Labour room
   - Eclampsia room
   - Nursing bay

- Admission, Examination and preparation room
- Toilets
- Waiting area for relatives
- Recovery room.

c. Operating suite
   - Main operating room
   - Sterilizing room with store
   - Staff changing room (Male and Female) and toilets
   - Scrub up and post anesthetic rooms
   - Recovery room.

B. Items of furniture and equipment

a. Maternity ward
   - Beds and bedside lockers, chairs and baby cot.
   - Wash basins
   - Mobile screens, I/V stands, cupboards
   - B.P. machine, bedpans, stool, trolley and bins, stethescope, themoter, suction machine.

b. Nursing station
   - Table, chair, trolley, cabinet, washing basin.

c. For cleaners
   - Brushes and brooms, bins, duster, cleaning materials.

d. Pantry / ward kitchen
   - Water boiler, refrigerator, crockery and cutleries, sink and cup board.

e. Labour room
   - Labour table, foetal mointor, Doppler, vacuum extractor, baby resuscitator, baby-sucker, intubation set, incubator, disposable umbilical clips, oxytocin infusion pump, obstetric forceps, baby tray, oxygen cylinder, surgeons stool, wash basin, baby tray.

f. Eclampsia room
   - Same as delivery room but bed with side railings.

g. Operating suite-
   - Operating tables, operating stools.
   - Ceiling mounted shadow less lamp (with 5 lamps)
   - Pedestal mounted shadow less lamp

- Trolley for instruments
- Stands for I/V drips
- Air conditioner
- Cupboard, shelves, drums for linens
- Container for used swabs and instruments, swab rack
- Diathermy apparatus, suction apparatus
- Sterilizer, Sterilizer drums, sterilizer forceps, forceps
- Neonatal resuscitation trolley.

h. Staff changing room

- Locker, mirror, washbasin, towel, shelves with clean gowns, masks and caps, baskets for used gowns, toilets.

i. Scrub up post:

- Sink with elbow operational tap, soap, bowl with antiseptic solution, and scrub up hand brushes.

j. Anaesthetic room:

- Anaesthetic machine and anaesthetic gases, trolley, stool, table, cupboard for drugs and instruments.

k. Recovery room:

- Bed, trolley, BP and stethoscope oxygen channel.

l. The other essential requirements are-

- Technical working group on essential obstetric functions.
- Surgical and delivery instrument.
- Materials for laboratory tests and blood transfusion.
- Essential drugs for obstetric services.

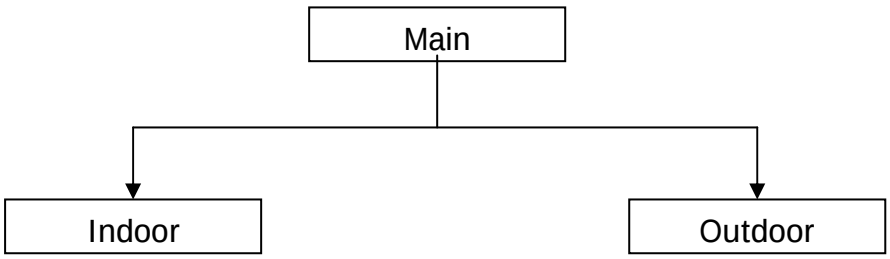
C. Manpower

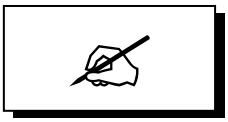
a. For 1 unit (indoor)

- 1 × Sr. Consultant
- 2 × Jr. Consultant
- 4 × Medical Officer
- 1 × Asst. Registrar
- 10 × Nursing supervision
- 3 × Ward Boy
- 3 × Aya
- 3 × Sweeper / Cleaner

b. Outdoor
   - 1 × Resident Surgeon/Jr. Consultant
   - 2 × Medical Officer
   - 1 × MO - Sonologist
   - 3 × Staff Nurse
   - 2 × Family Planning Counselor
   - 2 × Aya
   - 1 × Cleaner

c. Main Office
   - 1 × Chief Consultant (Head of the Clinic)
   - 1 × Paediatric Consultant
   - 1 × Anaesthesiologist
   - 1 × Clinical Pathologist
   - 1 × Nursing super
   - 3 × Store Keeper
   - 2 × Ward Master
   - 3 × Lab Technologist
   - 1 × PA/PS
   - 2 × Clerk cum Computer Operator
   - 3 × Account Personnel
   - 3 × Driver
   - 2 × MLSS
   - 1 × Cleaner
   - 3 × TPT



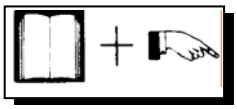


6.2. Exercise

6.2.1. Short questions

1. What is maternity unit?
2. What facilities equipments should remain in maternity center?

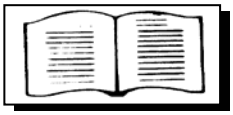
Lesson 7: Preventive Measures: In promotion of Child Health, Infant Feeding, Immunization and Health Education



7.1. Learning Objectives

On completion of this lesson you will be able to -

- take the preventive measures for the promotion of child health
- manage infant feedings and
- provide immunization and health education.



7.2. Preventive Measures in the Promotion of Child Health

Of the 140 million children born each year in the world, 90 percent are in the third world.

Although the chances of survival of these new born has improved by 50 percent in the last 20 years, the first few hours, days and months of their lives are still an obstacle. From the time of birth 20-30 percent babies are under weight that makes them vulnerable to infection and diseases. About 50 percent total infant mortality occurs in the 1st month of life.

Then comes the weaning period, when 1 out of 4 surviving children receive neither the quality nor the quantity of food needed to replace mother's milk.

The result is more children in developing countries reach adulthood with their health already impaired.

In short main health problems encountered in the child population comprises the following-

a. Low birth weight

b. Malnutrition

c. Infection and parasitoses

d. Accidents and poisoning

e. Behavioural problems.

Preventive measures that are taken can be broadly divided into antenatal paediatrics and postnatal paediatrics. Child health can be promoted through such activities as growth monitoring, oral rehydration, promotion of breast feeding, immunization, regular health check-ups, community feeding etc. These preventive measures will reduce the high child mortality and morbidity that is currently the problem in developing countries.

Infant feeding

Breast-feeding

Breast-feeding should be initiated within an hour of birth. The first milk 'colostrum' is most suitable food for the baby during this early period. It contains high concentration of protein and other nutrients the body needs. It is also rich in antiinfective factors, which protect the baby against respiratory infections and diarrhoeal diseases. The baby should be allowed to breast feed on demands. It is very important to advise mother to avoid feeding bottles.

Advantages of breast milk are

- Safe, clean, hygienic, cheap, available to the infant at correct temperature.
- It fully meets the nutritional requirement of the infant for the first few months of life.
- It contains anti microbial factors, which provides protection against infection.
- It promotes bonding between the mother and infant.
- Sucking helps development of jaws and teeth of the baby.
- It protects babies from tendency to obesity.
- It prevents malnutrition and reduces infant mortality.
- It helps in birth spacing.

Artificial Feeding

In planning an artificial feed the nutritional needs of infants should be kept in mind.

These includes –

- Infants require an average 100 K cal of energy per kg of body weight during 1st 6 month. It declines to about 1.5 g/Kg by the end of 1 year.
- 13-14 gm protein daily during 1st year.
- Carbohydrate requirement is about 10 gm/ Kg body weight daily.
- After 4 months of age undiluted boiled and cooled milk is given.
- Infants need feeding at frequent intervals.
- During illness the calorie need is increased.

Weaning

Gradual process of starting "Supplementary foods" around the age of 6 months, because the mothers milk alone is not sufficient to sustain growth beyond 6 months.

The supplementary foods are – cow's milk, fruit juice, soft cooked rice, daal, vegetable etc.

Immunization

Injection or swallowing vaccines containing antigenic substance can confer protection against infection artificially. These make the body from protective antibodies hence immunization.

World Health Organization (WHO) launched a global immunization programme known as Expanded Programme of Immunization (EPI) officially in May 1974, to protect all children of the world against six vaccines preventable diseases. These are –

a. Tuberculosis
b. Diphtheria
c. Whooping Cough
d. Tetanus
e. Poliomyelitis
f. Measles

Immunization Schedule

Vaccine	**Age**	**Dose**	**Route**
BCG	0 – 1 year	0.05 ml single	Intradermal
DPT	6 weeks – 1 year	.5 ml 3 dose 4 weeks interval	Intradermal
Polio	6 weeks – 1 year	2-3 drops 3 dose 4 weeks interval	Oral
Measles	After 9 months	.5 ml single	Subcutaneous

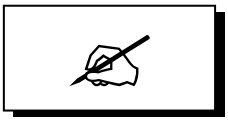
Health Education

It is a process that informs, motivates and helps people to adopt and maintain healthy practices and life styles; advocate environmental changes as needed to facilitate this goal and conducts professional training and research to same end.

Aims-

- Informing people
- Motivating people
- Guiding into action.

By providing of health education many diseases can be prevented through healthy practices.



7.3. Exercise

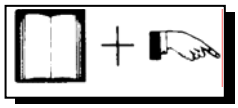
7.3.1. Short questions

1. What are preventive measures is the promotion of child health?
2. How would you manage infant feeding?
3. How would you provide immunization and health education?

Unit 3: Child Health Nursing in Bangladesh

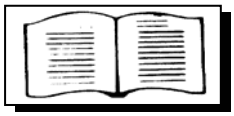
Lesson 1: Trends, Concepts, Facilities in Child Care

1.1. Learning Objectives



On completion of this lesson you will be able to -

- why child health nursing is very important
- what is the concept of child health nursing in Bangladesh and
- what facilities about child health nursing are available in this country?



1.2. Introduction

Children are always dependent on their parents or family members for routine care including feeding. Role of mother in the childcare cannot be argued. A nursing mother is also taking care of all other family members specially of the father of the child as well as the grand parents because in our country most of us live in a joint family. She also takes active part in the farming products like cereals, poultry, dairy etc. Therefore every mother is very busy. So we must consider the value of their time while we treat their children.

During sickness children become weaker than adults and, therefore, they need more affectionate and skilled care. Child health nursing has therefore got its own merits and specialties. In fact, you need more skill and lovingness to handle sick babies and children than you need to nurse adult patients. Children are easily attacked and weakened by diseases particularly infectious ones. Infectious diseases are very common in the poor developing countries like Bangladesh.

Though infectious diseases are much more common in children modern treatment like use of antibiotics is saving many child lives. Immunization is also very important to reduce death from infectious diseases as by giving vaccines you can prevent a deadly infectious disease. All of you know that a deadly disease named small pox has been eradicated from all over the world by dint of universal vaccination (immunisation) using small pox vaccine against this disease.

Breast feeding for 2 years and periodic distribution of vitamin A capsule to children aged 6 months to 6 years can further lower infant mortality in poor countries because infectious diseases like Acute Respiratory Infections (ARI) and diarrhoeas are significantly reduced be y these 2 practices. Simple personal hygiene like hand washing, use

of sanitary latrines, wearing shoes, taking clean water etc. are also be important to prevent infectious diseases. Nutrition is also a big factor for child health. Balanced food from local cheap products can ensure good health to fight diseases because malnutrition causes multiple diseases.

1.3. Children differ from adults in the following ways

1. They are growing every day by adding to their weight and length
2. They rapidly develop to learn walking, running, speaking, and acquiring other skills
3. They need love and stimulation for normal growth and development
4. They are dependent on their seniors particularly parents for routine care including feeding
5. They are physically weaker and more prone to diseases particularly infectious ones
6. Mortality from infectious diseases e.g. diarrhoea and pneumonias, are more common in children particularly in the poor countries
7. They need to be vaccinated against infectious diseases in their early age
8. They learn from adults and learning in early childhood is very effective for long time
9. They learn more from other children particularly in school, so they need to be educated together. Children play better only with children.

Mortality from various diseases is also high in children particularly in developing countries. In many areas of the poor countries 1 out of 4 (250 per 1000) children dies before reaching his or her 5^{th} birthday. Many are still sick. Bangladesh is a least developed country and her childhood mortality is very high.

1.4. Followings are various mortality rates at various age groups in Bangladesh

Neonatal mortality rate (NMR)	42 per 1000 live births
Infant mortality rate (IMR)	66 per 1000 live births
Under-5 mortality rate	94 per 1000 live births

You can see that two-thirds of under-5 mortality occurs below 12 months (1 year) of age. So, you need to give attention more for this age group.

1.5. Trends, concepts and facilities in child health nursing in Bangladesh

Caring for sick children is not popular among medical personnel in this country. Many nurses including some doctors are still scary to handle small children particularly newborn babies. Medical procedures in children are seen as very difficult jobs both by doctors and nurses. For every medical procedure you need skill. Acquiring skill in child health nursing is not difficult. One needs to be very sincere and hard working to learn these skills.

As a child health nurse you need to acquire the following qualities:

1. You must be very kind, polite and loving to handle young infants. Remember that kindness is an important part of quality of care
2. Talk patiently with the family. The family members are always anxious. They may often visit in small groups and create annoyance in you. You might feel hopeless to tell the same story to every group. In this situation you can politely ask them to come together and have the briefing from you. Please don't get upset and loose your nerve. Remember that they all like all of us, love the child and are ready to sacrifice everything for their beloved one.
3. Be smiling to each member of the family. A child's family and his community are very important for his health care.
4. Before doing a procedure try to fondle the child first, if needed in the mother's lap
5. Try to involve the mother as much as possible. Mothers in this country are available to care the sick baby. Often they stay with the child in the hospital.

1.6. Dos and Don'ts for a Child Health Nurse

1. Call the children with their names. It reflects your kindness and friendship.
2. Try to cause least pain and discomfort while doing procedures. Clean wounds carefully.
3. Be tactical in giving medicines to the ailing child! Most paediatric syrupy medicines are sweet and tasty. But some children always refuse to take them. Don't force. Be patient in giving a drug slowly with the help of the mother if she is available. Applying force may render the child panicky.
4. Every one of us is afraid of needle prick. So, a fretful child may scream very much. You need affection to handle this situation. All children ultimately become very friendly to medical professionals.

5. Don't make the mothers wait for long time. Her time is very valuable because she is taking care of all family members.
6. Parents are often scary of medical personnel. If you are frank they will certainly be attracted to you. You will get increasing number of fans.

Though you must be very polite, friendly and sober in handling small children you should be more careful during doing some procedure. Parents are very anxious to hear about a procedure. It is essential to communicate beforehand with the family of the child, so that you can explain the matter clearly. Tell them what is going to happen, what benefits this procedure will give for their child and what risk whatever small, is there with such procedure. The attending doctor to the parents explains high-risk procedures like lumbar puncture and bone marrow aspiration should better. Convince them about the procedures. In most cases the parents will be cooperative and convinced to have the procedures done.

1.7. Common Procedures Done in Children

1. IM, IV and SC injection
2. Nasogastric tube introduction
3. Nasogastric feeding and medication.
4. Lumbar puncture
5. Bone marrow aspiration
6. Suction clearance of the airways
7. Nebulised medication
8. Oxygen delivery
9. Keeping the newborn in the incubator
10. Demonstrating the mother how to feed breast milk
11. Feeding the child
12. Making ORS and rehydrating the child, teaching the mother how to make ORS.

3.8. For practical purposes children are classified according to their age

1. Neonates all babies up to 1 month or 28 days of age
2. Infant all babies up to 12 months o age
3. Toddler children between 12 months of age to 2.5 years of age
4. Preschool 2.5 years to 5 years of age
5. School going children- all children between 5 years to 15 years of age.

Please note that when we say infant mortality, we include all children from birth to 12 months of age. Similarly under-5 mortality means mortality in all children from birth to 5 years of age.

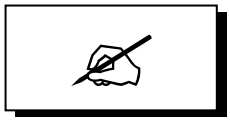
Newborn babies are also classified according to their gestational age-

1.	Full term or term baby.	When the baby born between 37 week to 42 weeks of pregnancy
2.	Preterm baby	Born before 37 weeks
3.	Post term	Born after 42 weeks of pregnancy

All babies are also classified according to their birth weight:

1.	Low birth weight (LBW)	weighing 2500g or less
2.	Normal birth weight	weighing more than 2500g
3.	Large babies	weighing more than 4000g.

Remember that weight is a great factor for the overall survival of the newborn. Preterm babies die much more in number than full term babies.



1.9. Exercise

1.9.1. Multiple choice questions

Tick (√) the correct answer

1. Please put the tick mark against the correct statement

a. Maternal and child health nursing is well developed in Bangladesh
b. Children are stronger during illness than adults
c. Most nurses, even some doctors are scary to handle small children
d. Babies bigger than 4 kg birth weight are healthier than babies weighing 3.5 kg
e. A baby of 2 months of age is a neonate.

2. Which of the following statements are true?

a. Bangladesh has a high infant mortality rate (IMR)
b. 36 week gestational period means full term pregnancy
c. Low birth weight babies are a big problem for our country
d. Oxygen is very important for diarrhoea.
e. Mother is very important in the treatment of her children

3. Say true or false

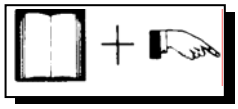
a. ORS (oral rehydration solution) is mainly used for vomiting
b. Adults like children continue to grow
c. High potency vitamin A capsule is distributed for all children
d. Poliomyelitis is no more existing in Bangladesh
e. Maternal malnutrition is a great cause of low birth weight baby (LBW).

1.9.2. Short questions

1. What are the qualities of a child health nurse?
2. What are the common procedures in child health nursing?

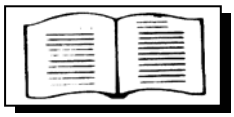
Lesson 2: Organization of Child Health Services in Bangladesh (0-5 years)

2.1. Learning Objectives



On completion of this lesson you will be able to -

- know current status of child health
- learn about organizing child health care.



2.2 Current Status of Child Health in Bangladesh

Almost 38% of our populations are children (0-15 years). Yet hospital bed, trained doctors and nurses, are very inadequate for children. Children may suddenly become very sick specially those who have diarrhoea and pneumonia. These children need emergency treatment. Bangladesh has achieved spectacular success in immunization. This has drastically reduced the neonatal and infant mortality rate. For example neonatal tetanus has become almost nonexistent in our country due to universal immunization of all pregnant mothers with tetanus vaccine.

The workforce for immunization can be utilized to assess sick children by using the integrated management of childhood illnesses (IMCI) procedures of UNICEF. These are very easy and can be used by the trained field workers.

The electronic and print media can be used to raise awareness among people regarding health education Along with this training the field workers of the government health infrastructure and NGOs to ensure safe child birth, immunization, exclusive breast feeding, preventing malnutrition, etc. rapid improvement in national health status can be achieved.

As child health services are expanding and improving to be available to rural community levels, skilled nursing care to handle children is becoming more necessary.

2.3. Organizing Child Health Care

Children of all ages will attend a child health facility in a hospital or clinic. But you should be more careful to attend the children less than 5 years of age because these children are more susceptible to infectious diseases and malnutrition.

You need separate rooms for indoor and outdoor patients. In our country it is customary to let the mother stay with the child in the hospital. Though the mothers are very busy with their household works they spare time with the help of their family members so that they can

stay with the admitted child. We must be very considerate while dealing with such admitted child. Every effort should be made to release the child as soon as possible to let the mother join the family earlier.

The children's ward should be specious, well lit, and ventilated. There should be some toys and dolls to stimulate the children. You can keep some pictorial books as well. The walls of the ward can be decorated with mural pictures like those of favourite cartoons. Once children are stimulated they become very friendly to the nurses. Offering a candy or a toy often makes them very happy and tough procedures become easier.

Instruments for general nursing care must be available. Thorough hand washing must be done each time before you care for a child. Separate stethoscope, thermometer, disposable tongue depressor should be available.

Medical procedures must be done in a separate earmarked room. Painful procedures on a child should not be performed in presence of other children.

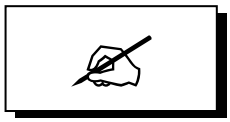
Recording rectal temperature is the best for small children under 3 years of age and in those who are unconscious. Older children above 5 years usually allow taking temperature by putting thermometer under the tongue. You need to take care while taking oral (sublingual) temperature so that the child does not break the thermometer. Mercury from thermometer is very toxic for the body. Electronic thermometers do not work very well in our environment.

Dispensing medicines is sometimes a difficult job. Some children do not like medicines whether these are sweet or not. You can take help of the mother while administering drugs. Many other children like medicines too much. You must be alert to keep medicines out of their reach to prevent accidental poisoning. Tell the mothers to do so while they use medicines at their homes.

Do not push injections in the back or buttocks in children because there may be accidental injury to the big nerves there. Always push injections in the mid-thigh on the anterolateral portions. Inject vertically and deep so that you do not put the material in the subcutaneous fatty tissue. This will cause abscess. Some vaccines are given subcutaneously. BCG vaccination is given intradermally usually at the upper part over the deltoid muscle. Always remember that injection must be given by sterile disposable syringe. We call it: 1 child 1 syringe, 1 needle. All syringes with needle must be destroyed after use.

The out door department (OPD) should be well decorated with informative pictorial posters on diarrhoea, immunization, acute

respiratory infection, feeding and nutrition. The refrigerator earmarked for vaccines must not be used for other purposes. Frequent load shedding may cause damage to vaccines and biologicals. So you should not store large quantities of such materials.



2.4. Exercise

2.4.1. Multiple choice questions

Tick (√) the correct answers

1. Say true or false

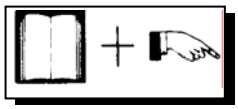
a. Immunization saves thousands of lives of children in our country
b. Exclusive breast-feeding is essential to protect newborn children
c. Rectal temperature is always more than normal body temperature
d. Buttock is a preferred site for injection in small children
f. BCG vaccination leaves a scar

2.4.2. Short questions

a. How will you organize child health nursing in an Upajilla?
b. What are the precautions for injecting a drug in a child?

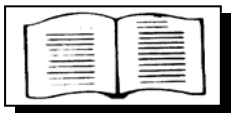
Lesson 3: Growth and Development of Children (0-5 years)

3.1. Learning Objectives



On completion of this lesson you will be able to -

- why growth monitoring is very important
- how to monitor growth in children and
- what is development?



3.2. Introduction

Becoming larger and longer is called growth. Learning various skills and functions is called development. In other words growth means increase in volume and development means maturity in function.

Growth means increase in volume and development means maturity in function.

Children are distinctly different from adults by their unique quality of growth and development. Every child is growing and maturing, and it occurs everyday.

3.3. Growth

A baby with 3 kg of birth weight becomes almost double (6 kg or more) by 5 months of age. Length of the newborn baby (usually 50 cm) doubles by 3 years of age. Thereafter the length increases about 5cm in each year. A 10-year-old boy measures in height about 135cm.

Birth weight triples at 1 year. At 2 years of age the weight becomes 12 kg. Thereafter a child adds about 2 kg in weight in each year. So you can see with becoming older in age weight and height change. Thus, looking at the weight and height you can assess the level of growth in a particular child. For this, we call weight and height as parameters of growth.

Measuring these parameters of growth is called anthropometry.

There are some other parameters of growth such as skinfold thickness, occipito-frontal circumference (OFC or head circumference), and mid-upper arm circumference (MUAC). MUAC can be used to monitor growth in children aged 12 months to 5 years). Measuring these parameters of growth is called anthropometry.

3.4. Development

The neonates can hear, make sound and smell. Crying is the first speech. Man starts crying long before smiling! Babies cry a lot day and night. Starts smiling by 4 – 8 weeks of age. Smiling is a milestone of social development in the child. Remember that Babbling sounds at 5 months. Says mamma, dada at 10 months. A one-year-old child tells 1-2 meaningful words. This increases to 6 words at 16 months. He or she

makes a sentence of 2 words at 2 years. Fluency is achieved by 8 years of age. A child with good hearing will learn language by the age of 3 years.

A newborn baby only moves his limbs, cannot turn to side. He or she learns to sit at 6 months. Twelve months is a time to stand and walking starts at 13 months. At 18 months, a child can run well after having some initial falls.

When a child sees a thing he or she tries to explore it. A 5 months old child takes a toy and catches alternately with both hands. A 5 year old child will try to open a toy to see its various parts.

A 2 years old child develops personal liking and disliking, knows who loves him or her best. Children develop by using their looking power (vision), hearing, touching, tasting, etc. All these are stages of maturing and we call it together development. These are called parameters or milestones of development.

You can assess development by looking at the gross motor functions such as sitting, walking, running, etc. and fine motor such as working with fingers, buttoning the dress, etc.

Achieving various skills at advancement of age is called developmental milestones.

Toilet training after 18 months.

By 2 years the child develops ego and empathy, understands right and wrong, realize parental expectation, and develops body awareness.

Achieving various skills at advancement of age is called developmental milestones.

3.5. Some Interesting Point

Growth Monitoring and Recording

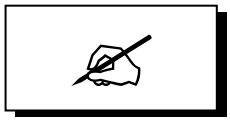
To record something means to write it down. To monitor something is to follow up the recordings. For example if you record the weight of a child once every month from birth to 6 months then you are monitoring (observing or watching) the weight of that child to assess whether he or she is growing well or not. For growth we record weight, height, and mid-upper arm circumference (MUAC). If you can take weight and height then you do not need to record arm circumference. Measures of weight, height, or MUAC are recorded on special charts called growth charts.

Nowadays growth chart also contains information about the child's family, immunization, feeding, ingestion of vitamin A capsule, record of illnesses if any, etc. For these reasons we prefer to call it health card or health chart. Growth charts or health cards are usually kept by the

parents in their house and bring those whenever they come to the health centre for any problem of the child.

Growth monitoring is very important because-

- It tells us whether the child is growing as per expectation
- It gives us warning about any failure of growth such as the child is losing weight of fails to gain further weight on successive weight monitoring
- It shows us improvement in a child's condition when he or she was malnourished and now is gaining weight and height
- It a child is very fat and falls above the growth chart then we can assume that mother is overfeeding the child and needs feeding advise



3.6. Exercise

3.6.1. Multiple choice questions

Tick (√) the correct answers

1. Say true or false

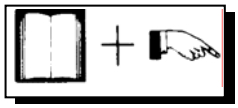
a. Growth means to become more intelligent
b. Standard birth weight is 3-3.5 kg
c. Growth chart show uses only weight of a child
d. Neonate has a bigger head in comparison to his body
e. Toilet training is achieved by 12 months.

3.6.2. Short questions

1. Describe a growth chart.
2. What are developmental milestones?

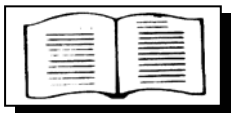
Lesson 4: Preventive Measures in Promotion on Child Health

4.1. Learning Objectives



On completion of this lesson you will be able to -

- what are the preventive measures to save children
- benefits of breast feeding
- immunization schedule
- health education.



4.2. Promotion of Child Health

The preventive measures in promotion of child health are well understood. These are as follows-

- Regular antenatal care (ANC) of the pregnant mother to ensure good health of her and
- The growing foetus. This will improve the growth of the child and decrease chance of delivering low-birth-weight babies. Pushing tetanus toxoid (TT) 2 doses during pregnancy will prevent fatal neonatal tetanus.
- Breast feeding, exclusive breast feeding for up to 6 months and then continuing with
- Complimentary feeds up to two and half years
- Avoiding use of feeder bottle to feed
- Timely immunization
- Periodic dosing of V it A Capsule
- Periodic deworming
- Avoidance of air pollution
- Avoidance of smoking, etc. is all-important aspects of preventing measures.

Probably the most important thing to promote child health is female literacy. An educated mother knows best how to look after her growing baby. Female literacy on the other hand can teach the mother how to take balanced food within family affordability and using locally available foods. She knows the importance of health education and can identify risk factors for child health. Establishing breast feeding, avoiding hazards of bottle feeding, immunization, all these are directly influenced by maternal education. A learned mother will breast feed her baby, not use bottle, give the right complimentary food, regularly immunize her child, and is the best teacher to give the child health education. Educated mother usually will not remain poor. She will

create an exciting environment for the developing child; she will opt for the birth spacing so that the child gets enough attention and care for growth and development.

4.3. Infant Feeding

The young infant is totally dependent on the parents or caregivers for their feeding and nutrition. Breast-feeding is the best for the newborn baby and by this he or she remains healthy. Before knowing infant feeding in details you need to know some important definition.

4.4. Some Definitions

Exclusive breast feeding (EBF). This means feeding the baby since birth with only breast milk, and not even a drop of water, for up to 6 months of age. It ensures virtually an infection free healthy condition in the child. The baby grows and develops normally and uneventfully. It also helps to create bonding between the baby and mother. Up to 6 months of age breast milk is sufficient to fulfill all the nutritional needs of the newborn baby. Even additional water intake is not essential. Breast-feeding is very cost effective, easy to do, ready to feed, and psychologically rewarding for both the mother and the baby.

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Formula feeds. These are modified (dried and changed in some components) cow's milk (prepared according to the prescribed formula) in which only nutrients are adjusted to enable these become like mother's milk. Please remember that formulas are basically dried cow's milk and not designed by the Almighty to feed human babies. They may be near to mother's milk in some aspects of composition but they never contain the unique biological properties (benefits) of breast milk. So you should think twice to call these 'human baby food'. They were best for baby animals if not modified.

Bottle-feeding. The feeding bottle is probably one of the worst inventions made by man. It is indeed very dangerous for all babies, and a killer machine for them too, specially in the poor countries like Bangladesh. Diarrhoea and other infections are 8 times more common in babies who are bottle-fed. They die 4 times more than the babies who are not fed with a feeding bottle.

So, you should not advocate a bottle even for your enemy's baby.

You should remember the following harms the feeding bottle does for all babies:

1. It may easily be contaminated and cause infections. Mortality and morbidity are several times greater in babies fed with a bottle.
2. Feeds are often diluted to ensure easy flow of milk from the bottle. Thus thin dilute feeds (less calorie) may render the baby malnourished.

3. The mother may feed the baby while he or she is asleep. Is is only possible by using a bottle. After eruption of teeth feeding during sleep is totally unhygienic.
4. Bottles are made of plastic chemicals. Poor families cannot afford a new bottle every day. Old bottles will add more eroded chemicals specially on repeated boiling. These might be very harmful for the child.
5. Bottle-fed babies become used to bottle and may refuse solid foods in time (around 6 months). They are commonly late in getting additional solid foods. These may cause malnutrition, anaemia, behavioural and developmental problems.

Weaning. This literally means taking the child off the breast. Now-a-days mothers continue breast-feeding as long as possible (usually up to 24 months). For this reason this term should better be not used. We preferably use complimentary feeds (previously called additional feed) to complement child's increasing energy need from 6 months of age. These feeds are very important but very simple to provide.

Breast Feeding

The newborn infant like the foetus continues to be fed from the mother for a significant period after birth. In fact the breast takes over the nutritional role of the placenta after birth.

Benefits of breast milk. Breast milk or better-termed mother's milk has many unique benefits both for the mother and the baby. These are as follows:

A. For the mother

1. Mother who breastfeeds her baby does not get obese easily rather loses weight.
2. It is very cost effective. The mother does not need extra labour for it.
3. It makes bonding between the baby and the mother.
4. Regular breast-feeding induces lactational amenorrhoea and thus helps birth spacing for the mother.
5. Some malignant tumours are rare in mothers who breastfeed their babies.

B. For the infant

1. Breast-feeding is the nature's way and environmentally friendly.
2. Nutritional values of breast milk are just parallel to the actual needs of the newborn baby. So, the baby can grow optimally, neither very thin nor obese.

3. Breast milk is always fresh and flows round the clock. It is the easiest feed to serve the baby and needs no tools.
4. In addition to its nutritional values it also gives immunological protection to the baby by one important antibody called secretary immunoglobulin A (IgA). It also contains macrophages, bifidus factors, lysozymes, lactoferin, complements etc. to prevent infection.
5. Infection of the respiratory system is also very uncommon in these babies.
6. Babies prefer mother's milk. They continue to take it even when they are otherwise anorexic, irritable, nauseating, or suffering from illnesses.
7. There are some growth factors in the breast milk that stimulate cellular growth and protein synthesis.
8. Breast milk may delay or reduce the subsequent development of eczema, asthma or other allergic disorders.
9. Incidence of some deficiency disorders such as anaemia, scurvy, rickets, etc. are found less in breast fed babies.

An Interesting Point to Note

Exclusive breast-feeding causes passage of unformed soft stools in the baby several to many times a day. The volume is small ranging from a few drops to a few spoonfuls. The frequency, which is commonly 15-20 times a day or sometimes much, more is often very terrifying for the mother and other family members. We call these stools as breast milk stools. It is not known why grand parents who have exclusively breast fed their babies and observed passage of such stools in them are so often very anxious for their grand children. They commonly suggest that mother's milk is spoiled by supernatural creatures or is defective. They may advice even stoppage of breast milk or suggest withdrawal of common foods for the mother. It is totally unfortunate and unnecessary.

Some Important Points

Feeding during sleep: young infants up to 5-6 months of age needs frequent feeds probably not less than 8 times in a 24 hours period. Then the frequency decreases as the child gets calorie-dense complimentary feeds. Calorie-dense means much more calories in a given amount of solid feed than the equal amount of liquid feed. At this age the child also has eruption of 'milk teeth', which help to take solid foods.

A calorie-dense feed will contend the child for longer time, probably several hours, so that he or she can sleep for longer time feeling no hungry. Late introduction of complimentary feeds will cause feeding

during sleep specially after eruption of teeth, use of bottle to feed easily.

Feeding during sleep is a bad and dangerous habit which is always made by the mother who prefers to feed during sleep because she thinks the child is taking less or her baby is naughty and clever to avoid food.

Force-feeding. This is another bad practice. The child is commonly overweight, scary of the mother. Tell the mother that if the child is punished in this way he or she may be annoyed of her and in her or his subconscious mind may develop even hatred for her. This may later in life may cause repulsion of the child from mother, which is tragic.

Poor appetite: If the mother not to take feeds look at blames a child the child to see whether he or she is sick, the growth and development pattern. Most commonly these children are otherwise healthy or even marginally overweight, very active and playful. Ask the mother what foods the child get and try to calculate the calorie intake of the child. Show the mother the growth and development pattern of the baby using a chart and tell that you do not measure the foods taken by the child rather measure the weight. Many mothers of obese children are themselves slim and regularly watch their weight but insist overfeeding for their children. It is very amazing but the cause is not known. Make the discussion with the parents very interesting using some jokes so that the mother can cooperate with you.

4.5. Additional Feeds (Complimentary Feeds)

Why additional feeds are needed. Exclusively breast fed babies can grow up and develop optimally up to 6 months of age. They become bigger and more active or playful needing more calories (energy). An active playful child needs more energy (calorie) than a child who is less active and less playful. It has been found that after the age of 6 months breast milk alone can no longer give sufficient calories to the baby.

For this reason at this age we give extra feeds besides breast milk to complement the extra requirement. These feeds are therefore called complimentary feeds.

The term weaning (literally meaning discontinuation of breast milk) should better be avoided because our main objective should be continuation of breast milk as long as possible along with complimentary feeds.

No rigid schedule should be imposed on the child. Feeds should be enjoyable as we all enjoy. Children are very rational in amount of food they take. A child allowed to take foods according to his demand will not usually be obese. Children become hungry and then take food.

Otherwise they will prefer to play rather than eat! It is rather we that compel children to take large volume of foods and drinks to become fat.

Remember that obesity at any age is unwelcome.

4.6. Some Special Points

1. Non milk sugar should be limited to no more than 10% of the whole calorie intake.
2. Atopic children who are commonly allergic should better have late introduction of complimentary feeds to avoid allergy.
3. Wheat is better excluded during the first 12 months of age.
4. Animal milk (e.g. cow's milk) should not be given during first year of life
5. Complimentary feeding session should be enjoyable both for the mother and the child. War of will may harm the child-mother bonding.
6. Family foods must be preferred to commercially manufactured foods as this will save money and ensure maternal affection.
7. One of the important causes of vomiting is forced feeding.

People of vested interest have unnecessarily complicated infant feeding. Harmful and expensive foods have been marketed to replace the traditional family foods simply to earn profits. Millions of dollars are spent to promote these dangerous foods. This also damages the ever-growing mother-child bonding.

Energy dense thick or solid foods can be better accommodated by the baby's small stomach.

Form of feeds. Liquid foods like milk, juice, etc are calorie thin. A baby's stomach measures just like his or her fist. Therefore, calorie-thin feeds can no longer meet the increasing energy demand due to increasing activities. So, you need calorie-dense feeds, which are usually solid (or semisolid). Complimentary feeds therefore, are made at home using home food ingredients.

Don't use blender machine to make foods very easy to take in. It may cause a bad habit in your child. Think that you don't have money to afford a machine. Always remember that natural way is the best way at least for eating foods.

When to give extra food. Paediatricians in Bangladesh recommend complimentary feeds from the age of 6 months. The initial feed should better be of plant origin to reduce hypersensitivity from food of animal origin. You can do this easily in this country by giving rice powder

(locally called suji) cooked well with sugar, oil, and some fragrant spice. Every baby likes it.

Add egg in small amount at the beginning, and then increasing gradually. Never give egg in raw, poached, or half-boiled form. Cooking the egg well makes its allergenicity 70% less. It also kills the poultry germs, which may be present inside the eggs.

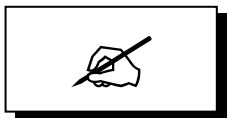
How to start? Don't force. At the start the child may refuse. He or she may spill. Don't expect that your child will take all the amount of feed you made. Usually 2-3 feeds are enough. Give these in-between the breast-feeding.

Stop feeding when the child refuses to take further. Never intimidate. Give some water at the end of feed. Don't try to feed during sleep (only possible by using bottle). Remember that homemade foods are always much better than the commercial foods. The slogan is family food is really good.

Breast milk should be continued up to 24 months of age. During this period no animal milk should be given.

How frequently? No rigid time schedule should be imposed on the young infant. Even for adults dining time may vary considerably day to day. The feed as an act of eating should be enjoyable for both the baby and the mother. Feed on demand like that with breast milk. Don't force. At the start the child may refuse. He or she may spill. Don't wish that your child would take all the amount of feed you made. Usually 2-3 feeds are enough. Give these in-between the breast-feeding. Give extra water in between feeds.

No rigid schedule should be imposed on the child. Feeds should be enjoyable as we all enjoy. Children are very rational in amount of food they take. A child allowed to take foods according to his demand will not be obese. Children become hungry and take food. Otherwise they will prefer to play rather than eat! It is the mother or rather we that compel children to take large volume of foods and drinks. Remember that obesity at any age is unwelcome.



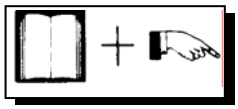
4.7. Exercises

4.7.1. Short questions

1. What are the preventive measures to save child?
2. What are benefits of breast-feeding?

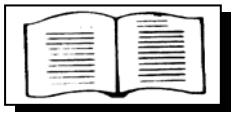
Lesson 5: Immunization

5.1. Learning Objectives



On completion of this lesson you will be able to -

- define immunization
- learn the principles of immunization and
- know side effect and contraindication of immunization.



5.2. Introduction

Immunization means to make a person protected or safe (immune) against a specific disease particularly infectious disease. An immune person may be infected by a particular germ (bacteria, viruses, etc) but he or she will not develop the disease because the germs are killed by his or her immune system. When you immunize a child with a vaccine (e.g. Tetanus Toxoid) the immune system of the child responds fully and makes necessary armaments called antibodies against that particular disease so that if the germs attack this child they are instantly killed. The child will not develop the disease.

Our immune system is a perfectly organized powerful system that produces killer cells (phagocytes) and antibodies to poison the offenders (germs).

Immunization is very important because by immunizing your child you can protect him or her from many serious and lethal diseases. You also know that by immunizing all the people of the world and treating diseased persons scientists have been successful to eradicate the lethal disease small pox from the world. . Poliomyelitis once a horrifying maiming and killer disease of the children is going to be extinct by dint of power of vaccines. Measles another deadly disease for our children can also be eradicated by universal vaccination.

5.3. Principles of Immunization

1. Vaccines should be given according to the immunisation schedule. But dates are usually flexible. Better late than never. Four weekly or monthly dosing is almost synonymous. Schedule varies significantly in different countries.
2. Two live vaccines should be given at an interval of minimum 3 weeks. If they are to be given simultaneously they should be given at different sites. Exception- MMR vaccine (triple live vaccines) given as a single dose.
3. No vaccine within 3 months of immunoglobulin injection.
4. The first dose of polio is better given in injectable form (IPV: killed virus). There will no chance of wilderness of the live OPV given later.

5. In case of acquiring clinical disease of diphtheria, tetanus and pertussis (whooping cough) specific vaccine would still be required after the patient recovers fully, because natural infection does not confer adequate immunogenecity in these diseases.
6. Two doses of TT should be given to all women with first pregnancy between 4^{th} to 7^{th} months of gestation. One shot is enough for subsequent pregnancy.

5.4. Side Effects

Most vaccines are safe and have minimum side effects. Polio vaccine produces very few side effects while measles and rubella may produce a very mild form of the respective disease. Extract and toxoid do not produce such reactions.

The most significant side effects are found with the pertussis component of DPT vaccine. Fever, malaise, irritability and inconsolable cry can occur with DPT vaccine. The parents may falsely attribute this as pain at the injection site. It occurs a few hours after pushing the injection and is minimized by giving paracetamol for couple of days. Please remember that you should not rub the injection site because it may lead to sudden high antigenaemia and the immune response may not be satisfactory. Anaphylaxis though a very rare occurrence is documented with some vaccines specially DPT vaccine.

Best herd immunity is seen with OPV. Herd immunity is not found with toxoid or inactivated vaccines.

5.5. Contra-Indications

Live vaccine should not be given to an immunocompromised person. Immunodeficiency states such as HIV, high dose steroid treatment, radiotherapy, malignancies particularly lymphomas and other reticuloendothelial tumours, anticancer drug therapy are contra-indications of live vaccines.

Live vaccines should not be routinely given during pregnancy (an immunodepressed condition) because of possible harm to the foetus.

Family members having a immunocompromised person should not get live immunization too.

Mild respiratory illnesses, diarrhoea, etc. are not contra-indications of immunization. Asthma, eczema, antibiotic treatment, chronic lung and heart diseases are not contra-indications of vaccination.

5.6. Sites of Administration

Do not push vaccines in the buttocks of small children. It may damage nerves. All intramuscularly vaccines should be pushed at right angle into the anterolateral part of thigh of small children. 'Z track' method of injecting usually ensures less leakage and subcutaneous infiltration of the injected material.

BCG should be given in the deltoid area not very up or low (abscess formation minimum), usually in the left arm (in Bangladesh). Thigh is better avoided for BCG because other vaccines cannot be given in the BCG territory. BCG is always intradermal, much expertise is required for it.

Measles, MMR, Varicella vaccines are all given subcutaneously. All subcutaneous vaccines can be given in the thigh skin in small children.

The IM. route should not be used in-patient with bleeding disorders.

Jet guns should not be used for vaccination (infection).

5.7. EPI (Expanded Programme of Immunization)

This is WHO and UNICEF (1974) sponsored programme in Bangladesh for universal vaccination of all children up to 5 years of age and women of childbearing age (15 – 49 years).

Immunization Schedule:

At birth	BCG OPV 0 HBV 1
6 weeks (42 days)	DPT 1 OPV 1 HBV 2 HIB 1
10 weeks	DPT 2 OPV 2 HIB 2
14 weeks	DPT 3 OPV 3 HIB 3
6 months	HBV 3
9 months (270 days)	Measles OPV 4

In EPI schedule practiced in Bangladesh and other developing countries there is no requirement for booster dosage. But standard immunization practice still requires a booster dose of DPT before entering school.

A booster dose of HBV is required after 5 years.

OPV pulse doses are given nowadays 2 times on 2 occasions a year. After 5 years pertussis vaccine is discontinued.

In many places such as Middle East measles vaccine is given earlier (6 months onward).

MMR vaccine is given at an age of 15 – 18 months.

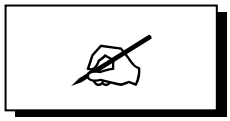
Other vaccines available: Some other vaccines are available in Bangladesh these are

1. Hepatitis A Vaccine
2. Tetanus Toxoid
3. Varicella
4. Typhoid vaccine, only parenteral form
5. Meningococcal a and c
6. Rabies

5.8. Health Education

Health is state of complete physical and mental well being not merely absence of disease. You also need good social support to stay happy which is part of your mental health. By health education we mean educating all concerned about health. It includes information regarding good and balanced food, avoiding infectious disease particularly pneumonia and diarrhoea, taking vaccines, treating diseases etc.

At present science has most of the information about basic health needs. If we implement all these we can stay healthy without spending lot of money. For example if you take safe drinking water you will not get diarrhoeal diseases easily.



5.9. Exercise

5.9.1. Multiple choice questions

Tick (√) the correct answers

1. Say true or false

a. BCG is given to protect from diphtheria
b. A child should b exclusively breast feeding till 12 months
c. Most vaccine is very risky for side effects
d. Complimentary feeding should b started from 3 months
e. HBV can prevent liver cancer.

2. Mark true or false

a. Feeding during sleep in older children is beneficial
b. Rabies vaccine can be given even after having dog bite
c. Feeding bottle is a killer tool
d. Mothers should breast feed their babies as long as desired
e. Yellow fever is common in Bangladesh.

5.9.2. Short questions

1. EPI.
2. Side effects of vaccines.
3. Exclusive breast-feeding.
4. Complimentary feeding.

Unit 4: Common Child Health Problems in Bangladesh

Introduction

Children below 5 years of age are called under-5 children. Such groupings like under-5 and above-5 have important clinical and demographic implications. Childhood death also mostly occurs during this time.

Under-5 children have poor resistance against infectious diseases. This poor resistance is due to absence of antibodies against infecting agents, lack of exclusive breast-feeding, lack of vitamin A, use of feeding bottle, etc.

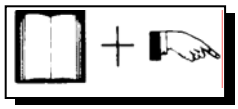
The common health problems of under-5 children are given below according to their age:

Neonatal	Infantile	Under 5 years beyond infancy-
▪ Preterm babies ▪ Low birth weight babies ▪ Neonatal sepsis ▪ Birth trauma ▪ Neonatal tetanus ▪ Hypothermia ▪ Faulty feeding	▪ ARI ▪ Diarrhoea ▪ Lack of immunization ▪ Malnutrition ▪ Faulty feeding	▪ ARI ▪ Diarrhoea ▪ Malnutrition ▪ TB, malaria, tetanus measles, pertussia polio, enteic fever etc. ▪ Worms

Review on some common child health problems (0-5 years).

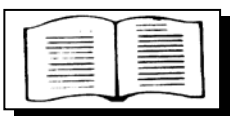
Lesson 1: Management of Fever in Children

1.1. Learning Objectives



On completion of this lesson you will able to -

- what is fever
- what are the causes of fever and
- how to manage a patient with fever.



Fever means rise in body temperature usually above 100.4^{o} F. Normal body temperature is between 97-99^{o}F. Most people have the temperature of 98.4^{o} F. Commonly fever does not cause any harm; rather it is a part of body's efforts to clear the infection. Or you can simply say fever is a natural process against an offender. As you know there are many mechanisms by which our intelligent body tries to defend itself against foreign invaders. Therefore, fever is a part of

treatment by the body itself. So you do not need to lower the fever until and unless it is very high or the child has convulsion associated with fever. It is wise to look into the underlying cause of fever rather than to reduce it. Most fevers in children are caused by viral infection. These are mostly self-limiting diseases. If you allow fever to continue, total duration of illness is shortened.

Fever is a reaction against infection. It is apart of treatment by the body. Do not use antipyretic frequently. Nursing care is helpful in fever.

- Fever is a reaction against infection
- It is apart of treatment by the body
- Do not use antipyretic frequently
- Nursing care is helpful in fever.

1.2. Acute Respiratory Infections (ARI)

This is the single largest cause of under-five mortality (2 million deaths per year) worldwide.

Definition

ARI means Acute Respiratory Infection. This term is used to indicate acute infection of the respiratory system in children usually below 5 years of age.

In case of acute respiratory infection (ARI) the child may develop thickening of the air exchange membrane, which we call as respiratory membrane, particularly in pneumonias. He or she may have dangerous narrowing of the respiratory tract, which may obstruct entry and exit of air inside the lungs and out of it. The latter may occur in bronchitis, asthma, and in bronchiolitis.

1. Each year approximately 2 million children die from ARI.
2. It is one of the most important precipitators of malnutrition and VADX.
3. It is the most common cause of paediatric hospital admission.
4. Overcrowding, prevailing malnutrition, lack of immunization, illiteracy, etc. play important roles in the causation of ARI.

Causes of ARI

<u>Commonest causes are viral infections</u>

Commonest bacteria are S. pneumoniae, H. influenzae, S. pyogenes, and S. aureus.

1. Viruses: RSV. Adenoviruses, influenza and parainfluenza viruses, rhinoviruses, corona viruses, etc.

2. Bacteria: S pneumoniae, H. influenzae, M. catarrhalis, S. aureus, S haemolyticus, C diphtheriae, M TB, Enteric bacilli, Pseudomonas, Klebsiella
3. Mycoplasma: M. pneumoniae
4. Fungus: C. albicans
5. Miscellaneous: P. carinii.

How does ARI harm children?

1. Death from hypoxia, exhaustion and fit
2. Malnutrition
3. Acute depletion of vitamin A status
4. Dehydration
5. Convulsion
6. Collapse, consolidation, lung abscess, bronchiectasis, pleural effusion, pneumothorax.

Prevention of ARI

Exclusive breast-feeding, immunization, avoidance of bottle feeding, ORT, balanced food, preventing air pollution, etc are main aspects of prevention of acute respiratory infection. These are enumerated below:

Prevention of ARI

1. Exclusive breast feeding for 6 months and continued along with other feeds up to 2 years
2. Periodic VA dosing
3. Immunization
4. Treatment of malnutrition
5. Family planning and female literacy
6. Good sanitation and avoidance of overcrowding
7. Prevention of air pollution
8. Avoidance of cigarette smoking.

Important Symptoms and Signs of ARI

These include cough, sputum, wheeze, fast breathing, etc. A child with acute severe upper respiratory tract infection may occasionally have stridor (inspiratory crowing sound due to laryngitis and/or tracheitis causing upper respiratory tract obstruction, may also occur in expiration). This is a dangerous sign and needs immediate medical attention in the hospital. Fast breathing or tachypnoea is also and serious sign and should be evaluated by counting the rate when the

child is calm. Count it for a full one-minute. Following is the standard definition for fast breathing.

Tachypnoea or fast breathing

A. Normal breathing rates

Neonates-	50/min
Infants-	40/min
Older children	30/min.

B. Techypnoea

<2mo	60 or more/min
>2mo-12mo	50 or more/min
>12mo-5yrs	40 or more/min.

There may be recession or retraction of chest wall (simply called chest in drawing). Its presence simply allows you to diagnose the child's condition as severe pneumonia.

Wheeze or ronchi (due to obstruction in the lower respiratory tract, usually occur during expiration) is more common with bronchiolitis, bronchial asthma, and acute bronchitis. But in sick small child the diagnosis should be acute broncho-pneumonia. Cyanosis indicates hypoxia and demands immediate oxygen therapy.

Management of ARI

Assess the child whether he/she has no-pneumonia (cough and cold, chronic cough), pneumonia, or severe pneumonia. In babies less than 2 months any pneumonia is taken as severe pneumonia. See the following tables for these categories.

Signs of severe pneumonia

1 Very sick not able to feed or drink

2. Drowsiness

3. Crepitations, wheeze

4. Chest in drawing

1. Tachypnoea, tachycardia.

2. Cyanosis

3. Convulsion.

Signs of pneumonia

1. Sick, not feeding or drinking well

2. Tachypnoea. tachycardia
3. Moist sounds in the chest
4. No chest in drawing.

Signs of no pneumonia

1. Cold and cough
2. No tachypnoea
3. No chest in drawing.

Severe Pneumonia

You must give O_2 first before doing all other things. You can do suction clearance of the airways so that more O_2 can enter the respiratory tract. Nebulised bronchodilators (salbutamol, albuterol, etc.).

Viruses cause most pneumonia in children. But secondary bacterial infections are very common. So you need to give antibiotics to most cases of pneumonias.

Severe pneumonia

1. Hospitalisation
2. Oxygen, clearing of airway, bronchodilators
3. Warmth, feeding, fluid balance
4. Antibiotics
5. Treatment of fever.

Antibiotics: usually ampicillin + gentamicin and or chloramphenicol.

Management of Pneumonia

1. Hospitalisation
2. Oxygen, clearance of airways, bronchodilators
3. Antibiotics: Ampicillin + gentamicin,
   chloramphenicol, cotrimoxazole
4. Warmth and feeding
5. Treatment of fever.

If kept at home, teach mother how to look for breathlessness. Ask her to report immediately if there are signs of deterioration.

Cough and Cold (no pneumonia)

Most of upper respiratory tract infections in small children are simple cold and cough caused by viruses. But if the cough persists for more than 30 days, full investigations are required to exclude TB.

Management of Cough and Cold

1. Most of these are simply viral infections
2. For persistent cough (>30 days), exclude TB, congenital heart disease, foreign body, atopy, etc.
3. Exam the child for AOM and sore throat
4. Ensure feeding
5. Treat fever
6. Clean the nose frequently
7. Mist therapy for irritating cough. Honey and tulsipata are useful.

Teach the mother how to observe for breathlessness. Ask her to report if there are signs of deterioration.

Common Cold

Many viruses cause also called coryza. Predominantly nasal symptoms such as runny nose, nose block, nasal irritation, sneezing, etc. mild conjunctivitis, low-grade fever, headache, and malaise may be present. Pharyngitis is usually absent. Clearing the nose using normal saline (Norsol) is enough.

Pharyngitis and Tonsillitis

The term sore throat includes tonsillitis, pharyngitis, tonsillopharyngitis, and nasopharyngitis. Bacteria, viruses, or noninfectious causes may cause this.

Treatment of the underlying cause with supportive measures is enough. In case of streptococcal infection a 10-day regimen is mandatory to thwart off any possibility of rheumatogenic or nephritogenic strains.

Otitis Media (Middle Ear Infection)

It is extremely common in the third world countries (up to 2o% of school children). You must not miss acute otitis media because bilateral permanent hearing damage particularly below 3 year of age can turn the child deaf and dumb. Severe pain is the main symptom and the child screams continuously. Other symptoms are nonspecific such as fever, vomiting, irritability, restlessness, or even a febrile fit.

Diagnosis by seeing the ear drums which are diffusely red. Treatment should start as soon as possible by procaine penicillin or amoxicillin or ampicillin or cotrimoxazole for a period of 10 days. If discharge is present the external meatus must be kept clean and dry by careful swabbing to prevent secondary infection.

Acute Bronchiolitis

Acute bronchiolitis means acute inflammation of the bronchioles and the peribronchial tissues. Inflammatory exudate may obstruct the lumen of bronchioles and may turn the condition to be life threatening. The condition is confined to the infants from 6 weeks to 10 months: the peak age is 4 months.

Most cases are caused by the respiratory syncytial virus (RSV). Other viruses may also cause bronchiolitis.

Onset is abrupt: the child has cold, cough, irritability and breathlessness. There are tachypnoea and tachycardia. Cyanosis occurs when dyspnoea is severe. Diffuse high-pitched ronchi and crepitations are audible all over the lung fields.

The infant should be admitted in the hospital. Oxygen, humidity, bronchodilator (better given in nebulised form), fluid and electrolyte balance, nutrition (nasogastric feeding when the child is severely dyspnoeic), and warmth are important aspects of treatment. Intensive care may be required (e.g. artificial ventilation).

Approx. **50%** of cases may later develop recurrent wheezing.

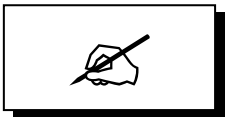
Staphylococcal Pneumonia

This is a severe pneumonia usually affecting children below 2 years of age and older children with cystic fibrosis.

Chest x-ray is diagnostic: shows cystic appearance with pneumatocoele.

Beta-lactamase resistant antibiotic (fusidic acid, flucloxacilin, etc.) is given because staphylococci are mostly penicillin resistant.

Complications are many including pyothorax, pneumothorax, collapse, consolidation, septicaemia, etc. To prevent these early diagnoses is very important.



1.3. Exercise

1.3.1. Multiple choice questions

Tick (√) the choice answer

1. Tell whether the following statements are true or false

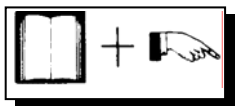
a. Acute respiratory infection is the commonest cause of childhood mortality
b. Acute otitis media can cause dumbness
c. In pneumonia there is no hypoxia
d. Acute epiglottitis is medical emergency
e. Bottle-feeding can cause acute respiratory infection more frequently.

1.3.2. Short questions

1. Acute respiratory infection.
2. Prevention of acute respiratory infection.
3. Complications of acute respiratory infection.
4. High potency vitamin A capsule.
5. Clinical features of pneumonia.

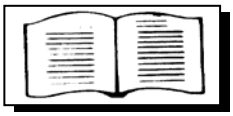
Lesson 2: Diarrhoea

2.1. Learning Objectives



On completion of this lesson you will be able to -

- what is diarrhoea, dehydration and its complications
- what are the causes of diarrhoea and
- how to treat diarrhoeal dehydration.



Diarrhoea

Diarrhoea simply means passing loose stools more than 2 times in a 24 hours period (one day), a loose stool being one that takes up the shape of the container.

It is dangerous because water (fluid) is lost in such stools and this will cause decrease in water volume of our body (dehydration). But now a days the degree of danger has become less because we can use solution called oral rehydration saline (ORS) to correct dehydration due to diarrhoea.

Diarrhoea is the second commonest (previously greatest) cause of death of children under 5 years of age in the developing countries. In Bangladesh, approximately 260,000 under-five children die from diarrhoea each year. Eighty percent of these deaths occur below 2 years of age.

Salient Features

- Diarrhoea may be acute or chronic.
- Children most commonly catch acute diarrhoea.
- Viruses cause acute diarrhoea most commonly.
- About 70% of acute diarrhoea in small children fewer than 2 years of age are caused by Rotavirus.
- Acute diarrhoea may be classified into 3 categories, namely acute watery diarrhoea, acute invasive diarrhoea, and persistent diarrhoea.
- Viruses most commonly cause acute watery diarrhoea. It is the commonest form of diarrhoea.
- Bacteria mainly cause acute invasive diarrhoea. They invade the bowel wall and causes inflammation, ulceration and bleeding.
- Persistent diarrhoea starts as an acute diarrhoea either acute watery diarrhoea, or acute invasive diarrhoea. But due to some underlying causes it is prolonged beyond 14 days.
- In general bacterial diarrhoeas occur more during summer and rainy season, and viral diarrhoeas in winter.

- V. cholerae 01, and S. dysenteriae type 1 cause major epidemics in Bangladesh.

Complications of Diarrhoeas

These are very serious and you should know all of these. Most serious complication is dehydration leading to hypovolaemia and shock. This can kill the child very easily.

Complications of diarrhoeas

Causes of death in diarrhoea

1. Dehydration
2. Electrolyte imbalance
3. Severe malnutrition
4. Associated serious infections.

1. Dehydration leading to hypovolaemia
2. Malnutrition
3. Metabolic acidosis
4. Hypokalaemia and paralytic ileus
5. Hyponatraemia
6. Hypochloraemia
7. Oliguria-anuria-ARF
8. Convulsion.

Acidosis occurs due to loss of large amount of bicarbonate in stools. Serum bicarbonate is reduced and may be less than 10mmol/l. Arterial pH may be <7.10. Breathing becomes deep and rapid. There is increased vomiting.

Hypokalaemia occurs due to loss of large amount of potassium in the stools. Loss is more in infants and can be dangerous in malnourished children who are frequently potassium depleted before diarrhoea starts. Hypokalaemia is suspected by general muscular weakness, cardiac arrhythmias, and paralytic ileus. ECG can confirm it. Electrolyte analysis will show the level of potassium.

ARF occurs due to acute renal shutdown following severe dehydration. Convulsion can occur due to hyponatraemia, hypochloraemia, and acidosis or due to associated fever.

Please remember that Hypokalaemia does not cause convulsion.

Why children die from diarrhoea?

1. Because, dehydration from diarrhoea causes hypovolaemic shock,
2. Electrolyte imbalance specially hypokalaemia may cause cardiac failure,
3. Severe malnutrition is often precipitated by diarrhoea and
4. Serious infections such as pneumonia may be associated with diarrhoea or due to malnutrition caused by diarrhoea.

Factors promoting diarrhoea

1. Failing to breast feed
2. Bottle feeding
3. Contaminated food and drinks
4. Failing to wash hands
5. Failing to dispose excreta safely
6. Lack of immunization.

Acute Watery Diarrhoea (AWD)

It is the commonest category of acute diarrhoea and the commonest cause of dehydration from diarrhoea. In this case of diarrhoea, stools are watery, usually of large volume, and there are no features of invasion of the bowel wall by the pathogen (congestion, ulcers, bleeds, etc.). So the stool microscopy will not show signs of inflammation such as presence of pus cells, red blood cells, macrophages, etc. Vomiting may occur and fever, usually of low grade, may be present. Dehydration develops rapidly.

Causes of acute watery diarrhoeas

1. Rotavirus (commonest)
2. ETEC
3. Cryptosporidium
4. V. cholerae 01
5. Nontyphoidal Salmonella
6. EPEC
7. Giardia
8. Aeromonas hydrophila.

Acute Invasive Diarrhoea (Dysentery)

In this case there is invasion of the bowel wall by the offending microbe, which usually is a bacterium. Inflammation occurs with oedema, ulceration and haemorrhage. Excess mucus is secreted. Haemorrhage causes presence of visible or microscopic blood in the stools.

Acute invasive diarrhoea is commonly known as dysentery. It is conventionally defined as passage of loose stools mixed with mucus and blood; and associated with abdominal pain and tenesmus (urge to purge with little output, it is sign of irritation of the internal sphincter).

Common causes of ac. invasive diarrhoea

1. Shigella (commonest)
2. Salmonella
3. Entero-invasive E. coli (EIEC)
4. Entamoeba histolytica
5. Helicobacter jejuni.

Persistent diarrhoea

This is not uncommon specially when the child is malnourished and acute diarrhoea is not treated appropriately.

It is conveniently defined as diarrhoea that begins acutely but due to some modifying factors is prolonged beyond 14 days. Both acute watery and invasive diarrhoea can be complicated as persistent diarrhoea. It is a serious condition. So, the effects are supposed to be very severe.

Weight loss and malnutrition is prominent in persistent diarrhoea.

Don't confuse chronic diarrhoea with persistent diarrhoea. Chronic diarrhoea is long lasting and recurrent; has an insidious onset, and is usually due to non-infectious causes.

Effects of persistent diarrhoea

1. Dehydration
2. Rapid weight loss
3. Malabsorption
4. Nutrient deficiency specially
5. Vitamin A (sudden depletion).

Observe and assess the child for dehydration and start treatment

	A (No dehydration)	**B (Some dehydration)**	**C (Severe dehydration)**
Look:	Well, alert		
1.Gen. condition		***Restless, irritable***	***Lethargic, unconscious, floppy***
2. Eyes	Normal		Very sunken and dry
3. Tears	Present		Absent
4. Mouth & tongue	Moist	Sunken Absent	Very dry
5. Thirst	Drinks normally	Dry	***Drinks poorly or not able to drink***
		Thirsty, drinks eagerly	

Feel: Skin pinch	Goes back quickly	***Goes back slowly***	***Very slowly***
Assess:	No dehydration	2 or more with at least 1 ***sign*** (key sign) = some dehydration	2 more with at least 1 ***sign*** (key sign) =severe dehydration
Treat	Treat at home with ORS. Teach the mother how to make ORS. Give food based fluids. Continue breast feeding	Give ORS as follows in 4h <4 mo- 200-400ml 4-11 mo- 400-600,, 12-23mo- 600-800,, 2-4y- 800-1200,, 5-14y- 1200-2200,, older- 2200-4000,, After 4 hours reassess the child and decide to select plan A, B, or C	Start I.V. fluid (Diarrhoea solution) immediately @ 100ml/kg. 50% in the firs 2 hrs and 50% in next 3-4 hrs. Replace further loss Give ORS as well if the patient can drink. 1. Assess pulse, blood pressure, and urine output. Assess the child frequently and select treatment plan A, B, or C.

Treatment of Acute Diarrhoea

Please note that:

i. Irrespective of its cause watery diarrhoea requires only replacement of fluids and electrolytes lost in liquid stools. This is called rehydration therapy. Rehydration therapy means to correct existing deficits of fluids and electrolytes. To replace further losses in stools as diarrhoea continues is called maintenance therapy.

ii. Intravascular replacement fluids should better treat severe dehydration.

iii. Feeding particularly breast milk in small children should be continued during all types of diarrhoeas. Feeding should be increased during convalescence.

Indications of antibiotic in diarrhoea

1. Dysentery caused by Shigella and virulent E. histolytica
2. Cholera
3. Giardiasis
4. Diarrhoea caused by S. typhi and S. paratyphi.

Oral Rehydration Therapy (ORT)

Oral rehydration therapy means treatment of dehydration from diarrhoea by appropriate oral rehydrating fluid (solution).

2.2. ORT Corner

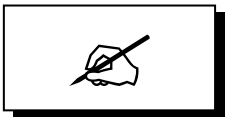
This is a special room in the outpatient section of a hospital with availability of standard ORS (oral rehydration solution) with dispensing tools such as cup, mug, jars, spoons, etc. One trained nurse attends the children having diarrhoea with no or some dehydration (severe dehydration needs admission).

The nurse feeds the child ORS (oral rehydration solution) and teaches the mother how to make and feed ORS at home. Usually 4 hours stay is enough and the child is assessed again for dehydration. When dehydration is corrected the child can return home.

Prevention of Diarrhoea

Prevention is very important because it will reduce mortality and morbidity.

1. Breastfeeding
2. Hand washing
3. Safe preparation and handling of food
4. Safe drinking water
2. Safe disposal of excreta
3. Avoidance of overcrowding
5. No bottle feeding
6. Immunization
7. Periodic vitamin A dosing
8. Safe additional feeds.



2.3. Exercise

2.3.1. Multiple choice questions

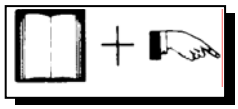
Tick (√) the correct answer

a. Main cause of death in diarrhoeas is dehydration
b. Fever is more common in invasive diarrhoea
c. Breast feeding causes diarrhoea in small infants
d. Cholera is an invasive diarrhoea
e. Antibiotic is needed in most of diarrhoeas.

2.3.2. Short questions

1. Acute watery diarrhoea.
2. Acute invasive diarrhoea.
3. Acute persistent diarrhoea.
4. ORS
5. ORT
6. Management of acute diarrhoeas.

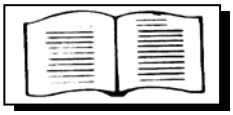
Lesson 3: Management of Low Birth Weight Neonates at Home



3.1. Learning Objectives

On completion of this lesson you will be able to -

- what is a low-birth-weight baby
- what are the problems with low-birth-weight babies and
- how to rear a low-birth-weight baby at home specially in a country like Bangladesh.



Introduction

Newborn babies are classified according to the duration of pregnancy. A newborn baby born before 37 completed weeks (259 days) is called preterm; between 37 and 42 weeks (260 – 294 days) called term or full-term; and after 42 weeks (295 days or more) post-term.

Neonates are also classified according to their birth weight. A newborn weighing 2500 grams or less is called a low birth weight (LBW) baby. Weighing less than 1500 grams at birth is called very low birth weight baby (VLBW). If the birth weight is still less than 1000 grams then it is called extremely low birth weight (ELBW) baby.

Usually low birth weight babies are premature (not mature) in activities. Babies inside the uterus mature in activities and attain full physical growth (weight, length, head circumference, etc) during the 3rd trimester 6 months to 9 months of pregnancy). You can easily understand that babies born before completing this last 3 months are less in weight and maturity. They are weak and not fit to face hazards in the new environment after birth.

Problems of Premature Baby

a. Feeding difficulties

b. Breathing difficulties (such as respiratory distress syndrome)

c. Infections (commonly called neonatal sepsis)

d. Difficulty in maintaining normal body temperature (commonly develops hypothermia)

e. Jaundice (due to immaturity of the liver)

f. Oedema (due to less plasma protein and immaturity of wall of blood vessels)

g. Intraventricular haemorrhage (IVH), etc.

Causes of Premature Baby

1. Maternal causes

- Age below 20 years or more than 35 years
- Narrow birth spacing (less than 3 years)
- Maternal malnutrition
- Previous history of low birth weight (LBW)
- Lack of rest for mother
- Very poor mother.

2. Fetal causes

- Cong malformation
- Hereditary defects
- Fetal infection.

You should also know some definitions before knowing management of low birth weight babies.

Perinatal Mortality Rate

This includes stillbirths and death within 7days of delivery per one thousand live births.

- Common causes of perinatal mortality are antepartum haemorrhage (APH)
- Pre-eclamptic toxaemia (PET)
- Eclampsia, abruption of placenta, placenta praevia
- Complications of umbilical cord (knots
- Cord around the neck
- Pprolapse of cord)
- Congenital malformation
- Foetal infection and unknown (14%).

Neonatal Mortality Rate (NMR)

It is the number of neonatal deaths (up to 1 month of age) per one thousand live births. Most NMR occurs during the first 7 days of life.

NMR in Bangladesh is still very high with a figure of 42 deaths per one thousand live births.

- Common causes of neonatal mortality are

- Low birth weight baby
- Birth asphyxia
- Neonatal sepsis
- Neonatal tetanus
- Congenital malformation
- Hypothermia
- Birth injury
- Infant of diabetic mother (IDM).

Infant Mortality Rate (IMR)

It is the number of death of infants up to 1 year of age per one thousand live births. This also includes the neonatal mortality rate (NMR). This is also very high in our country; the official figure is 66.

Management of Low Birth Weight Baby

Regular antenatal care (ANC), adequate rest for the mother, healthy and happy environment, safe coitus, medicines for problems, identification of danger signs in the pregnant mother, taking appropriate and right decision, etc. are very important (see Table 7).

Danger signs in a neonate

- Feeding poorly or not feeding at all
- Poor limb movement or floppy (very loose all over)
- Fast breathing or severe chest in-drawing
- Blue all over
- Convulsion
- Fever or cold body
- Red/discharging eyes
- Periumbilical reddening or bleeding/smelly umbilicus
- Jaundice within 1st 24 hours or persisting beyond 2 weeks.

Risk factors for anticipated neonatal emergencies

- **During pregnancy**

  Maternal fever, PV bleeds, severe headache, dim vision,

  Severe abdominal pain, fit, poor fetal movement,

  Malpresentation (breech, shoulder, hand prolapse).

- **During labour**

  PV bleeds, convulsion, prolonged labour (>12 hours),

  Prolonged rupture membrane (> 6 hours), smelly

  Discharge per vagina.

Action 1

- Continue stimulating keeping the baby warm and dry
- Colour and breathing to be noted
- If breathing and colour is OK, keep the baby in kangaroo care (Warmth, stimulation, energy from breast feeding, affection).

Action 2

- Give breath once. Note chest expansion. If no, change position
- And ensure chest expansion. Give 40 breaths pm. Observe
- Breath and colour. Continue till breathing and colour are normal
- Maintain step 1 when breathing and colour are normal.

When the baby needs referral

- Breath Rate is less than 30 or more than 60 per minute
- Severe Chest indrawing
- Grunting or gasping
- Pale all over or cyanosed.

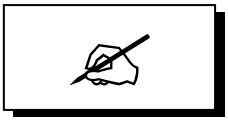
To simplify neonatal care specially low birth weight baby immediately after birth can be summarized as follows :

- Step 1. Drying and stimulation to start breathing
- Step 2. Assessing breathing and colour
- Step 3. Decision whether assisted breathing is required (Steps 1-3 to be done simultaneously)
- Step 4. Maternal warmth for the neonates
- Step 5. Cord tying and cutting
- Step 6. Breastfeeding.

Cord Care

There should be 3 ligatures 1st one at 2 fingers, 2nd at 3 fingers away from the baby. Now milk the cord away from the 2nd tie and put the 3rd ligature 4 fingers away from the 2nd. Now cut the cord in-between

the 2nd and 3rd ties with a new blade or sterile scissors. You can use a piece of cloth to avoid spillage of blood and contaminating you. No applicant is required for the umbilical stump.



3.2. Exercise

3.2.1. Mark the following statements as true or false

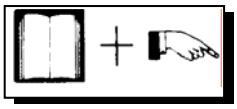
a. A baby weighing 3 kg is a low birth weight baby
b. A baby weighing 900 gram is a extremely low birth weight baby
c. Low birth weight baby breathes easily
d. Only 10% babies in this country are born low birth weight
e. Kangaroo care is specially designed for full-term babies.

3.2.2. Short questions

1. Kangaroo mother care (KMC).
2. Low birth weight baby.
3. Breast feeding for low birth weight baby.
4. Management of low birth weight baby.

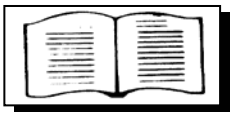
Lesson 4: Management of Children with Malnutrition, Diarrhoea, ARI, Scabies, Worms, etc.

4.1. Learning Objectives



On completion of this lesson you will able to -

- define malnutrition
- measure nutritional status and
- know about clinical feature of malnutrition.



Introduction

Before going to details of malnutrition we should know in brief about nutrition. Our body needs various foods for various functions. Nutrients are conventionally classified into carbohydrates, proteins, fats or oils, vitamins, minerals and water. Of these, protein is the body building nutrient that builds our body. Beans, pulse, eggs, milk, meat, and fish are proteinous foods. Carbohydrates and fats are energy giving foods. Rice, maize, wheat, oils are energy giving foods. Vitamins are essential foods required in small amounts. They mobilize all other types of foods during metabolism. Our body cannot make vitamins except vitamin.

A staple food is the most important food in a society or country (e.g. rice in our country). Staple food is the main food taken regularly and usually in large volume. It is usually a carbohydrate.

What is Malnutrition?

Malnutrition means deficiency in amount and or types (protein, carbohydrate, vitamins, etc) of nutrients. It is usually due to inadequate intake, but may be due to decrease absorption. Malnutrition is mainly a disease of the poor people of the poor countries.

In Bangladesh approximately 60%, children below 5 years are malnourished. Exclusively breasting babies up to the age of 5-6 months are very rarely malnourished. Diarrhoeas and acute respiratory infections are the 2 most common diseases that cause severe malnutrition.

How to Measure Nutrition?

You can take the weight, length, skin thickness, mid upper arm circumference (MUAC, only 1-5 years of age), occipitofrontal circumference (OFC) etc. and compare the results with standard figures available in chart forms which we call growth charts. Recording these parameters just mentioned is called anthropometry

(meaning measuring humans). Specific disturbances such as vitamin and mineral deficiencies are diagnosed by physical examination and laboratory tests.

Some Definitions Related to Malnutrition

1. PEM (protein energy malnutrition): It occurs when protein as well as energy (calories) is deficient in the body. It is usually due to deficient food.

2. Kwashiorkor: This is a severe malnutrition. The affected child has a body weight between 60-80% of the standard weight and in addition, he or she has oedema, skin and hair changes, and mental disturbances.

3. Marasmus: This is also a severe form of malnutrition in which the affected child has a body weight less than 60% of reference weight but there is no oedema.

4. Marasmic kwashiorkor: This is a combination of marasmus and kwashiorkor. Obviously the child is severely malnourished. He or she has a weight for marasmus (<60% of reference weight) and in addition, has oedema and other features of kwashiorkor.

Commonly the term PEM is interchangeably used for malnutrition.

Why Malnutrition Occurs?

Most commonly malnutrition occurs due to inadequate food. Therefore it is most commonly found during famine. You can also see it in case of natural disasters like cyclones, floods, draughts, earthquakes, tsunamis, etc. Or man makes the calamities by war, ethnic conflict, hoarding of foods, etc. Children who have diarrhoeas, acute respiratory infections (ARI), and other infections particularly chronic ones like. TB, whooping cough, etc are specially liable to develop malnutrition.

In these conditions they have poor appetite, nausea, vomiting, etc.

Poverty, ignorance, illiteracy, cultural beliefs, overcrowding, and insanitation are recognized causes of malnutrition.

Clinical Features

A severely malnourished child looks very wasted, pale (anaemic), unhappy, and indifferent (not interested in the surroundings). He or she is pale, may have oedema; skin changes particularly pigmentation, ulcers, etc. The hair is sparse, thin, lusterless, and easily pluckible.

Differences Between Kwashiorkor and Marasmus

Features	**Kwashiorkor**	**Marasmus**
		6-12 months
		Absent
		Gross wasting
		Severe
		Usually absent
		Good
Skin changes	Present	Usually absent
Hair changes	Present	Usually absent
Hepatomegaly	Present	Absent

Treatment

Severe PEM should ideally be treated in the hospital. Objectives of treatment are :

a. Nutritional correction

b. Management of complications

c. Rehabilitation.

Nutritional Correction

This is the main part of treatment. The nutritional condition of the child should be improved as soon as possible by giving sufficient energy (calories), high quality proteins vitamins and minerals. But due to severe anorexia the child should be fed with nasogastric tube. When appetite improves, solid foods could be introduced. Feeding is better given round the clock (less chance of intolerance, prevents hypoglycaemia).

Following are guidelines for feeding

a. Calories: Usually 150-200kcal/ kg/ days is given. As the diet is liquid (tube feeding) oil is added to avoid fluid overload. Daily fluid load should not exceed 100ml/kg.

b. Proteins: Usually 3-4g/kg/day of high quality protein is given. Milk is an excellent source of high quality protein. Skimmed or fresh milk can be used. In spite of lactose intolerance milk is well tolerated when given slowly in small frequent meals. Milk should provide at least one-fourth of the protein requirement.

c. Vitamins and minerals: high potency vitamin A capsule (200,000 iu) is given if not already administered; other vitamins are given in drop or tablet form. Conventional multi-vitamin drops 5-10 drops

three times a day are effective. Iron and folic acid are given to correct anaemia. Oral potassium, magnesium, and zinc may be required.

Management of Complications

a. Diarrhoeas and dehydration: Mild diarrhoea does not require any specific treatment. Diarrhoea associated with infection is treated with appropriate antibiotics or chemotherapeutics.

b. Hypoglycaemia: 10 ml 50% glucose in aqua or 20 ml 25% glucose in aqua is given intravenously as start dose. Round the clock feeding prevents further hypoglycaemia.

c. Hypothermia: When present, hypothermia should be treated by gradual warming up of the child. A kwashiorkor child should not be nursed in a windy place.

d. Infection: Diarrhoeas respiratory tract infection, and urinary tract infection (UTI), is common in PEM. Broad-spectrum antibiotic may be needed. Giardiadsis and helminthiasis should be treated. Deworming is usually done during recovery. TB must be excluded in all malnourished children specially in our country. In malaria endemic area, suppressive dose of chloroquine is recommended for all children on admission.

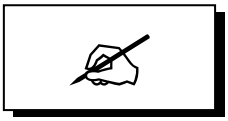
Signs of recovery

These usually appear within a week.

1. The child smiles. He or she is no more apathetic; becomes alert and shows interest in the surroundings. Starts playing.
2. Appetite improves. Takes more foods; demands food orally.
3. Oedema reduces (weight decreases). Here a kwashiorkor child will become marasmic first and then recovers. Loose stools disappear.
4. Skin condition improves.
5. Signs of vitamin deficiencies disappear.

Rehabilitation

The mother should be taught how to feed the child with full nutritional requirements within the family affordability by using cheaper and available foods. Health education regarding personal hygiene is very important.



4.1. Exercise

4.2.1. Mark the followings as true or false

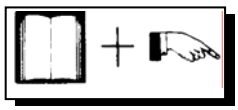
a. A weight of less than 60% is severe malnutrition
b. Oedema may be absent in kwashiorkor
c. Malnutrition is always associated with anaemia
d. Malnourished patients may develop rickets on recovery
e. Hypokalaemia is common in kwashiorkor

4.2.2. Short questions

1. Kwashiorkor.
2. Marasmus.
3. Marasmic kwashiorkor.
4. Treatment of severe malnutrition
5. Complications of severe malnutrition.

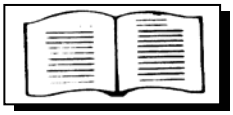
Lesson 5: Rickets and Osteomalacia

5.1. Learning Objectives



On completion of this lesson you will be able to -

- define rickets and osteomalacia
- learn clinical feature of rickets and
- know treatment of rickets.



Introduction

Rickets may be defined as failure of growing bone to mineralize osteoid tissue. Obviously the term is used for such condition only in children because only children have growing bones.

Failure to mineralize mature bone (only in adult) is called osteomalacia. Normal growth of growing bones is suppressed. Bones become soft easily deform. Deformities may result in fracture (pathological).

This is usually caused by deficiency of Vitamin D. Vitamin D is stored in the liver. It facilitates absorption of calcium and phosphorus in the intestine, maintains calcium and phosphorus levels in the body, and regulates deposition of calcium and phosphorus in the bone and teeth.

Clinical Features

Usual age of onset is below 2 years. Onset is usually slow with nonspecific symptoms like poor appetite, excessive sweating, irritability, abdominal distension, etc. Thickening of wrists and ankles, are early bony signs. Bony changes like bowing of weight bearing long bones of lower limbs, pigeoning of chest, etc. require a few months to appear. Anterior fontanelle may stay large and close lately (delayed closure of fontanelle). The head may be large.

Eruption of temporary teeth may be delayed. There may be defect in enamel and extensive caries. Permanent teeth may have defect in enamel.

Pigeon breast (chest) deformity may occur. Kyphosis, (forward bending), and scoliosis (lateral bending), may occur usually in the lower back. These may occur in combination. Lordosis (backward bending) may also occur. The usual site is lumbar region.

Growth of pelvis is affected. Entrance becomes narrowed due to forward projection of the sacral promontory. The pelvic outlet may also become narrowed due to forward displacement of the sacrococcyx (these changes can cause obstructed labour, hence rickets is much more dangerous for females). Bowlegs and knock-knees are also seen

(these deformities of the extremities, pelvis, and spine together produces rachitic dwarfism).

Relaxation of ligaments causes overextension of the knee joints. Hypotonia and delay in standing and walking with potbelly are also common.

Diagnosis

Dietary history, clinical and X-ray findings are diagnostic. Wrist is the best site for early x-ray signs of rickets. Laboratory investigation show normal or low calcium, low phosphates, and elevated serum alkaline phosphatase.

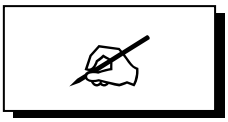
Treatment

Oral Vitamin D 50-150 microgram/d.

Healing occurs in 2-4 weeks. Exposure to sunlight is also effective.

Single dose of 15000 i.u. Vitamin D is advantageous.

Intake of calcium containing foods is also important and should be ensured.



5.2. Exercise

5.2.1. Say whether the following are true or false

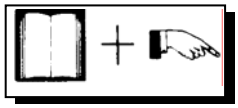
a. Vitamin D can be produced in our body.
b. Vitamin D is a water-soluble vitamin.
c. Tetany can occur in rickets.
d. Rickets can cause obstructive labour.
f. Liver and kidney diseases can cause rickets.

5.2.2. Short questions

1. What is rickets and osteomalacia?
2. What are clinical features of rickets and osteomalacia?

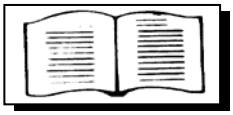
Lesson 6: Scurvy

6.1. Learning Objectives



On completion of this lesson you will be able to -

- about vitamin C
- the causes of C vit. deficiency and
- clinical features of vit. C deficiency.



Introduction

Vitamin C or ascorbic acid is a water-soluble vitamin. There is poor storage of this vitamin in our body, so we have to take vitamin C daily. It is abundant in the nature. Vitamin C is destroyed by heat, light, and alkali. Main sources are citrus fruits, and green leafy vegetables. Vitamin C is essential for formation of connective tissue. It also helps absorption of iron from the gut. It also helps conversion of folic acid (B_9) to folinic acid. Deficiency of vitamin C produces scurvy. Deficiency of vit. C causes defects in collagen structure. This is the basic cause of all clinical features in scurvy. This leads to weakening of capillary wall so that it bleeds. There is defective dentin formation and loosening of teeth and defective bone formation with loosened periosteum. Subperiosteal bleeding occurs particularly in the femora and tibias. In case of severe scurvy there may be degeneration of skeletal muscles, cardiac hypertrophy, bone marrow depression, and adrenal atrophy. This ultimately causes death.

Causes of Vitamin C deficiency

ii. Formula and animal milk fed babies develop scurvy as vitamin C is destroyed on boiling and exposure to light.

iii. Children on chiefly carbohydrate diet also develop because lack of fruits and vegetables make them deficient in this vitamin particularly.

iv. If the breastfeeding mothers are deficient, poor concentration of Vitamin C in breast milk will cause scurvy in their exclusively breastfed babies.

v. Need of Vitamin C is increased by febrile illnesses, infections and diarrhoeal diseases, iron deficiency, cold exposure, protein depletion and smoking.

Clinical Features

Scurvy can occur at any age. Common age is 6 months to 24 months. In adults and elderly scurvy is more common among those who are living solitary life. But it is rare in neonatal period especially in breastfed babies.

There are vague symptoms like irritability, crying on handling, less movements of limbs, muscular tenderness, and pseudoparesis (due to severe pain or tenderness).

The child is anorexic, loses weight, and becomes apathetic. Low-grade fever is common.

The legs assume typical frog position and there may be oedema in these due to capillary leakage and haemorrhage.

Teeth are erupted gums may be swollen and spongy. They bleed.

Petechial haemorrhage may be seen in the skin. Haematuria, melena, orbital and intracranial haemorrhage may occur.

Anaemia may occur due to poor iron absorption, impaired folic acid metabolism, and poor food intake. Joint may be swollen.

Diagnosis

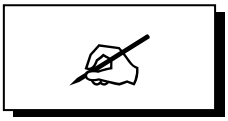
a. X-ray findings are diagnostic. X-ray of long bones specially that taken around the knee joint show: Ground glass opacity (osteopenia) of shafts and epiphysis, ‘pencil point’ thinning ‘ringing’ of epiphysis. Elevated periosteum occurs due to subperiosteal haemorrhage.
b. Typical clinical picture and dietary history also suggestive.

Differential Diagnoses

These include arthritis, osteitis, osteomyelitis, painful limbs due to other causes, poliomyelitis and other causes of purpura.

Treatment

Oral Vitamin C is very effective. Response is dramatic. Prognosis is excellent.



6.2. Exercise

6.2.1. Tell whether the following statements are true or false

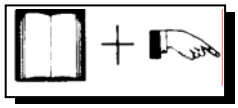
a. Sweet foods are good sources of vitamin C
b. Breastfed babies have less scurvy
c. Bones and teeth are affected in scurvy
d. Iron absorption requires vitamin Can
e. Scurvy causes delay in dentition.

6.2.2. Short questions

1. What is scurvy>
2. What are deficiency syndromes of vit.C?
3. What are causes of vit. deficiency C?
4. What are clinical features of vit. C deficiency.

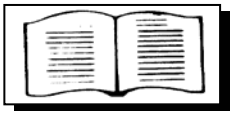
Lesson 7: Vitamin A Deficiency and Xerophthalmia

7.1. Learning Objectives



On completion of this lesson you will able to -

- about the function of vit. A
- the deficiency disease of vit. A and
- clinical features of vit. A deficiency.



Introduction

Vitamin A or retinol is a fat-soluble and heat stable vitamin widely available in the nature in its provitamin is called beta-carotene. Green leafy vegetables and yellow fruits.

Beta-carotene is richin. Otherwise the rich sources of this vitamin are foods of animal origins only like liver, fish liver oils (halibut, cod etc.), whole milk, dairy products, egg yolk, fortified margarines, etc.

Retinol is essential for dim light vision. It is also essential for maturation of epithelium and maintenance of epithelial integrity.

Causes of vit. A deficiency

a. Chiefly carbohydrate diet. Here want of oils and fat hamper absorption of Vitamin A. Carbohydrate diet may be deficient in beta- carotene as well.

b. Malabsorption syndrome. In this condition the affected child cannot absorb nutrients, particularly, fat-soluble vitamins like Vitamin A.

c. Some infections like measles and pertussis. Severe respiratory tract infections cause rapid utilization of this vitamin so that the child becomes depleted in Vitamin A content.

d. Gastrointestinal tract infections like diarrhoeas and dysenteries. The mechanism is same. The above 2 conditions namely. ARI and diarrhoeas, particularly in measles, cause severe acute deficiency of retinol children. .

e. Hepatic and pancreatic diseases. Here Vitamin A cannot be stored in the diseased live or the transformation of beta-carotene into retinol cannot be done. In pancreatic disorders, malabsorption in all occur fat-soluble vitamins.

f. Chronic infections (more excretion). More Vitamins are utilized to fight infections.

g. Zinc deficiency (required for mobilization of Vitamins).

h. Maternal Vitamin A deficiency may cause Vitamin A deficiency in the breastfed babies.

Very Important Clinical Features

The ocular changes in vitamin A deficiency are called xerophthalmia.

When the clinical features of xerophthalmia are present it can be assumed that the Vitamin A level has reached the lowest point inside the body because it needs almost total depletion of retinol inside the body to manifest these features. Features of xerophthalmia are -

1. Night blindness (nyctalopia)
2. Conjunctival xerosis
3. Bitot's spots
4. Corneal xerosis
5. Corneal softening and ulceration (keratomalacia)
6. Xerosis of the fundus of eyes.

Why to do in xerophthalmia? There is also photophobia. Xerophthalmia is a medical emergency and hence earliest possible treatment is essential. The whole cornea may melt and the eyeball may shrink. The ulcerated cornea may heal with variable scar formation causing blindness. In this case corneal grafting may be needed.

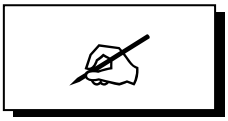
When xerophthalmia is present treatment is very urgent. High potency vitamin A capsule HPVAC is given according to the following schedule-

1 capsule on day 1

1 capsule on day 4

1 capsule on day 14.

Both mortality and morbidity from measles acquired by a child can be lowered by giving HPVAC irrespective of having the Vitamin by the child before the occurrence of the disease. The dose is 1 cap on day 1 and another cap on day 4.



7.2. Exercise

7.2.1. Say whether the following statements are true or false

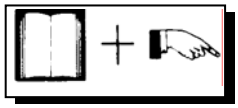
a. All Vitamins have a provitamin form.
b. Measles may cause total depletion of Vitamin A
c. Diarrhoea does not cause Vitamin A deficiency
d. Night blindness is the earliest sign of xerophthalmia
e. Measles vaccine can reduce xerophthalmia.

7.2.2. Short questions

1. Xerophthalmia.
2. Malabsorption.
3. Beta-carotene.
4. Vitamin A.
5. High potency Vitamin A capsule.

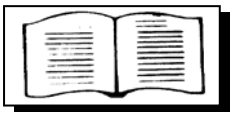
Lesson 8: Short Notes on Other Vitamins

8.1. Learning Objectives



On completion of this lesson you will able to -

- about water soluble vitamins
- vitamin E and K.



Vitamin B Complex

Thiamine (Vitamin B_1): It is a water soluble Vitamin. It is labile to heat, alkali and sulfites. Sources are whole grain, wheat germ, legumes, nuts, liver, meat etc.

Deficiency causes beriberi manifested by fatigue, irritability, anorexia, headache, insomnia, aphonia, paraesthesia of limbs (neuritis), features of Congestive Cardiac Failure.

Riboflavin (Vitamin B_2)

It is a water-soluble vitamin sensitive to light and alkali but stable to heat, oxidation and acid. Sources are whole grain, green leafy vegetables, milk, cheese, meat, eggs, fish etc. Deficiency condition is called ariboflavinosis, which manifests by angular stomatitis, glossitis, photophobia, blurred vision, burning and itching of eyes, corneal vascularisation, and poor growth.

Niacin

It is a water-soluble vitamin stable to light, acid, alkali, and oxidation. Sources of niacin are whole grain, green leafy vegetables, peanuts, liver meat and fish. Deficiency state is called pellagra, which is characterized, by dermatitis (mainly on the extensor surfaces of the limbs), dementia, and diarrhoea.

Pyridoxine (Vitamin B_6)

Pyridoxine is a water-soluble vitamin. It is destroyed by light and heat. Chief sources are whole grains, nuts, soybeans, green vegetables, meat, fish, liver, kidneys, etc. Deficiency may cause convulsion in neonates, irritability, hypochromic anaemia, and oxaluria.

Folic acid

It is a water-soluble vitamin, which is very labile to heat, light, and acids. Chief sources are green leafy vegetables, fresh fruits, liver, yeasts, beans, peas, and nuts. Deficiency produces megaloblastic anaemia particularly during infancy and pregnancy, glossitis, impaired immunity.

Vitamin B_{12}

It is also soluble in water but has a big storage in the liver. It is stable to heat but labile to light, acid and alkali.

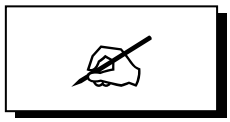
Its deficiency causes pernicious anaemia (Addisonian anaemia), subacute combined degeneration of the cord.

Vitamin E

Vitamin E is fat-soluble and hence bile and pancreatic juice is essential for its absorption. It is destroyed by light, oxidation, and alkali. Main sources are seeds, nuts, legumes, and green leafy vegetables. It is an important antioxidant and used in HPVAC to protect Vitamin A (retinol).

Vitamin K

It is also a fat-soluble vitamin. It is stable to heat but destroyed by light, alkali, acids and oxidation. Bile and pancreatic juice are essential for absorption. Sources are green leafy vegetables, liver and other foods. Deficiency produces bleeding due to coagulation factors deficiencies, uses it. This condition in neonates is called haemorrhagic disease of the newborn.



8.2. Exercise

8.2.1. Mark the following statements as true or false

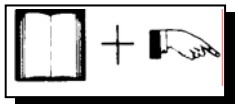
a. We can make vitamin D in in our body
b. Deficiency of vitamin K causes bleeding
c. Scurvy is caused by deficiency of thiamine
d. In beriberi there may be cardiac failure
e. Xerophthalmia can be treated by vitamin A.

8.2.2. Short questions

1. Xerophthalmia
2. Beriberi
3. Rickets
4. Haemorrhagic disease of the newborn
5. Scurvy

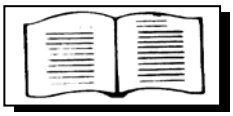
Lesson 9: Important Minerals

9.1. Learning Objectives



On completion of this lesson you will able to -

- about iron, zinc, and iodine.



Iron

It is an important component of haemoglobin and myoglobin, which function for transport of O_2 and CO_2. It is also present in the cytochrome and catalase enzyme system for transport of energy. Total body iron is 3 g only.

Only 10% of ingested iron is absorbed which is facilitated by gastric acid and Vitamin C. Main sources of iron are liver, meat, kidneys, whole grains, green vegetables, legumes, nuts etc.

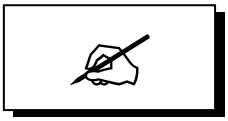
Deficiency produces hypochromic microcytic anaemia, irritability, and growth failure. Excess may produce acute iron poisoning and haemosiderosis.

Zinc

It is an important component of several enzymes like carbonic anhydrase, dehydrogenase, etc. Sources are meat, green leafy vegetables, whole grains, nuts, cheese, etc. (These sources may have poor zinc content if the soil becomes deficient due to washing of zinc from it by repeated flooding. This is why Bangladesh has got one of the highest zinc deficient populations.) Deficiency produces growth failure (dwarfism), poor wound healing, anaemia, depressed cell mediated immunity (CMI), acrodermatitis enteropathica, hypogonadism and hypopigmentation.

Iodine

Iodine is an essential element for our body. It functions mainly in the synthesis of thyroid hormones. So deficiency of it causes failure in the synthesis of these hormones (T4, T3) and the affected person becomes hypothyroid. Enlarged thyroid is called goiter. Iodine deficiency is more common in the hilly or mountainous areas away from sea. It is because iodine is plenty in seafoods including sea salt. Northern part of Bangladesh is suffering form this disease probably due to washed-soil. If people use iodized salt in foods, they will not develop iodine deficiency.



9.2. Exercise

9.2.1. Mark the following statements as true or false

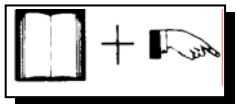
a. Zinc is needed for haemoglobin
b. Iron is totally absorbed from the gut
c. Haemoglobin carries CO_2
d. Liver is the store house of the body
e. Fruits are good source of vitamins.

9.2.2. Short questions

1. Zinc.
2. Iron deficiency anaemia.
3. Goiter.
4. Dwarfism.
5. Vitamins.

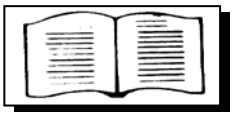
Lesson 10: Scabies and Worms

10.1. Learning Objectives



On completion of this lesson you will able to -

- about scabies
- about worms.



Scabies

Scabies is a contagious disease caused by *Sarcoptes scabii*. This organism is a mite and lives in the skin making a burrow. It causes intense itchy rash, which is often secondarily infected by bacteria (Staphylococci). Commonly there is strong family history affecting more or less all the family members. This is why you must treat all the family members at the same time to prevent reinfection from other persons.

There are several drugs to treat scabies but Permethrine cream applied once only is very effective. Secondary infection by Streptococcus pyogenes can cause a severe disease called acute post-streptococcal glomerulonephritis.

Several anti-scabies medicines are available. These are all for topical application. All family members should be treated at the same time.

Worms

Worm infestations are common in Bangladesh. Most common worms (helminths) are round worms (Ascaris lumbricoides), hook worms (Ankylostoma duodenale), thread worms (Enterovius vermicularis), and whip worms (Trichinella spiralis). Other worms are Strongyloides stercoralis, Endolymax nana, tapeworms, etc. Blood infesting worms such as filarias are also common in some parts of our country. Two common filarias are Wuchereria Bancrofti and Brugia malayi.

Round worms mainly causes malnutrition especially in poor children who take inadequate amount of food. These worms are long and big mimicking earthworms. When they are great in number they may cause obstruction (ileus) in the gut lumen. They may enter the biliary tract to produce obstructive jaundice. Rarely they may migrate upward and enter the respiratory tract to cause suffocation.

Hookworms do not cause any obstruction. But they are bloodsucker and can render a person very anaemic by taking repeated blood meals for long time. People specially in the rural areas who do not wear shoes can be infested by this worm. Its larva can enter the body by piercing the intact skin. Through circulation they ultimately enter the gastrointestinal tract to live therein. Hookworm is also very dangerous

because the affected patient can be severely anaemic and ultimately die from anaemic heart failure.

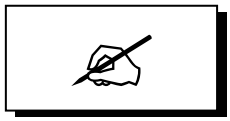
Threadworm produces very irritating symptoms of anal itch or in females additional vulval itch. The child may be very unhappy. This worm also causes auto-infestation. For this reason you should give a second dose of anthelmintic after 2 weeks. All other family members should also be treated for sustained cure.

Filariasis is common in the northern part of the country.

Filarial parasites infect an estimated 170 million people all over the world in areas where socio-economic and sanitary conditions are poor with overcrowding.

Eight types of filarial worms (these are also roundworms living in the blood) infest human beings. Out of which Wuchereria bancrofti, Brugia malayi, Onchocercus volvulus and Loa loa are responsible for most of the serious filarial infestation. Wuchereria bancrofti transmitted by Culex quinquefasciatus mosquito accounts for more than 90% of the global burden of lymphatic filariasis.

Adult filarial parasite causes blocking of lymphatics (lymph vessels). This leads to the final development of lymphoedema (elephantiasis). Filariasis is a curable disease, but early diagnosis and treatment is very important because it then can halt development of elephantiasis. Diethylcarbamazine (DEC), Ivermectin, etc. are important drugs.



10.2. Exercise

10.2. Mark as true or false

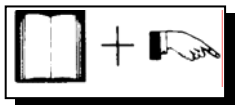
a. Filariasis is caused by a worm
b. Some worms can invade our blood
c. Round worm can cause obstructive jaundice
d. Thread worm cause frequency of micturition
e. Hookworm can cause severe anaemia.

10.2.2. Short questions

1. Scabies
2. Helminthiasis
3. Hookworm disease
4. Filariasis
5. Elephantiasis.

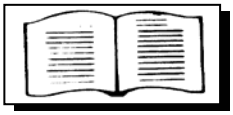
Lesson 11: Management of Behavioural Problems and Mental Disturbances in Children

11.1. Learning Objectives



On completion of this lesson you will be able to -

- what are the common behavioural problems in small children
- what are the common mental disturbances in them and
- how to nurse these children.



Mental disturbances in children are not uncommon. As a child health nurse you should be kind in handling such situations.

Reassure the parents because most behavioural problems are self-limiting. Try to learn from the child about the family environment, which may cause such problems. Mental disturbances need special attention with adequate sympathy. Common behavioural and mental disturbances in children are as follows:

Rumination

It is commonly seen in male babies of age group 3 and 14 months. The child brings up milk (regurgitation) and churns it inside the mouth. In fact it is a habit disorder and the child does not have any nausea or abdominal disorders. It is usually self-limiting. Thickening of feeds may help. Psychological counseling of the parents is essential. Antiemetic or prokinetic drugs may have some role.

Pica

It is also called dirt eating. Tasting or mouthing of anything is not abnormal for children below 2 years of age. But dirt eating beyond this period must be investigated. The affected child eats non-nutritional dirty things such as earth, plaster, charcoal, clay, wool, ashes, paint, etc. Main danger of pica is lead poisoning and worm infestation.

Enuresis and Encopresis

These two are major challenges for a doctor.

Enuresis or bed-wetting in an important common problem in childhood. Most children bed wet till 5 years of age. If a child continues to bed wet after the age of 5 years the condition is termed to be enuresis. The affected child is not mentally abnormal. There is no association with epilepsy or other neurological disorders. The child must not be blamed nor punished. So, you should be very kind and

affectionate to him or her. If it occurs only during night it is called nocturnal enuresis.

Encopresis means incontinence of passage of stool. It is psychologically and socially more serious because family members take it to be worse than enuresis. There may be history of bad toilet training, overprotective parents, severe constipation, anal fissure, etc.

The child must be reassured and the parents counseled. Tell the parents that it is either not due to child's fault neither the parents are to be blamed. It there is anal fissure it should be treated first by applying topical cream, anal stretching, and use of analgesics. The child should be encouraged to sit daily in a squatting position on a toilet pan for several minutes so that if there is impaction of stool in the lower abdomen it will gradually descend and ultimately empty. Never force or intimidate the child. Glycerin suppository may be used. Stool softener such as lactulose can be used. The child should be adapted to balanced foods with adequate roughage or fibers. Animal milk should better be avoided for the time being.

Breath Holding Attacks

It is a condition in which the affected child cries violently in one very long expiration (breathing out) and then stops to breathe in. He or she may become stiff, blue (cyanosed) and occasionally there may be a fit (convulsion). The underlying cause is not known. There is a strong familial trend. Adequate counseling is essential. No specific medication is required.

Sleep disorders

These are not uncommon. Night terror is a disorder that occurs in children 3-8 years of age. It is characterized by sudden partial waking of the child from sleep and he or she is severely frightened. There are fast breathing, running pulse and excessive sweating. Reassurance to the anxious parents and sedatives like diphenhydramine may be helpful.

Somnambulism is another sleeps disorders in which the child while asleep starts walking though he or she is not aware of doing this. It occurs in children 6-16 years of age. No cause is known. It may be associated with childhood migraine. No treatment is required.

Habit disorder

These include thumb sucking, nail biting, teeth grinding, head banging, body rocking, hair pulling and eating, air swallowing, etc. these are repetitive pattern of particular movement and may not be abnormal in mildest form because these are shown by most children in their developmental period. Teeth grinding (bruxism) is often but wrongly

attributed to worm infestation (helminthiasis). It is not harmless and may cause problem in dental occlusion. Giving the child more time to play, reading storybooks, talking and praising etc. may relieve the child from the problem.

Other behavioural problems should be tackled with similar ways. Thumb sucking is normal in early infancy. Giving the child other options for playing, talking more, enjoyable bedtime etc. may be of help.

Stammering or stuttering

It is not an uncommon condition, about 5% children stutter. Almost 80% recover spontaneously. There is a strong family incidence. The affected child finds difficulty to pronounce a word, in proceeding to the next word or completing a sentence. It usually starts before the age of 5 years. The child may overcome the problem by himself or herself. The physician can help the parents to accept this problem in earlier period. If it persists, help from a speech therapist can be sought.

Phobias or fears are natural phenomena. When it is unduly excessive then it is abnormal.

Obsession

The affected child cannot satisfy him/herself of a work in the recommended way. For example washing the hands can be done with using soap and a little amount of water. But here the child goes on washing repeatedly for long time and yet is not satisfied thinking that the hands are still unclean. Mild degree of obsession is acceptable. It is abnormal when it distresses others, waste time, and interfere with normal routine.

Autism

It is not an uncommon condition. One in 500 children are affected. It is more common than Down syndrome, or childhood cancer. Onset is before age of 3 years. Eighty percent (80%) affected children are males.

Autism is very variable in severity and in symptoms and signs. One in 10 autistic children shows exceptional skill in art, music, calculation, and memory.

The affected child has developmental disability that affects the way he or she communicates and relates to the surrounding persons.

All autistic children have the 3 (triad) variable impairments :

1. Impairment of social interaction (social relation).

2. Impairment of social communication (speaking and body languages). They cannot interpret facial expressions, or emotions. They do not know how to share with or make friends.
3. Impairment of imagination (imagining and playing).

In addition to these triad the affected child has repetitive behaviour patterns and he or she strongly resists to any change in the routine works.

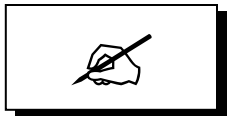
Exact causes are unknown. Genetic factors play an important role. It does not occur due to emotional problem or emotional deprivation. Poverty or bad parenting's have no role.

No medical test is available. Earlier diagnosis may have a good prognosis.
Clinical screening called CHAT (checklist for autism in toddlers) is used to diagnose autism in small children as young as 18 months. Some believe that all children should undergo it. A child who fails to succeed each of the following 5 tests almost certainly has autism:

1. Does your child use the index finger to indicate interest in something?
2. Get the child's attention. Point to an interesting object and ask him or her to look at. Does the child look?
3. Does your child pretend toys (cup, spoon) with real things?
4. Get the child's attention. Give him or her a toy cup and toy pot and ask to make a cup of tea. Does he or she respond?
5. Say, "where is the ball?" Does the child point with index finger at the ball?
6. Autism is treatable. Early diagnosis and intensive behavioural therapy can have a lasting positive effect. Good educational programme may benefit them.
7. With intensive therapy 50% children with autism diagnosed before 5 years can go on to attend mainstream school.

Defiance, negativism, and temper-tantrum

These are closely related conditions. Commonly the affected child is a toddler (usually 18 months to 36 months). Showing sympathy and at the same time overlooking the problem gives the child adequate time to recover.



11.2. Exercise

11.2.1. Mark the followings either true or false

a. A child aged 2 years having incontinence of urine is said to have enuresis
b. Pica causes iron deficiency anaemia
c. Breath holding attack (BHA) can kill
d. Rumination may be very dangerous
e. Autism is a self-limiting disease

11.2.2. Short questions

1. Autism
2. Pica
3. Habit disorders
4. Breath holding attack (BHA)
5. Tics.