1.2. Health Priorities in children

Child health Indicators:

A. Perinatal mortality rate:- the total number of still-births plus the number of deaths under one week old, per 1000 birth or the sum of late fetal and early neonatal deaths. The causes of Perinatal mortality are generally attributed to trauma and stress of labor, toxemia ante partum hemorrhage, maternal disease (particularly malaria and malnutrition), congenital anomalies, infection and induced abortions. Rates and causes of perinatal mortality are less well documented in developing areas. Available data indicate that in some areas like Addis Ababa, Ethiopia, the perinatal mortality rate was documented as high as 66 per 1000 live births.

B. Neonatal mortality rate: - The number of deaths under 28 days of age per 1000 live births. The neonatal death reflects not only the quality of care available to women during pregnancy and childbirth but also the quality of care available

to the newborn during the first months of life. Immaturity of the infant is the chief cause of these early deaths. Approximately 80 % of infants who die within 48 hours of birth weigh less than 2500 g.

C. Post-natal mortality rate: - The number of deaths over 28 days but under one year of age per 1000 live births.

D. Infant mortality rate: - The number of infant under one year of age dies per 1000 live births. It is the sum of neonatal and postnatal deaths. The primary cause is immaturity and the second leading cause is gastroenteritis, which can be prevented by putting the newborn immediately with the mother and advocating breast-feeding.

E. Child mortality rate: - The number of deaths between 1 and 4 years in a year per 1000 children. This rate reflects the main environmental factors affecting the child health, such as nutrition, sanitation, communicable diseases and accidents around the home. It is a sensitive indicator of socioeconomic development in a community and may be 25 times higher in developing countries compared to developed countries.

1.5 Care of the Under-Fives

In most countries of the world, there is a relative neglect of the children of pre-school age. They are a vulnerable or special risk group in any population. The reasons why they need special health care are:

- **Large numbers**: constitute 15 – 20% of population in developing countries.
- **High mortality**: Apart from infant mortality which is more than 100/1000 live birth in developing countries, the mortality in age groups 1-4 years is not less than 40/1000 as compared to 0.5 in developed countries. The major causes of death in this group are due to malnutrition and infection, both preventable.
- **Morbidity:** The major diseases which affect this preschool age group are: diphtheria, whooping cough tetanus, diarrhea, dysentery, malnutrition, accidents all are preventable etc...

A) Major childhood problems:

- Pneumonia
- Diarrhea
- Malaria
- Tuberculosis
- HIV (mother to child transmission)
- Perinatal infection
- Malnutrition

B) Major child health programs/activities:

- CDD see the section on IMCI case management of Diarrhea
- ARI see the section on IMCI case management of ARI
- Malaria control see the section on IMCI case management of fever
- HIV control activities (mother to child transmission prevention) see the section in HIV prevention.

C) Antenatal and deliver care:

Every child begins as a fetus, and the months before delivery are some of the most important in his life. Pregnant mothers should be checked regularly and advised on their nutrition and any other difficulties they have. Every mother should receive tetanus immunization to protect her new baby. Finally, skilled help during labor and delivery will provide the final step for a good start in life.

D) EPI (Immunization):

Tuberculosis, diphtheria, whooping cough, tetanus, polio and measles can all be prevented by Immunization. These are some of the main causes of sickness and death among children. These methods of primary prevention are available and effective and should be given to every child.

E) Under Five Clinic:

- The aims and objectives of the under-fives clinic are to provide curative, preventive and promotive health services within the resources available in the country such as:
- Well baby care
- Care in illness
- Adequate nutrition
- Immunization

F) Traditional Practice:

Everyone is greatly influenced by the traditional customs of his family, tribe, and country. Some of these traditional practices are good for health, such as breast feeding or the acceptance of modern medicine, should be supported. Those traditional practices and beliefs, which are bad (cutting of uvula, female genital mutilation etc) need to be gradually changed. This is another important area in which health workers can have a strong influence in improving health.

Study Questions

1. Discuss the components of safe motherhood that can contribute to the reduction of neonatal morbidity and mortality.
2. What are the immediate essential newborn cares?
3. What are the major components of child health program activities?
4. Discuss advantages and disadvantages of traditional practices in relation to child health

CHAPTER TWO

HISTORY TAKING AND PHYSICAL EXAMINATION

2.1 History taking and approach

A) The Chief complaint: is the symptom the patient presents himself with. It can be stated briefly as e.g. fever, cut wound, or vomiting etc.

B) History of the present illness: this is a chronologic description and duration of the chief complaint. We try to answer the following questions;

- Duration of disease onset
- Severity
- Aggravating and alleviating factors
- Associated symptoms
- Any treatment and response to treatment
- History of contact with similar illness
- Relevant pediatric history (like history of immunizations) related to chief complaints or history present illness

C) Past medical history: this is made up of the illness the patient has had in the past. Past medical history section of pediatrics contains (Past illness, child hood illness, Prenatal history, birth history). Find out if your patient has been hospitalized previously and for what conditions. Do the symptoms he/she has now resemble the one he had in connection with these past conditions, if so then they might be due to the same illness.

In the case of children ask about what childhood diseases they have had. If a child has a rash now which resembles measles you do not have to worry about this condition if he has already had measles or if he has been immunized against measles.

D) Social and family history:

The social history should include the parents' occupation as

well as the current living condition. Poverty and ignorance are major sources of ill health. You may have to educate a poor mother with malnourished baby that the best treatment for her baby is to be breast-fed exclusively till the age of one or more. If a mother feeds the baby food containing unbilled water the baby may get diarrhea. Teach the mother to boil water used for preparing food to infants.

E) Immunization status:

Immunization is a way of protecting children against the major diseases of childhood, which harm, cripple or kill thousands of children.

Ask the mother about immunization status and if he/she is not properly immunized, take the opportunity of a minor illness to prevent major diseases by advice and vaccination.

NB. No proper history can be obtained without observation of the child and the mother.

Some rules in history taking:

Be an intelligent observer (while you are waiting for the undressing of the child or while you are taking with the mother)

Situation	**your action in history taking**
The very sick child	try to find out quickly what is causes

The Symptoms of disease (e.g. respiratory distress, dehydration, pain, anxiety). This will direct your history taking. The healthy looking child whose mother believes he is ill. See how the proposed illness affects the general wellbeing or growth of the child. History taking does not have to be long if he looks well. Inappropriate reaction of the mother the recent history may be irrelevant. Social history may be more important to get.

- Abnormal reaction of the child towards

What is happening around him

history may be directed towards CNS

2. Listen to the mother's description of the complaints carefully and get the main symptoms.

- How did the disease start, which symptoms followed?
- Get the time factor. When the disease starts? Has the child had the same kind of symptoms before?
- Ask about the condition of other members of the family?
- How is the child eating at present? How was his appetite in the last month?
- How is he doing between the attacks of illness? Is he weak and inactive or strong and active?
- It may be necessary to obtain the social history in certain conditions such as malnutrition.
- Get the 'story'. Where has the child gone for help before?

What sort of local treatment has he had? What are the mother's beliefs about his illness/disease?

- Always try to evaluate the weight progress of the child. This is best done by looking at the weight chart which the mother preferably should have and bring to outpatients' department at every visit.
- Ask about vaccinations done.
- When the symptoms are vague and nonspecific, e.g. tiredness, abdominal pain etc. review the different systems of the body.

2.2 Review of Systems:

The review of system is essentially the same as in the adult history. It is best organized from the head to down to the extremities. In the child, however, there should be increased emphasis on the symptoms related to the respiratory, gastrointestinal, and genitourinary systems. The high incidence of symptoms and diseases related to these symptoms obligate the interviewer to focus in this area.

To get the important points:

The patient usually comes with his mother and the task is to pick out from all the different information the mother is giving what is important.

- Try to make good contact with her and with the child

- Treat them as human beings who have come for help and advice and do not look upon them as 'cases' only.
- Always believe what the mother tells, but try to be realistic about the importance the symptoms she is mentioning.
- If he is not well nourished and not properly immunized, take the opportunity of a minor illness to prevent major diseases by advice and vaccination.
- Use communication skill (APAC: Ask ,Praise, Advice and check ones understanding)

2.3 Physical Examination:

A) Principles and techniques of physical examination:

The principles and techniques of physical examinations in the case of a small children you should make it habit to undress the child and examine the whole child. To examine the whole body we start with the head and end at feet in older children and adults. In order not to frighten small children it is best to examine things that are uncomfortable or frightening to them last so as not to loose their cooperation. This means the last thing to do in a child is auscultation of the heart, inspection of the ears with an auriscope and inspection of the throat with a throat stick. We use our eyes, ears and hands in addition to a few special items of equipment to perform the physical examination.

1. Chronological steps of physical examination:

This consists of three parts:

a. General appearance:

This is what you observe while examing your patient

The mental state of the patient

- is he acting normally?
- is he confused?
- is he drowsy, stuporous or even comatose? etc.

The general physical state of the patient

- general state of health
- weight and body build
- colors
- respiration
- signs of dehydration
- edema

b. Vital signs:-

These are:

- Temperature
- Pulse rate
- Respiratory rate
- Blood Pressure

The temperature:

All sick children should have their temperature measured (rectally, orally, and axially) The normal temperature is about 37• C. A temperature below 36•C is abnormally low and may be a sign of infection in a small baby.

A temperature above 37.5•C is fever. When there is a fever it usually means an infection is present and you must try to locate the site of the infection and decide whether it needs treatment and with what.

The pulse:-

The pulse can be felt and count in children radically for fifteen seconds multiply by four. In the infant it is sometimes easiest to count the heart rate with the stethoscope apically.

Normal pulse rate:

- babies 100-140 beats per minute
- children 80-100 beats per minute

In fever the pulse rate generally rises. In dehydration the pulse rate may be very rapid and weak.

The respiratory rate:-

Normal respiratory rate:

- < 2 month ,< 60 breath per minute
- 2-12 months < 50 breath per minute
- 12 month-5years< 40 breath per minute

A rapid respiration of 60 or more in a small, feverish child is a very good indicator of pneumonia

c. Anthropometric measurement:

- Weight
- Height/Length
- head circumference
- mid-arm circumference
- Chest circumstances

Weight:

The best way to assess nutritional status is to take body weight. The weight should be charted on a weight chart. Most weight charts have three curves. The upper line shows the average weight of healthy well nourished children and this is an ideal growth curve. The middle shows the lowest weight that is still considered to be within limits of normal and the weights on this line are 80 % of the weights on the upper line. The lower curve shows 60 % of the ideal weight. According to Gomez classification any child whose weight is below this line is marasmic.

Height: Height (length) is also used but more difficult to measure than weight especially in infants. It is a less sensitive measure than weight because it does not decrease during malnutrition, it only stops increasing. This means that height is

not affected much for the first six months in malnutrition and is therefore more a measurement of longstanding malnutrition.

d. Evaluation of various body system:

For various body system evaluation we use our

- eyes for inspection
- hands for palpation
- ears for auscultation
- HEENT (hair color and texture, pallor, oral lesions, ear discharge, eye discharge, neck swellings…) inspection.
- Chest (Inspection, Palpation/ Percussion, Auscultations)
- CVS (Inspection, Palpation/, Auscultations)
- Abdomen(Inspection, Palpation/ Percussion, Auscultations)
- GUS (Costo-vertebral angle (CVA) tenderness, Suprapubic tenderness, and inspection of external genitalia)
- Musculoskeletal system(joint swelling or tenderness or deformity, bone swelling or tenderness, muscles)
- Intugementory /skin (color, lesions)
- CNS(Level of consciousness, reflexes,(motor and sensory)and meningeal Signs

Study Questions

1. What are the essential components of history taking?
2. What are the principles and techniques of physical examination in a small child?
3. What methods can you use when evaluating the body system?
4. What techniques would you use to get information about the sick child?

CHAPTER THREE

ESSENTIAL CARE FOR HOSPITALIZED CHILDREN

Learning Objectives

After studying the material in this unit, the students will be able to:

- Administer drugs for hospitalized children through different routs
- Identify indications and use NG-tube feeding
- Identify indications and administer Oxygen as ordered
- Identify the need and carryout resuscitation
- Care for a child under specific conditions

3.1 Administration of Drugs:

The giving of medication to a child is a serious responsibility of a nurse. The need for accuracy in pouring and giving medication is greater than with adult patients. The dose varies with the size, surface area, the age of the child and the nurse has no standard dose as is customary for adult patients. Since the dose is relatively small, a slight mistake in amount of drug given makes a greater proportional error in terms of the amount ordered than with the adult dose.

Since the possibility of error is greater in the giving of medication to children than to adults, and since a child's reaction to a dose ordered by a physician is less predictable than adult's reaction, the nurse must be alert to recognize undesired effects of the medication given.

A) Oral administration:

Infants will generally accept the medication put into their mouth, provided that it is in a form which they can deadly swallow. The medication should be given slowly in order to prevent choking. The nurse should sit-down and hold infant or if he cannot be removed from his crib, raises him to sitting position or if this is contraindicated elevate his head and shoulders. There is then less danger of his choking. Medication can be given from medication glass, the tip of teaspoon or rubber-tipped medicine dropper. If the medication is immediately vomited, the physician should be notified. The child as young as two years of age can be taught to swallow drugs. The child should be told to place the tablet near the back of his tongue and to drink the water, fruit juice, milk offered him in order to wash down the tablet. In younger seriously sick children, tablets crushed and dissolved in water can be given by spoon or through Naso- gastric tube

B) Intramuscular Injections:

The procedure of using an intramuscular injection is the same as for the adults. In children and infants anterior lateral thigh is often used for IM injection to reduce the risk of vascular and peripheral nerve (sciatic) injuries. The needle used for intramuscular injection must be long enough so that the medication should be given deeply into the muscle tissue in order to be absorbed properly.

C) Intravenous Administration:

When a patient's gastrointestinal tract can not accept food, nutritional requirements are often met intravenously. Parental administration may include high concentrations of glucose, protein or fat to meet nutritional requirements. Many medications are delivered intravenously, either by infusion or directly into the vein. Because intravenous administrations circulate rapidly. The ability to gain access to the venous system for administering fluid and medications is an expected nursing skill in many settings. They are responsible for selecting the appropriate venipuncture site and being proficient in the technique of vein entry. Ideally, both arms and hands should be carefully inspected before a specific venipuncture site is chosen.

The following are considered when selecting a site for venipuncture.

- Condition of the vein
- Type of fluid/ medication to be infused
- Duration of the therapy
- Patients age and size
- Skill of the health provider

Possible Sites:

- Scalp veins
- Femoral Veins
- External jaguar Veins
- Antecubital –fossa

3.2 Indications and use of NG-tube:

Gavage feeding (nasogastric or NG-tube feeding) is a means of supplying adequate nutrition to an infant who is unable or tires too easily to suck or to an older child who can not drink. To prepare for Gavage feedings, the space from the bridge of the infant's nose to the earlobe to a point halfway between the xiphoid process and the umbilicus is measured against a No 8 or 10 Gavage tube for children over one year measure from the bridge of the nose to the earlobe to the xiphoid process. The tube is marked at this point by a small Kelly clamp or

piece of tape to ensure that it reaches the stomach after it is passed. The tip of the catheter may be lubricated by water. An oil lubricant should never be used. Although the tube is passed into the stomach, it is occasionally passed into the trachea accidentally, oil left in the trachea could lead to lipoid pneumonia, a complication that a child already burdened with disease may not be able to tolerate.

Once you are assured that the catheter is in the stomach, attach a syringe or special feeding funnel to the tube. Be certain that the child's head and chest are slightly elevated to encourage fluid to flow downward into the stomach. Then feed with funnel or syringe and allow it to flow by gravity into the child's stomach. When the total feeding has passed through the tube, the tube is reclamped securely and then gently and rapidly withdrawn to reduce the risk of aspiration. If the tube is to be remain in place, it should be flashed with 1 to 5 ml of sterile water and cupped to seal out air.

Indications for NG tube:

- Prematurity
- Neurologic disorders
- Respiratory distress
- Severe protein energy malnutrition
- Cleft palate

3) Resuscitation:

Respiratory arrest means that there is no apparent respiratory activity. The child will be unresponsive, pale and dead like. Cardiac arrest follows quickly after respiratory arrest as soon as the heart muscle is affected by the anoxia, which occurs. The outcome for the child will depend to great extent on the speed with which resuscitation is began. The steps for resuscitation can be remembered as “A, B, C, D” where A is for airway, B for breathing and C is for circulation and D is for drug administration. These three techniques (clearing the airway, ventilating the lungs, and circulating the blood by cardiac compression) will provide adequate oxygenation to major body organs for an extended period of time (A: clear airway, position, suction), (B: bagging, oxygen administration), (C: Cardiac compression, secure IV line), (D –drugs (epinephrine).

Oxygen administration: Oxygen administration elevates the arterial saturation level by supplying more available oxygen to the respiratory tract. Nursing care must be planned carefully when children are in tents:

- The tent should be open as little as possible so that as high an oxygen concentration as possible can be maintained.
- Oxygen may be delivered to an infant by use of plastic mask. This tight fitting plastic can keep oxygen concentration at nearly 100 %.

- A nasal catheter used with an oxygen flow of 4 L/ min provides a concentration of about 50 %. Most children do not like nasal catheter because it is irritant; assess the nostrils of the infant carefully when using nasal catheter. The pressure of catheter can cause areas of necrosis, particularly on the nasal septum.
- Oxygen must be administered warmed and moistened, no matter what the route of delivery; dry oxygen will dry and thicken, not loosen secretions.
- Oxygen must be administered with the same careful observation and thoughtfulness as any drug.
- If concentrations are too low, oxygen is not therapeutic
- In concentrations greater than those desired, oxygen toxicity can develop.
- If newborns are subjected to a Pao2 of over 100-mm/Hg for an extended time, retinopathy of prematurely can occur.

4. Administering Enemas:

Enemas are rarely used with children unless a part of preoperative preparation or are required for radiological study. The usual amount of enema solution used are as follows:

- Infant: less than 250 ml
- Preschooler: 250-350 ml
- School age child: 300-500 ml
- Adolescent: 500 ml

For an infant:

- Use a small soft catheter (no 10 to 12 French) in place of an enema tip.
- Infants and children up to ages 3 years or 4 years are unable to retain enema solutions, so they must rest on a bed pan or baby pan during the procedure
- Pad the edge of the pan so that it is not cold or sharp.
- Place a pillow under the infants or the young child's upper body for positioning and comfort.
- Lubricate the catheter and insert it only 2 to 3 inches (5cm – 7cm) in children and only 1 inch (2.5 cm) in infants.
- Be certain to hold the solution container no more than 12-15 inch above the bed surface so the solution flows at controlled rate.
- If the child experiences intestinal cramping, clamp the tubing to halt the flow temporarily and wait until the cramping passes before instilling any more fluid
- If the enema solution is to be retained, such as an oil solution, hold the child's buttocks together after administration
- Tape water is not used because it is not isotonic and causes rapid fluid shifts of water in body compartments, leading to water intoxication.
- Normal saline (0.9 sodium chloride) is the usual solution

3.3 Care of child under specific conditions:

Fever: Fever in children is common and can have many causes. In many cases you will make the diagnosis of non-specific virus infection. This may be true, but such a diagnosis is difficult to prove and should never be made without taking a careful history and performing a proper examination in any child with fever. Young children appear to tolerate fever better than adults but some develop convulsions. Remember to ask for any contact with infectious diseases. Think of malaria and take a blood film. If you still do not have a definite cause for the fever, rule out (Malaria, Early measles, Pneumonia, meningitis)

A) Features of Febrile convulsions:

- Begin between 6 month and 5 years of age
- Incidence is 3 % by 5 years of age
- Epilepsy develop in 3 % of cases
- % are neurologically abnormal
- 30 % of cases develop further seizure with fever
- Febrile seizures lasting over 30 minutes are more serious
- Repeated convulsions may damage the brain. The best treatment is controlling and preventing high fever rather than giving continuous anticonvulsants.

General management of children with fever:

a. If the fever is high (over 39 degree centigrade)

- Tepid sponging with ordinary water will help to reduce but ice cold water is harmful because it causes constriction of blood vessel in the skin and prevents heat loss.
- Antipyretics (paracetamol) 10 –15 mg /kg
- Use a fun to increase water evaporation and hence skin cooling and reduction in body temperature.

b. Feverish children should never be wrapped in warm blankets. Children must be able to get rid of the heat, otherwise febrile convulsions can be precipitated

c. children who have fever need to take extra fluids, so make sure that they have plenty to drink.

- If they are too sick to take, give fluids by NG tube
- If they are obviously dehydrated, they need intravenous or intraperitoneal infusion
- Room ventilation
- Re-assess the child for fever later
- Attempts should be made to identify and treat underlying causes

B) Coma:

Coma is a state of unconsciousness from which patient cannot be aroused by any stimulation.

- This might be the result of a recent convulsions
- Coma can be caused by local damage to the brain by

infection (brain absces, encephalitis, TB. or other types of meningitis)

- coma can be caused by abnormal function of the brain cells due to:

1. uremia
2. high blood pressure as in acute glomerulonephritis
3. drugs or poisons
4. hypoglycemia as in malnourished children or diabetics after too much insulin
5. hyperglycemic diabetic coma
6. dehydration with electrolyte disturbances
7. liver failure
8. toxic coma as in typhoid fever and septicemia

Management of coma:

1. Take care the airway does not become blocked by the tongue or secretions by placing the patient in the coma position with the mouth downwards and using suction p.r.n.(A,B,C, D of life saving measures)
2. Find and treat the cause, if possible or refer to hospital. A malaria blood film, a lumbar puncture, dextrostix in blood or clinistix in urine, measuring blood pressure, and a thorough history and examination will usually reveal the cause. If not: treat as malaria in any case. In case of a feverish, toxic, comatose child, also start treatment with penicillin and chloramphenicol and refer to hospital.

3. Turn the patient every 2 hourly
4. Check the bladder regularly for retention
5. Insert NGT for feeding

C) Convulsive seizure: Convulsions are much commoner during the first two or three years of life than at any other period. This is not only due to congenital malformation or perinatal injury to the central nervous system but also the frequency of “febrile“ convulsions in response to a rapid rise of temperature at the onset of acute infective illnesses

1. Management of Convulsion in children:

- (A,B,C,D) of life saving measures
- Give 20 % glucose (IV or PO)
- Give Diazepam, (Rectal, IV,NGT) if convulsion does not stop
- Give Phenobarbitone or Phenytine if convulsion does not stop
- Give General anesthesia

2. Nursing Management during seizure:

- Provide privacy
- Protect head injury by placing pillow under head and neck
- Loosen constrictive clothing’s
- Remove any furniture from patient side
- Remove denture if any

- Place padded tongue blade between teethes to prevent tongue bit
- Do not attempt to restrain the patient during attack
- If possible place patient on side

3. Nursing Management after seizure:

- Prevent aspiration by placing on side
- On awaking re-orient the patient to the environment
- Re-assure and calm the patient

3.4 Tracheostomy Care (Care of a child under Tracheostomy):

A tracheotomy is a procedure in which an opening is made into the trachea. When an indwelling tube is inserted into the trachea, the term tracheostomy is used. A trachestomy may be either temporary or permanent.

A trachestomy is performed to by pass an upper airway obstruction, to remove tracheobornchеal secretions, to prevent aspiration of oral or gastric secretions in the unconscious or paralyzed patient and to replace an endotracheal tube. There are many disease processes and emergency conditions that make a tracheostomy necessary.

Procedure:

The procedure is performed in the operating room or in an intensive care unit, where the patients condition can be well controlled an optimal aseptic technique can be maintained. An opening is made in the second or third tracheal rings. After the trachea is (opened) exposed a tracheostomy tube of appropriate size is inserted.

The tracheostomy tube is held in place by tapes fastened around the patients neck usually, a square of sterile gauze is placed between the tube and the skin to absorb drainage and prevent infection.

Complications:

Early complications immediately after the trachestomy is performed include:

- bleeding
- pneumothorax
- air embolism
- aspiration
- subcutaneous or mediastinal emphysema
- recurrent laryngeal nerve damage or
- posterior tracheal wall penetration.

Long-term complications include:

- air way obstructions due to accumulation of secretions.
- infection
- dysphasia
- tracheo-esophageal fistula
- tracheal dilation
- tracheal ischemia and necrosis
- tracheal stenosis after removal of tracheostomy tube.

Immediate Postoperative Nursing care:

- The patient requires continuous monitoring and assessment.
- The opening must be kept patent by proper suctioning of secretions.
- After the vital signs are stable, the patient is placed in semi-fowler's position to facilitate ventilation, promote drainage, minimize edema and prevent strain on the suture lines.
- Analgesic and sedative drugs are administered with caution because it is undesirable to depress the cough reflex.
- Paper and pencil, and the patient call light are kept within reach of patient to ensure a means of communication.
- Psychosocial care

Tracheostomy tube and skin care:

- Inspect tracheostomy dressing for moisture or drainage
- Wash hands
- Explain procedure to pt.
- Wear clean gloves, remove soiled dressing and discard.
- Prepare sterile supplies (hydrogen peroxide, normal saline, or sterile water, cotton tipped applicators, dressing materials).
- Put on sterile gloves.
- Cleanse wound and tracheostomy tube with sterile applicators moistened with hydrogen peroxide and rinse with sterile saline.
- If old tapes of outer cannula are soiled change it with care and secure with a knot.
- Remove old tapes and discard.
- Use sterile tracheostomy dressing and fit securely to cover the incision.

Study Questions

1. What are the indications for Oxygen administration?
2. What are similarities and difference in giving IM medication to children and adults?
3. Discuss about the indications for NG tube feeding.
4. Discuss about the possible causes of fever in children and its management.
5. Discuss about the care of a child admitted to hospital in state of coma.
6. List the possible causes of convulsion in children.

CHAPTER FOUR

CARE OF THE NEW BORN

Learning Objectives:

After studying the material in this unit, the students will be able to:

- Provide basic delivery room care for the new born
- Identify high risk new born as early as possible and able to undertake basic neonatal resuscitation
- Provide proper nursing care for the normal neonate immediately after birth
- Perform assessment of the newborn before discharge
- Detect and manage the common neonatal problems
- Refer neonates with serious problems as soon as possible to higher facilities

4.1 Care of Normal Newborn:

A) Care at birth:

- Clear air way (suction mouth and pharynx)
- Temperature control (dry and wrap with dry cloth)
- clamping the cord immediately after the birth of baby app. 2.5 cm from abdomen

- provide appropriate eye care to prevent Ophthalmia Neonatorum(TTC eye ointment)
- Identification of newborn with mothers name
- Vitamin K injection to prevent hemorrhagic disease of the newborn
- Measurement (Weight, Height, Head circumference)
- Encourage rooming-in immediately after delivery

Assessment of APGAR score:

- 7-10 well adjusted
- 5-7 mild asphyxia
- 3-4 moderate asphyxia
- < 3 severe asphyxia

B) Care in the Postnatal Ward:

- Handle the baby gentle
- Avoid infection (hand washing)
- Keep the baby warm
- Encourage and initiate exclusive breast feeding -4 months of age
- Encourage care of umbilical stump
- Give immunization (BCG & OPV0)

C) Assessment of the newborn before discharge:

- Take vital sign
- Check for sign infections (eye , cord ,skin)

- Check for birth trauma (cephalohematoma, fracture..)
- Check for anomalies (spina-bifda, imporforate anus, club foot…)
- Carryout systematic examinations (head to foot)

D) Classification of the newborn:

Newborns are classified based on their gestational age and birth weight.

Gestational age defined as:

- Preterm defined as gestational age below 37 complete weeks
- Term defined as gestational age above 37-42 weeks
- post term defined as gestational age above 42 weeks

Classification of Newborn by birth weight:

Low birth weight *(LBW*- is defined as birth weight < 2.5 kg , they may be Preterm or small for gestational age (SGA)

Very LBW - birth weight < 1500gm

Large for gestational age (LGA)- birth weight above 90th percentile.

Appropriate for gestational age (AGA)- birth weight between and 10th and 90th percentile

Small for gestational age-(SGA) – birth weight below 10th percentile

4.2 Causes of Low Birth Weight (LBW):

Fetal:

1. Fetal distress
2. Multiple pregnancies
3. Erythroblastosis fetalis

Placental:

i. Premature separation

ii. Placenta previa

Uterine: Incompetent cervix

Maternal:

1. Pre-eclampsia
2. Chronic illness
3. Infection
4. PROM (prematurerapture ofmembrane)
5. Poly hydrominous >1500ml
6. Nutrition status of the mother

A) Management of low birth weight:

- Clean air way
- Initiate breathing
- Establish circulation
- Keep Warm
- Administer Vit. K
- Administer Silver nitrate or TTC ointment to the eyes
- Apply gentian Violet to the cord
- Feeding- Breast feeding
- NGT feeding
- Parental feeding
- Treat anticipated problems (infection)
- Hypothermia (cold injury). If Rectal temperature is < 350C
- Hyperthermia temperature >38.50C

Normal temperature:

- Rectal 36.5 - 37.20C
- Axillary 36.5 - 370C
- Hyperthermia caused by
- Excessive environmental temperature
- Infection
- Dehydration (loss of ECF, Evaporation)

B) Potential Deaths Averted:

Cause	percentage	Number
Diarrhea	40-60	24,000-36,000
Tetanus	80	450,000
Pneumonia	40	300,000
Sepsis/ meningitis	40-60	110,000-250,000

Where should the focus be for Perinatal/neonatal programs?

- Globally most births occur at home
- Most prenatal / neonatal deaths at home within the first week
- Sick babies are rarely identified by families or health workers referred to facilities in time to prevent death

Few health facilities are available to provide sophisticated neonatal care

Focus for prenatal and neonatal programs:

- In relation to neonatal mortality reduction, preventive approaches will be more effective and more feasible than curative care
- Many of the known proven interventions could be provided by skilled attendants and by informed family members.

Immediate Newborn care:

- Drying, wrapping, close contact with mother
- Immediate breast feeding
- Prophylactic eye care, where appropriate

Routine Newborn Care:

- Exclusive breast feeding, counseling for problems
- Maintenance of body temperature
- Clean cord care
- Early postpartum visit for mother and baby (within 3 days)
- Recognition of danger signs; treatment and referral as needed
- Immunization

Special Newborn Care:

- Special care for the sick children
- Recognition and management of birth asphyxia
- Recognition and management of infection
- Special care for the LBW infant
- Skin – to- skin / kangaroo mother care
- Close surveillance for signs of infections and feeding difficulties

Common causes of infants and childhood morbidity:

- Perinatal period: From 28 wks of gestation - one week of life after birth

Cause of morbidity:

- Perinatal asphyxia - Respiratory distress
- LBW
- Birth trauma
- Perinatal infection

1. Common Neonatal Problems

A. Due to maternal origin

- Amniotic fluid infection
- Obstructed labor
- Congenital syphilis

Placenta previa

- Causeless
- Toxemia of pregnancy
- Recurrent and the bleeding is painless

Gestational Hepatitis

B. Due to fetal and maternal origin

- Premature separation of placenta
- Trauma Abruption placenta

- Causeless
- Accidental
- Painful(rigid)

C. Due to fetal origin

- Compression of umbilical cord
- Congenital abnormality
- Obstructed labor /mal presentation

Clinical manifestation:

Apnea - the cessation of respiratory movement for 15 second

Pale or cyanotic

Less than normal tactile movement / stop movement

5 - 7 mild asphyxia

Management

High-risk mother should be identified at ANC to institute resuscitation measure immediately after delivery.

2. Respiratory distress (RD)

Cause:

- Me conium aspiration
- Congenital pneumonia (By aspiration of Amniotic fluid)
- Metabolic problems (Acidosis, Hypoglycemia, Hypertension)
- Congenital heart disease

- Anemia
- Drug (narcotic)

Clinical Manifestations:

- Tachypnoea
- Intercostals muscles retraction
- Flaring of Alai nasi
- Cyanosis

Management:

- Resuscitation
- Oxygen administration
- Fluid administration
- Warm - heat

3. Congenital pneumonia

It is caused by aspiration of amniotic fluid or ascending infection.

- Predisposing factors:
- Prolonged labor
- Prolonged rupture of membrane
- Difficult labor

4.3 Perinatal and infant infections:

1. Neonatal sepsis

Causes:

- Streptococcus
- E. coli
- Premature rupture of membrane (PROM)

Four routes of infection:

- Transplacental
- Ascending infection
- Bacterial colonization
- Environmental

Clinical Manifestation:

- Hypothermia
- Apnea, respiratory distress
- Failure to feed
- Vomiting and jaundice

Management:

Antibiotic (Gentamycin 5-7mg (kg) TID for 14)

Neonatal meningitis: is an infection of brain caused by sepsis or bacteria in the blood stream.

Management:

- Ampicillin 200mg/kg. 24 hr in 4 divided dose
- Gentamicin 5-7 mg/kg/ 24 hrs TID 14 days
- Neonatal pneumonia: is an infection of lung tissue in neonatal period.

Route of infection:

- Transplacental
- Amniotic fluid infection
- Environment
- Instrument

Other Neonatal problems:

- Congenital abnormalities
- Prematurity and related problems
- Jaundice
- Birth Trauma

4.4 Post neonatal and infant morbidity:

Causes of infant morbidity:

- Acute upper respiratory infection
- Diarrhea
- Hypertrophy of tonsils and adenoids
- Bronchopneumonia

- Pyrexia of unknown origin
- Acute Bronchitis
- Malaria
- Inflammatory disease of eye
- Accidents
- Other helemintisis

Toddler (1-3 year)

- ARI
- Diarrhea
- Measles
- Malnutrition
- Preschool
- ARI
- Measles
- Diarrhea
- Malaria
- Malnutrition
- Whooping cough
- Parasitosis
- Skin disease
- TB
- Accident

4.5. Neonatal resuscitation:

During the initial resuscitation efforts, a 100 % oxygen concentration is administered to the neonate. As soon as the infants condition is stabilized, the concentration is adjusted to maintain the PO2 (partial pressure of oxygen in the blood) within acceptable limits. This adjustment is essential, since elevated pao2 levels can cause irreparable damage to retinal vessels. Furthermore, high oxygen concentrations can directly injure lung tissue premature infants with immature lungs and eye vessels are at particular risk for two conditions that are a direct result of oxygen toxicity: retrolental fibroplasia and bronchopulmonary dysplasia.

4.6 Fever:

Fever in children is common and can have many causes. In many cases you will make the diagnosis of non- specific virus infection. This may be true, but such a diagnosis is difficult to prove and should never be made without taking a careful history and performing a proper examination in any child with fever.

NB. Remember to ask for any contact with infectious diseases.

Think of malaria and take a blood film. If you still do not have a definite cause for the fever, rule out:

A. Malaria: one negative blood film report does not exclude malaria
B Early measles: look for koplik's spots
C Pneumonia: look at the child for flaring of nostrils, rate of breathing, Lower chest in drawing
D Otitis media: check eardrums
E Meningitis: neck stiffness, irritability
F Urinary tract infection: check urine
G Tonsillitis: look at the throat
H Relapsing fever: take blood film for haemo parasite

4.7 Convulsions:

Convulsions are much common during the first two or three years of life than at any other period. This is not only due to congenital malformation or perinatal injury to the central nervous system but also the frequency of "febrile "convulsions in response to a rapid rise of temperature at the onset of acute infective illnesses

Causes:

1. In the neonatal period the major causes of convulsions are

- Congenital defect of the brain
- Cerebral damage occurring during the process of birth from hypoxia or trauma both account for 90 % of the cases.

The remaining 10 % includes:

- infection of the brain (meningitis)
- hypoglycaemia
- hyperbillirubinaemia with kernicterus etc

2. during early childhood (until about the age of 6 years)

- Infections both (intra and extra cranial) are the most frequent causes of convulsions
- Febrile convulsions between age of 6 months and 3 years and rare after this period
- At the age of two idiopathic epilepsy begins to accounts for an increased proportion of cases.

3. at later childhood and adolescence

- 50 % of recurrent convulsions have idiopathic origin

The remainders are organic and most frequently have originated from some brain injury sustained in the early year of life

4.8. Feeding Recommendations during sickness and health:

Up to 4 months of age

- Breast feed as often as the child wants, day and night, at least 8 times in 24 hours.
- Do not give other fluid of fluids
- Expose the child to sunshine for 20 to 30 minutes daily

4 months up to 6 months

- Breast feed as often as the child wants, day and night , at least 8 times in 24 hours
- Add complement foods mashed potatoes softened with milks cereal and legumes mixed with milk
- Give these foods with cup and spoon 1 or 2 times per day in addition to breast feed.
- Expose the child to sun shine for 20 to 30 minutes daily.

6 Months up to 12 months.

- Breast-feed as often as the child wants.
- Give adequate servings of shiro fitfit, Merek fitfit, porridge, made of cereal and legume mixes, mashed potatoes and carot, mashed gommen, egg and fruits.
- Give adequate servings of:Porridge made of cereal and legume mixes. Shiro, kik, merek fitfit, mashed potatoes and carot, gommen,undiluted milk and egg and fruits

- Add some extra butter or oil to child's food
- Give these foods:-3 times per day if breastfed 5 times per day if not breastfed
- Expose child to sunshine

12 months up to 2 years:

- Breast feed as often as the child wants, Give these foods 5 times per day
- Give adequate serving of: porridge made of cereal and legume mixes. Shiro, kik, merek fitifit mashed potatos and carrot, gommen, undiluted milk and fruits
- Add some extera butter or oil to child food
- Give these foods 5 times per day

2 years and older:

Give family food at least 3 times each day.

Also twice daily, give nutrious food between meals, such as: egg, milk, fruits, kita, dabo

Study Questions

1. List the common causes of low birth weight.
2. Discuss the focus areas to prevent prenatal and neonatal mortality.
3. What are the common causes of infant and childhood mortality?
4. What are the common causes of respiratory distress in newborns?
5. List common routes of infection in neonates?

CHAPTER FIVE

CONGENITAL ABNORMALITIES

Learning Objectives:

- After studying the material in this unit, the students will be able to:
- Define congenital abnormality
- Recognize the common types of congenital abnormalities and check each newborn baby to be sure that there is no congenital abnormalities
- Recognize the recommended treatment for each type of congenital abnormality
- provide appropriate care for children with congenital abnormalities

5.1 Introduction:

Congenital anomalies are structural anomalies present at birth. They may be obvious on examination of the newborn or they may be detected by histological structures.

One reason why more deaths occur in the first than during the remaining months of the first year of life is that many

congenital abnormalities are compatible with intrauterine life, but not with extra-uterine life approximately 15 % of death in the neonatal period care caused by such gross malformations.

5.2 Types of commonest congenital anomalies

1. Cleft lip and palate
2. Club foot
3. Umbilical hernia
4. Pyloric stenos
5. phemosis and paraphimosis
6. Spina bifida and hydrocephalus.

5.2.1. Cleft lip and palate

Cleft lip and palate are congenital deformities due to the failure of various parts of the upper lip and palate to fuse in the normal manner. Both may be present together. Cleft lip is operated on about the age of three months, cleft palate about the age of one year before speech detects have developed.

Cleft lip: may be unilateral or bilateral and may be extended up into nostril. The surgeon pares the age and stitches them together.

Preparation: The child should be admitted several days before operation and observed for sighs of a cold, as operation should be delayed if this is present and throat swabs should be taken.

The hemoglobin must be 70% before operation is undertaken. He is trained in spoon feeding, putting the feeds well to the back of the tongue.

After care:

The arms must be splinted with card board so that the child can not touch the wound. Crying must be prevented by good nursing care and lifting the mother to spend much of her time with the child. Drugs may be given to keep the child quiet. It should be ensured that no visitors with colds come to see the child. The stitches are taken out on the third to fifth days. Soft feeds are given by spoon well back on the tongue and followed by sterile water.

Cleft palate: is treated similarly by paring the adages and suturing after cutting on either side.

Preparation The child should be admitted well before operation to be accustomed with the environment. He should be trained on spoon feeding. His general condition must be improved and he must not be exposed to infection.

After Care:

Arms must be splinted

Soft feeds are given by spoon placed well back on the tongue and followed by sterile water.(others similar on cleft lip after care)

5.2.2 Club foot

Club foot is a foot which has been fell out of shape or position in uteri and can not be moved to uncorrected position.

The two most common types of club foot are:

Talipes equinovarus

Talipes calcaneovalgal

Both types are usually bilateral. In Talipes equinovarus, the foot is fixed in palantar fixation and deviates medially i.e. the heel is elevated.

The child walks on the toes and outer border of the foot. More than 95% of case of congenital clubfoot are of this type.

In Talipes calcaneovalgal as the foot is dorsiflexed and deviates laterally, i.e the heel is turned outward, and anterior part of the foot is elevated on the outer border. The child walks on the outwardly turned heel and the inner border of the foot.

Treatment and Responsibility of the Nurse

Treatment should be started as soon as possible. Delay makes correction more difficult, since the bones and muscles of the leg develop abnormally, and the tendons will be shortened.

In infancy, the application of cast to hold the foot in correct position may be used the nurse may be responsible for immobilization and holding the child during cast application. If this measure fails to correct, the surgery on the tendons and bones may be done in early childhood, and the leg and food placed in a cast. If the child has undergone operation and cast has been applied the nurse must watch for evidence of impairment of circulation or sensation and bleeding, i.e., for discoloration of the cast over the wound and report these observations to the physician. The nurses circle the area of discoloration and write the time this was done on the cast. After operation it is necessary to change the cast every three weeks to bring the foot gradually into normal position and ensure permanent correction. When the cast is no longer needed exercise may be required and parents need advice to return for checkup.

5.3 Umbilical Hernia:

An umbilical hernia is a protrusion at a portion of the intestine through the umbilical ring, muscle, and fascia surrounding the umbilical cord due to imperfect closure or weakness of the umbilical ring. The clinical manifestation is a swelling at the umbilicus which is covered with skin. This protrudes when the infant cries or strains. It can be reduced by gentle pressure over the fibrous ring at the umbilicus. The contents of the hernia are small intestine and omentum.

Treatment and Responsibilities of the Nurse

- Most small umbilical hernias disappear without treatment, but large ones may require operation. These hernias rarely cause incarceration or strangulation of the bowel.
- If the physician orders the hernia to be taped, the hernia is first reduced by gentle pushing the abdominal contents back through the umbilical ring.
- A 2 inch strip of adhesive tape can be applied to the abdomen over the skin covering the umbilical hernia.
- Usually operation is not done on an umbilical hernia unless it becomes strangulated, enlarges or persists to school age.
- Postoperative nursing care requires no special technique. The child may be as active as his desire. A normal diet and fluid may be given; pressure dressing applied at the time of operation must be kept clean and dry to prevent wound contamination.

5.4. Congenital Hypertrophic pyloric stenosis

This is a common surgical condition of the intestinal tract in infancy. It occurs most frequently in some family strain, in first-born infants, and in males. Pathologically, there is an increase in size of the circular musculature of the pylorus. The musculature is greatly thickened, and the resulting tumor like mass constricts the lumen of the pyloric canal. This impedes emptying of the stomach content through the constricted pylorus.

Clinical manifestations and x-ray, finding

The symptoms appear in infants 2-4 weeks old. The initial symptom is vomiting during and after feeding. The vomiting is at first mild, becomes progressively more forceful until it is projectile. Since little of the feeding is retained the infant is always hungry. There is either failure to gain weight or loss of weight. The signs of pyloric stenosis, dehydration with poor skin turgor, distention of the epigastrium and an olive-shaped mass, located by palpation, in the right upper quadrant of the abdomen. If barium is added to the feeding, an x-ray film will show the enlargement of the stomach, and the narrowing and enlargement of the pylorus, increased peristaltic waves, and an abnormal retention of the barium in the stomach.

Treatment

Pyloromyotomy involving longitudinal splitting of the hypertrophied circular muscle of the pylorus without incising the mucus membrane allow more food to pass through.

Preoperative care

- Correction of fluid and electrolyte imbalance since a dehydrated infant is at surgical risk.
- After rehydration, whole blood, vitamin B, C and K are given as needed.
- Just before operation NG tube is passed.
- Feedings must be recorded.

Post operative care

- IV fluids for the first few days
- Position the infant on side or abdomen and prevent aspiration of vomits.
- Frequent change of position
- Watching for indication of shock (rapid, week pulse, cool skin, pallor, and restlessness)
- Observing the abdomen for distention
- The mother's breast milk is expressed and given as soon as he can tolerate it
- Prevention of wound infection

Prognosis: The prognosis is excellent complete relief follows successful surgical repair. The mortality rate is low, proceeded operation is undertaken before the infant has become too dehydrated and malnurished.

5.5. Phimosis and paraphimosis

Phimosis is a tight for skin, i.e, a fore skin or prepuce which has a very small opening, so that it may interfere with the passage of urine and can not be drown back over the glanis penis for cleansing. In severe case this will prevent the scape of urine, so that the fore skin is distended during mictaration, and the infant screams with pain and strains during the act.

Paraphimosis, a condition due to a tight foreskin being pushed up and constrict the circulation, causing swelling of the parts below so that the foreskin cannot be pushed down again, and requiring operative treatment.

Treatment:

- Circumcision, cutting away the foreskin
- After this operation the wound must be kept clean, antiseptic dressing applied, and the parts cleansed after passing of the urine.
- Mild cases of phimosis can be relieved by gradually stretching the foreskin by pulling it back over the glanis penis, so that operation is avoided.

5.6 Spina Bifida

Spina bifida is a malformation of the spina in which the posterior portion of the laminae of the vertebrae fails to close. It may occur in almost in any area of the spina but most common in lumbosacral region.

It is the most common developmental defect of the central nervous system occurring in about one of 1000 newborn infant.

The three types are:

1. spinabifida occulta in which the spinalcord and meninges are normal, the defect being only of the vertebrae,
2. Meningocele, in which the meninges protrude through the opening in the spinal canal.
3. Meningomylocele, in which both the spinal cord and the meninges protrude through the defect in the bony rings of the spinal canal. Meningomyelocele is the most serious one.

Spina bifida occulta:

The majority of patients with spina bifida occulta have no symptoms. Some may have a dimple in the skin or growth of hair over the malformed vertebra. There is no need for treatment unless neurological symptoms indicate that the

defect is greater than was thought. If there is possibility that the spinal cord may be involved in the defect, surgical treatment is indicated.

Meningocele:

On examination the newborn infant is found to have a defect on the spinal column large enough to protrude through the opening. There is generally no evidence of weakness of the legs, the infant straitens and kicks in normal manner, or if lack of spincter control, though this is difficult to a certain in the newborn. The prognosis is excellent if surgical correction is done on this defects. Hydrocephalus may be an associated finding or may be aggravated after operation for a meningocele.

Meningomyelocele:

In this condition an imperfectly developed segment of the spinal cord as well as the meninges, protrudes through the spina bifida in the lumbosacral region. There may be a minimal weakness to a complete flaccid paralysis of the legs and absence of sensation in the feet.

Operation removes a cosmetically unacceptable deformity, prevents infection and in many instance improves the neurological deficit since obstruction is removed from the nerve path ways.

Responsibilities of nurse preoperatively in Meningomyelocele
Until the operation is performed the newborn should be kept flat on his abdomen with sterile pad over the lesion.
No pressure over meningocele sac.

Prompt surgical closure of the skin defect preferably within 24 to 48 hours after birth is done to prevent meningeal irritation.

Responsibilities of Nurse post operatively:

- Observing and reporting of all signs and symptom of the infant's condition.
- Temperature, pulse, and respiration (vital signs) must be noted frequently.
- Symptoms of shock must be noted
- Oxygen must be kept near to bed
- Abdominal distension caused by paralytic illus or distention of the bladder following most spinal cord surgery should be reported.
- The surgical dressing must be kept clean and dry.

5.7 Hydrocephalus:

Hydrocephalus is a condition due to inadequate absorption of cerebrospinal fluid with a corresponding increase of fluid under pressure within the intracranial cavity to obstruct within the ventricular system.

The obstruction inflow cerebrospinal fluid may be due to one of several causes.

- Congenital mal development of the ventricular foramina.
- Neoplasm may be present or fibrous residue making it may occlude the reabsorptive surface.
- Hemorrhage from trauma may cause hydrocephalus in the young infant.

The accumulation of fluid in the ventricles generally enlarges the infants skull, since the suture are not closed and the bones are soft.

Treatment: should be started as soon as the clinical manifestations are observed, before damage to the brain itself. Several shunting procedures are now in use eg. Ventriculovenostomy (shunting from the ventricle through the internal juqular vein to the right atrium of the heart), ventriculo peritoneostomy, ventriculoureterostomy, and lumbar subara-chnoid pertoneostomy.

The prognosis is dependant to a great extent on the promptness of treatment and the kind of operation performed.

Responsibility of the Nurse:

- Observing the degree of irritability and changing vital signs should be reported promptly.
- Frequent change of position to prevent hypostatic pneumonia and danger of pressure sore.

- If pressure areas develop, great care must be taken to prevent infection.
- When lifting head must be supported in order to prevent trauma.

Postoperative care:

- The temperature, pulse and respiration should be observed every 15 minutes until the infant is reactive.
- Signs of increased intracranial pressure (irritability, bulging of the fontanel, lethargy, vomiting, elevated systolic blood pressure, change in the pulse and respiration rate, change in body temperature must be recorded and reported.
- If temperature is elevated tepid sponging may be used or aspirin may be given.
- IV fluid must be given slowly until the infant can be fed orally.
- Mucus from nose and mouth should be aspirated to prevent the danger of aspiration.
- The child should be turned at least every two hourly.

5.8 Neonatal Jaundice:

Jaundice is a yellow discoloration of the skin, sclera and mucous membranes caused by high serum bilirubin. Bilirubin is the main pigment formed in humans during the catabolism

of the hem component of hemoglobin. Either excessive production or defective elimination of bilirubin causes jaundice.

- Physiologic jaundice resolves spontaneously by the end of first week in term infants and 2nd week in premature infants.
- Serum bilirubin is usually under 12 mg/dl in term infants and less than 15mg/dl in premature babies.
- Jaundice within 24 hrs of birth; conjugated bilirubin over 12mg/dl; or jaundice beyond 2nd week of life is pathological

Causes:

- ABO/RH incompatibility
- Red cell membrane defects
- RBC enzyme defects
- Polycythemia
- Infection

Management of pathological jaundice

- Enhancing conjugation by induction of glucuronyl transferase with phenobarbiton
- Changing insoluble bilirubin to a water soluble form by phototherapy
- Removing excess bilirubin by exchange transfusion.

Study Questions

1. Discuss the role and responsibility of nurse in identifying and caring for a child with congenital abnormality at birth
2. List the most common congenital abnormalities that can be detected at birth
3. What measures would you take concerning parents who had a baby with congenital abnormality?

CHAPTER SIX

NORMAL GROWTH AND DEVELOPMENT

Learning Objectives

After studying the material in this unit, the student will be able to:-

- Identify the difference between growth and development
- Recognize stages of normal growth and development
- Detect deviation from normal growth and development measures to be taken
- Use growth-monitoring chart to assess nutritional status of under 5 children
- Recognize needs of the growing child

Definition: Growth means increase in size, Development means increase of function. Growth and development go together but at different speeds.

The fetus: during the first trimester the main body systems are prepared. This is mainly the stage of development, when the body systems become more efficient

Harmful environmental factors, such as infections like rubella (German measles) in the mother, or exposure to certain drugs or X-rays may interfere with the development of the fetus at this stage. The child may be born with certain deformities, e.g. congenital heart disease, deafness, small head and brain. During the last 6 months the fetus increases greatly in size. This is mainly stage of growth. Malnutrition or amaemia in the mother, or other disease of placenta like malaria interfering with its blood supply, will stop the fetus growing properly. The baby may thus be born small, not weighing as much as he should.

The infant: growth and development is a continuous process, but it often goes fast for a while and slows down before going fast again. The infant needs a relatively large amount of water, energy, and protein while growing so fast.

6.1 Growth

The body can grow only if it gets enough good food. The food must contain enough calories, protein, and other nutrients. If the body does not grow properly it can not resist diseases either. The best way to measure growth is by weighing. Other ways are by measuring length (height) and the arm circumstances.

The figures below are average figures for normal growth.

Table 1. Normal growth and development

Age	Weight	Length	Arm circumference
Birth	3.5 kg	50 cm	
½ year	7 kg		
1 year	10 kg	75 cm	12.5cm
2 year	12 kg		
3 year	14 kg		
4 year	16 kg	100 cm	
5 year	18 kg		

Head circumference:

Below normal range-abnormally small = microcephalus

Above normal range-abnormally large head = usually hydrocephalus

The infant has relatively larger head than the adult. At birth the head is a quarter of the whole body length but in an adult it is only one eight.

Head Circumference: The head grows 12 cm in circumference in the first 12 months, but 6 cm of this is in the first three months; during the next three months it grows 3 more cm and

the rest of the year another 3cm. If the head circumference at birth is 34 cm it will be 46 cm at the age of 12 months. The head circumference is measured by taking the greatest distance around the forehead and the back of the head above the ears (maximal fronto-occipital circumference)

Arm circumference: The circumference of the middle of the upper arm remains nearly constant from 1-5 years.

Tooth eruption: Children start teething at the age of 6 months. A new teeth appears approximately every month. This makes the number of teeth roughly equal to the age in months minus six. At the age of 6 years the permanent teeth start to appear.

6.2 Development:

actors promoting development:

Nutrition: Good nutrition is the base for normal growth and development. Unlike most other organs in the body, the brain is not fully developed at birth. The first six months of life are extremely important as the brain may suffer for the rest of life, if the child is not getting enough food. A malnourished child is often tired and apathetic and not interested in learning new things that will promote normal development.

Emotional Support: The first years of life are the most important for the development of the child. It is very important to realize that a child is a growing and developing human being and he ought to be treated very carefully with love and respect by everyone so he can develop in harmony. He needs full emotional support. Here are six important aspects of what every child needs.

Love: a child who does not feel loved will not develop properly, and will not learn as quickly as normal children. Instead he becomes sad, lonely and no longer interested in what goes on around him.

Security: a child needs to feel safe. He can only feel safe if his parents show that they love him and take good care of him. He must know that his parents will look after him and help him, that they will feed him when he is hungry, play with him and keep him happy and comfortable. The love and security the child gets from his parents and family helps him to feel friendly to people outside his family when he grows up. Acceptance as individual: the young child needs to know that his mother and family love him for what he is. They should not compare him with other children and tell him that he is slow to do this or that, or that he is not as good as some other child. They should show him that they respect him as an individual with his own likes and dislikes, that they realize that he is different, as all children are different.

Recognition of achievement: the young child needs to know that his parents are happy and pleased when he has learned to do some thing new. His parents help him to do things and encourage him in his achievement. Wise and consistent use of authority: children need to know what they can and what they cannot do. Parents must teach children how they are expected to behave.

Independence: as the child grows he needs to be allowed to decide more and more things alone.

Playing: another important factor contributing to the development of a child is plying. Encourage playing even if it may be noisy sometimes. It helps physical, mental and social development and is also good for health. All normal children like to play. If a young child does not play, he may be ill.

Language training: adults should talk and sing with small children and encourage them to talk about what they are thinking. Do not laugh when children are talking; try to understand how they are thinking and be happy when they want involve you in their world.

Age periods and developmental milestones:

The development of a child can be assessed from different points of view.

- What he can do in the way of moving around (motor development)
- How he talks and makes his wants known (language)
- How he fits into his family and community (social behavior)

The various skills the baby and young children learns are called Milstones. In watching development we notice at what age the child learns to do certain things, such as smiling at his mother, sitting without support, grasping objects with his hands, walking and talking. We may record at what age the child has reached these various milestones.

All children are different. Some walk early others late. The average age at which children reach various milestones is given below. The individual child often differs widely from the average but is still quite normal.

Table 2. Summary of normal developmental milestones:

Average age	motor development	Language & social behaviors
1 month	can lift head when prone	can fix with eyes, often smiles
3-6 months	good head control	can follow an object with eyes, & play with hands
6-9 months	can sit unsupported	grasp actively, makes loud noise
9-12 months	able to stand	understand few words, tries to use
12-18 months	able to walk	grasp small objects with thumb and fingers
2 years	able to run around	can say several words, or even as much as he wants some sentences
3 years	actively plying, is clever in climbing and jumping	starts talking much

Study Questions

1 . List factors that affect growth and development of fetus.

2. Discuss the differences between growth and development.

3. List factors that promote normal development in children

CHAPTER SEVEN

NUTRITION AND NUTRITIONAL DEFICIENCIES

Learning Objectives:

After studying the material in this chapter the student will be able to:

- Identify the common causes of infant and child morbidity and mortality
- State the most common complication of malnutrition and their management
- List the most common forms of malnutrition in the developing Countries and their management
- State the purpose of screening and identify children who need appropriate management
- Perform weighing of babies under 3 years of age and interpret the weight according to weight for age chart
- Classify nutritional status of children and manage accordingly including nutrition education.

7.1 Normal feedings patterns:

The main rule for feedings children

- Only breast milk during the first 4 months start adding porridge at 4 months.
- Add some protein to every meal after 4-5 months of age. Plain porridge is not enough for more than a few weeks.
- Add fruits and vegetable to at least one meal every day start when the child is 4 months old.
- Give a child at least three meals /day. Infants may require four to six small ones.
- Continue breast feeding until the child is able to manage on other foods probably this will be at 18-24 months of age.
- Use the common local carbohydrate food and add a suitable protein food.
- Prepare balanced meals. Make sure that the added protein is well mixed with the staple
- Carbohydrate food and that both are given in a suitable amount.

A) Breast-Feeding:

The food for babies is undoubtedly human breast milk. Nurses and midwives should encourage and support mothers to breast feed even if it is only achieved for a few weeks. However, if a mother has decided, for what ever the reason,

to use a milk formula method of bottle feeding she should be given the same support, understanding, and help as the mother who breast feeds.

Good Reasons for Breast-feeding:

1. Promote bonding between mother and child.
2. Many infections are far less common in breast fed babies.
3. The fat in human milk is better absorbed than the fat in cow's milk
4. The danger of giving an over concentrated or a too diluted formula milk is avoided
5. The risk of eczema, asthma, and other allergic disorders is considerably reduced
6. Low birth weight and pre-term infants thrive best on breast milk
7. It helps for mental development

Preparation for Breast Feeding:

Ideally preparation for breast-feeding should be part of a health education program for both boys and girls while in secondary school. This early awareness should be expanded in antenatal sessions for both parents when baby is expected. This session should include:

1. Knowledge of the physiology of breast feeding
2. Management and comfort of breast and nipples
3. The importance of a well balanced diet during pregnancy

and of the need of extra protein and calories while breast feeding.

4. Practical demonstration and discussion with a breast-feeding mother

Management of Breast-Feeding:

Immediately after birth, while the mother still in the delivery room, all mothers should have the opportunity to hold the baby for 10-15 minutes quietly and contently. If the mother tends to breast-feed, she should suckle her infant for 1-2 minutes at each breast. Skin-to- skin contact and early suckling are important at this time in promoting “bonding” and to encourage the release of the prolactine and oxytocine hormones which stimulate milk secretion and help the uterus to contract.

B) Weaning Food:

The age at which solid foods can be introduced to the infants depend upon individual family circumstances. Most authorities agree, however, that it should be some time between 3 and 6 months of age for the normal healthy infant.

Principles of weaning:

1. Start with one food at one feed time, offering a small quantity only
2. Introduce new foods one at a time at 3-4 day intervals

3. Introduce second meal after 3-4 weeks. Include iron containing foods, e.g. liver, green vegetables
4. As solid foods increased and milk volumes reduced, remember to offer dilute fruit juice or water from a cup to infant atleast twice a day particularly during hot weather.

7.2 Assessment of Nutritional Status:

Growth Monitoring:

The first step in appraising the growth of a child is by comparing the child with others of the same age and sex. A child, generally, is healthy if she/he grows well and gains weight. When a child is not growing well, he is probably not healthy. The causes for this ill health could be infection or inadequate food intake. Because of these, the growth of a child will slow down or stop months before clear signs of protein energy malnutrition (PEM). Thus, measuring the growth of a child helps to understand if the child is healthy or not. Growth monitoring is particularly important for follow-ups for children under 3 years of age. You are advised to refer growth-monitoring chart.

How to interpret the growth chart:

The first sign of protein energy malnutrition (PEM) is growth failure. Weighing a child regularly on a growth chart and understanding the direction of the growth line are the most important steps in detection of early malnutrition.

Table 3. Gomeze classification of Nutrition Status

Weight for age/reference weight	Edema present	Edema absent
60-80%	Kwashiorkor	Underweight
< 60%	Marasmic Kwashiorkor	Marasmus

It is very important to follow subsequent measurements and plotting, to watch the direction of the line showing the child's growth.

Table 4 Interpretation and the findings of growth charts

Indication	**Child's condition Good gaining weight**	**Danger sign Stagnant**	**Very Dangerous Losing weight**
Indication of the growth Monitoring chart			
Interpretation	Child is growing well	Not gaining weight Find out why Poor nutrition infection	Losing weight may be ill, needs care
Intervention	Complement the mother	Instruct the mother, support her	Careful counseling return soon, admit or refer

7.3 Protein Energy Malnutrition

The most common form of malnutrition in the world today is that associated with diarrhea, as well as an inadequate diet in the young children. The side effects of malnutrition include hypoglycemia, hypothermia, hypotonic and mental apathy. Severe malnutrition (Kwashiorkor and Marasmus) contributes to high mortality and morbidity of children less than five years in developing countries and to mental and physical impairment in those who survive.

A) Kwashiorkor:

The most acute form of malnutrition is generally found in a child of 10-14 months who has had an excessive carbohydrate diet containing relatively little protein. Edema and enlargement of liver may later mask a slight loss of weight. Coldness of the extremities is well marked and the child is miserable but apathy when anorexia and/or diarrhea set in, there is loss of weight in spite of edema. This marsmic stage may be due to mal absorption rather than deficiency in caloric intake. Chronic cases show depigmentation of skin and hair, with the hair losing its luster, becoming straight, dry and sparse.

Marasmus:

This condition, seen in children whose weight is markedly

below normal for their length is described as state of starvation. A general deficiency of protein and energy has occurred, leading to severe wasting of subcutaneous fat and muscle tissue. It often occurs between the ages of 6 months and 18 months. The marasmic child appears as a wizened old man in appearance, with loss of most fatty tissue, shriveled buttocks and emaciated limbs. Many of the signs of kwashiorkor, such as edema, skin rash and hair discoloration are absent. There is a general slowing of all body processes in response to the starvation. The marasmic child is often hungry and willing to eat when offered food.

Treating Severe Malnutrition:

1. Food is the only cure for malnutrition. If a child is to be cured, he must be able to eat high protein and energy diet and his family must have enough food for him. If he does not want to eat, we have to feed him through a tube in health facilities.
2. The danger signs that show that a malnourished child needs treatment quickly are edema, apathy and not eating well.

Initial Treatment

- Give him a capsule of vitamin A
- If necessary rehydrate him
- Keep him warm, either close to his mother or well covered

- If he is apathy prevent hypoglycemia by IV glucose administration
- Treat skin or chest infection with an appropriate antibiotic

Later treatment

- Give him high protein foods by mouth later or as soon as he eats
- Give him iron mixture after the first week of treatment and continue until his hemoglobin is normal
- Explain the mother the importance of diet treatment and make sure that she understands that food not medicine is curing him
- Caring for a malnourished child:
- In addition to diagnosis of PEM there are five things we have to know
- How severely malnourished is he?
- His weight chart is useful
- What other diseases has he?

Many children with PEM have infections and some lack Vitamins

Which of the six rules of good nutrition have been broken?

- Breast feeding until at least 18 months
- Start supplementary diet at the fourth month
- Add protein foods to supplementary diet
- Give children four good meals a day

- Give protective foods to children over four months old (fruits, vegetables)
- Sick children need more feeding

Why have the rules been broken?

- Poverty?
- Lack of knowledge?
- How could his mother feed him?

Prevention of malnutrition

The following are some of the important approaches in prevention of malnutrition in children.

- Encouraging and protecting breast-feeding
- Improving weaning practices by using local foods.
- Screening of infants and children at risk for malnutrition and give them
- Special attention
- Providing nutrition rehabilitation especially in households.
- Integrate nutrition education into primary health care (PHC).
- Ensure regular supervision in clinics and visiting in homes by inspection and growth monitoring

E) WHO/IMCI Classification of PEM/Anemia

Look and feel;

- Visible severe wasting
- Look for palmer pallor (some/severe)

- Look for edema on both feet
- Determine weight for age

Table 5. Classification of malnutrition:

Signs	classification
Severe visible wasting or Severe palmer pallor or Edema on both feet	severe malnutrition/severe anemia
Some palmer pallor or Very low wt. For age	anemia or very low weight

7.4 Micro-nutrient/Vitamins deficiencies:

Vitamins are groups of organic substances not synthesized by the human body but essential as catalysts of cellular metabolism and thus for normal growth. Since the body doe not manufacture vitamins small amounts must be included in the diet. Some are soluble in fat and are ingested in dietary fat (vitamin A, D, E and K), and some are water soluble (Vitamin B complex and Vitamin C).

Vitamins; Functions and Deficiency

1. Vitamin A

Normal growth, normal vision, normal reproduction

Maintenance of epithelial cell structure and function

Immunity to infection

Deficiencies results in:

- xerophthalmia, (night blindness, conjunctiva dryness, Bitot spots, Keratomalacia, and even eyeball perforation and blindness)
- Increased risk of infections (Viral is more).

Excess results in:

- Raised intracranial pressure, irritability,dry skin, hair loss, brittle bones

2. Thiamin (B1)

Carbohydrate metabolism, decarboxylation

Synthesis of fatty acid and Ribose (for RNA)

Deficiency results in: Beriberi manifested by

- Anorexia, emotional disturbances. Parasthesia, weakness, gastrointestinal symptoms
- Dry beriberi (peripheral neuropathy, mental confusion,nystagmus)
- wet beriberi (biventricular cardiac enlargement, systemic venous hypertension, bounding pulse)
- Infantile beriberi (acute cardiac failure)

3. Riboflavine (B2)

- Coenzyme in oxidative –reduction reaction

Deficiency results in;

- Angular stomatitis, cracking and fissuring of lips
- Glositis, papillary atrophy
- Scrotal or vulvae dermatitis
- Photophobia, corneal vascularisation
- Anaemia, hair loss , ataxia
- Personality changes, retarded intellectual development

4. Niacin (nicotinic Acid)

- Oxidative –reduction reactions , fat synthesis, glucolysis
- Deficiency results in: Pellagra (dermatitis, diarrhea, dementia)
- loss of weight, poor appetite, sore mouth, indigestion
- insomina, confusion
- skin erythema, pruritus, discoloration, flaking

5. Pyriodoxine (B6)

- Coenzyme in amino acid metabolism and
- Muscle glucogen phosphorylase

  Deficiency results in:

  Infants: hyperirritability, convulsions, weakness anemia, and dermatitis

6. Folic Acid

- Co-enzyme in pyrimidine and purine synthesis (for DNA,RNA)

Deficiency results in:

- Megaloblastic anaemia
- Mild peripheral neuropathy, retarded growth
- Psychiatric disturbances, gastrointestinal disturbances

7. Ascorbic Acid (vitamine C)

- Formation of collagen, amino-acid metabolism
- Iron and copper metabolism
- Protection against free radicals (oxidents)

Deficiency results in: Scurvy

- ulceration ,poor wound healing, anemia
- Scurvy: irritability , unproductive cough, bone tenderness, sub-periosteal hemorrhages

8. Vitamin D:

- Calcium and phosphate homeostasis
- Normal mineralisation of bone and teeth

Deficiency result in:

- Rickets, Osteomalacia

Excess result in:

- Hypocalcaemia, ectopic calcification
- Failure to thrive

9. Vitamin E (tocopherol):

- Antioxidant (protects against free radicals)
- Preserve cell membrane integrity

Deficiency result in:

- Hemolytic anemia, skin changes
- Encephalomalacia

10. Vitamin K

Synthesis of coagulation factors

Deficiency results in:

- Coagulophathy: haematuria, hematomas, and heamorragic disease of newborn
- Hemolytic anemia may be caused by the water soluble form of vitamin K

Iron deficiency Anemia:

Anemia refers to a deficit of red blood cells or hemoglobin in the blood. It is the most frequent hematological disorder encounter in children.

Etiology:

- 1.Blood loss
- 2.Impairment of red blood cell production

a. Nutritional deficiency

- Iron deficiency
- Folic acid deficiency

Vitamin B12 deficiency

b) Decreased erythrocyte production:

- Pure red cell anemia
- Secondary hemolytic anemia's associated with infection, renal disease, and chronic disorders Aplastic anemias

Invasion of bone marrow by

A, Leukemia

B, Tumors

3. Increased erythrocyte destruction

a. Drugs and chemicals

b. Infections

c. Antibody reaction

d. Burns

e. Poisons including lead poisoning

f. Abnormalities of the red cell marrow

g. Hemolytic disease of the newborn

h. Abnormal hemoglobin synthesis

e.g. sickle cell disease

Clinical Manifestations:

1. The condition may be acute or chronic
2. Early symptoms
    a. Listlessness
    b. Fatigability
    c. Anorexia

3. Late symptoms
    a. Pallor b. weakness
    c. tachycardia d. Palpitation
4. Eventual symptoms
    a. Mental and physical retardation
    b. Cardiac enlargement and symptoms of congestive heart failure
    c. Inability to carry out the usual childhood activities
5. Prognosis
    a. Varies with the type of anemia
    b. death may result because of cardiac failure

Nursing Responsibility:

1. Assessment of the child's condition

Building resistance to infection

Administering blood transfusion as ordered

Nursing management:

1. Administer iron as ordered by the pediatrician
2. Observe for side effects
3. Initiate and reinforce good dietary habits
4. Assist parents to select iron rich foods that are affordable and culturally acceptable
5. Provide care to the underlying causes
6. Administer antibiotics as prescribed
7. Adminiter folic acid or Vitamin B12 as prescribed
8. Teach parents how to administer medications

Study Questions

1. How can a nurse contribute to decrease morbidity and mortality among under five children?
2. What are the important points to observe during screening in under five clinics?
3. What are some of the important approaches in preventing malnutrition among under five children's?
4. During growth monitoring intervention what important points should be considered to promote normal growth and development?

CHAPTER EIGHT

ACUTE RESPIRATORY INFECTION (ARI)

Learning Objectives:

After studying the material in this chapter the student will be able to:-

- Describe the magnitude of acute respiratory infection morbidity and mortality among under five children in Ethiopia
- Identify and use simple clinical signs to classify and treat a child with acute respiratory infection (ARI)
- Distinguish the clinical manifestations of ARI among children under 2 months of age and older children
- Identify danger signs of ARI in infants and children and take appropriate action
- Identify and use commonly available and effective antibiotics against Common etiologic agents of ARI.
- Give advice to the mother on home treatment of ARI.

8.1 Introduction

In Ethiopia 20-25 % of morbidity in under fives is due to ARI. The majority of serious ARI illnesses are due to pneumonia. Almost all ARI deaths in young children are due to Acute Lower Respiratory Infections (ALRI), mostly pneumonia. Acute respiratory infections are anatomically divided into Acute Upper and Acute Lower Respiratory infections. The main objective of ARI control program is to reduce mortality due to pneumonia in children <5 by improving the quality of ARI case management. Present evidence indicates that bacteria play a great role as causes of pneumonia in children. Streptococcus pneumonia and Homophiles influenza accounts for more than 2/3 of all bacteria isolates. Early treatment with antimicrobials that are effective against S.Pneumoniae and H-influenza can prevent deaths from pneumonia in children with a substantial decrease on pneumonia mortality. Almost of all the cases where the ARI may lead to the death of the child can be detected without radio graph or laboratory tests by use of a few simple clinical signs, particularly fast breathing and chest in drawing. Fast-breathing helps to categorize children with cough into two groups with high and low probability of pneumonia and it is a better predictor of pneumonia than auscultatory findings (stethoscope). As pneumonia progresses and becomes more severe, lung elasticity is gradually reduced and chest in

drawing develops. The presence of lower chest in drawing means that the child has severe pneumonia and is at a higher risk of death. Because of the high probability of bacterial pneumonia and the reliability of these two diagnostic criteria, there is a strong justification for the empirical use of antibacterial based on simple diagnostic criteria.

8.2 Management of Children with ARI

The management of children with ARI comprises three essential steps.

- Identify children who should be examined for possible pneumonia
- Identify the case of pneumonia (case classification)
- Institute the appropriate treatment

Examine children <5 for possible pneumonia if they have cough or difficult breathing

Classification and Diagnostic Criteria:

It is necessary to distinguish between infants under 2 month of age and older children because the etiology and clinical manifestations of pneumonia are different in these age groups.

a) Children 2 months – 4 years old

In these age groups, children with cough or difficult breathing are classified in to 4 groups.

- Very severe disease
- Severe pneumonia
- Pneumonia
- No pneumonia

Danger Signs

If any sign indicating complications or severely deteriorated general condition (danger sign) is present, the child is classified as having very severe disease

In this age group the danger signs are:

- Not able to drink
- Convulsion
- Abnormally sleepy or difficult to awake
- Strider in a calm child
- Severe under nutrition

In the absence of any danger sign, a child presenting with chest in drawing is classified as having severe pneumonia. Since many children have slight intercostals retraction in absence of severe pneumonia, in order to avoid and over classification of severe pneumonia and needless referral, chest in drawing is considered present only when the lower part of the chest wall (the lower ribs and lower sternum) is drawn in (or retracts) when the child breathes in. In absence of any danger sign or chest in drawing a child is classified as having pneumonia if s/he has fast breathing that is when the

respiratory rate is above

- 50 per minute (50/m) or more in infants 2-12 months
- 40 per minute (40/m) or more in children 1-4 years

If there are no danger signs, chest in drawing or fast breathing, the child is classified as having no pneumonia cough or cold.

b) Young infant under 2 months of age:

Pneumonia in young infant is classified into 3 groups

- Very severe disease
- Severe pneumonia
- No pneumonia

If any sign indicating complications or severely deteriorated general conditions (danger signs) is present, the child is classified as having a severe disease.

In this age group the danger signs are:

- Stopping feeding well
- Convulsions
- Abnormally sleepy or difficult to wake
- Stridor in calm child
- Wheezing
- Fever or low body temperature

In the absence of any danger sign, a young infant presenting with chest in drawing or fast breathing is classified as having severe pneumonia. Fast breathing is present when the respiratory rate is 60/min or more (counted twice). Due to the

higher chest compliance in young infants, the presence of severe chest in drawing is required to classify an infant below 2 months as having severe pneumonia. There is no pneumonia if there is no danger signs, no severe chest in drawing or not fast breathing. It should be noted that young infants could become sick and die very quickly from pneumonia. For this reason, any young infant who has signs of pneumonia (chest in drawing or fast breathing) is classified as having a severe pneumonia.

c) Treatment of acute lower respiratory disease (ALRI)

Children below 5 years of age with ALRI are divided into 3 therapeutic categories. Children with very severe disease or severe pneumonia must be refereed to a health center or a hospital with inpatient capacity where adequate treatment can be given/provided. Before referral, a first dose of antibiotic should be given and fever treated if present.

Children with pneumonia must be treated for 5 days on ambulatory basis with a first line antibiotic recommended by the program. Other problems (fever, ear infection etc) should also be treated if present. The child should return after two days for reassessment. If the child shows sign of a very severe disease or severe pneumonia she/he must be referred. If the child does not show signs of a very severe disease or severe pneumonia but did not improve, different antibiotics

should be given for other two days. If the child still does not show improvement, s/he should be referred.

c. A child having cough for more than 30 days (chronic cough) should be referred for further assessment.

Children with no pneumonia must not be treated with antibiotic. Advice to the mother should be given on home care and other problems assessed and treated.

Table 6 a. ARI Clinical Chart: children < 2 months

Signs, cough plus	Classification	Treatment
Stopping feeding well or Convulsion Abnormally sleepy or difficult to walk or Strider in calm child or Wheezing or Fever or low temperature or Severe chest in drawing or fast breathing or	Serious bacterial infection	- Refer urgently to hospital - Give first dose of antibiotic - Refer urgently to hospital - Give first dose of antibiotic -Treat fever if present
Fast breathing but no chest in drawing	Pneumonia	-Advise mother to give home care - Give an antibiotic - Keep young infant warm

Table 6b. ARI Clinical Chart: children 2 months – 4 years of age

Signs	Classification	Treatment
- Not able to drink or - Convulsion or -Abnormally sleepy or difficulty to awake or - Stridor in calm child or - Chest in drawing	Severe pneumonia or very severe disease	- Refer urgently to hospital/ admission - Give first dose of antibiotic - Treat fever if present - If cereberal malaria is possible give ant malarial drug(s) -Refer urgently to hospital - Give first dose of antibiotic - Treat fever if present
- Fast breathing	Pneumonia	- Advise mother to give home care - Give an antibiotic - Treat fever if present
- Not fast breathing and no chest in drawing	No pneumonia	- If there is cough for more than 30 days refer for assessment - Advise mother to give home care - Treat fever if present

8.3 Antbiotic Treatment

The commonly available antibiotics most effective against the main etiologic agents of pneumonia in children are:

- amoxycillin
- ampicillin
- cotrimoxazole and
- procaine penicillin

8.4 Home Care

Mothers of children treated for pneumonia should return home knowing how to correctly administer the antibiotic.

Children with no pneumonia and children with pneumonia (in addition to antibiotic therapy) must receive appropriate home care. Before leaving the health unit, mothers should receive the following instructions

- Feed the child during illness and increase the feeding after illness
- Give the child more fluids to drink. Increase breast-feeding
- Sooth the throat and relieve cough with a safe remedy
- Return quickly to the health unit, if the child develops any of the following signs

a. breathing becomes difficult
b. breathing becomes fast
c. child is not able to drink or young infant stops feeding well
d. child becomes sicker

Mothers of young infants should also be told to keep the infants warm and clear the baby's nose if it interferes with feeding.

8.5 Referral Criteria:

Children with a very severe disease or severe pneumonia must be refereed to HC or hospital. Refer only if it is expected that the patient will receive better care. If this is not the case, the child should be treated with the available antibiotics and needless referral avoided.

Explain to the mother the reason why the child should be referred. If you think the mother will not take the child to hospital or the referral will be delayed, whatever the reason, you should take the following steps:

- If timely referral is likely give first dose of antibiotic
- If there is long referral time give additional doses
- If referral is uncertain give full course
- Treat any other problem present (fever, malaria etc)

8.6 Croup or Obstructive Laryngitis

Croup is an infection of the larynx by viruses or bacteria. If bacteria are involved they are usually not very sensitive to pencillin. Because the larynx is rather narrow in childhood infection leads to obstruction. Therefore, great care is needed in treating these children.

Clinical Features:

A) The illness usually follows a cold or accompanies measles. Then the child suddenly develops a croupy cough and inspiratory stridor as a result of obstruction in the area.

B) In some children a large red and infected epiglottis can be seen.

C) In some the condition becomes worse, retraction of intercostal space, the supraclavicular space and even of the ribs themselves become more evident. The child become restless, pale, shows obvious sign of air hunger

Treatment:

A) Steam: liquefies the dry secretions and results in marked improvement. A bed sheet over an infant bed makes a perfect steam tent

B) A humidified oxygen if available can be life saving

C) Make sure the child drinks enough

D) Prednisolone 2mg /kg/day decreases edema

E) Antibiotics: PPF 50,000u/kg with sulphdimidine orally 100mg/kg/day in 3 divided doses for 5 to 7 days

F) Trachetomy or intubationcan be lifesaving

G) Mild sadation with phenergan 1mg/kg/ day can be of help in:

8.7 Tonsilitis, Pharyngitis:

Tonsillitis is caused by a variety of bacteria and viruses. Mild pharyngitise or tonsillitis without much fever, pus, swelling of lymph glands is almost always a viral disease. This means no antibiotics. Moderate or severe tonsillitis (usually accompanied by pharyngitis) with high fever, pus and often with enlarged lymph glands in neck is more often than not due to beta-hemolytic streptococci. Beta-hemolytic streptococci secrete toxic substances into the blood stream that, as an allergic reaction can cause rheumatic fever or acute glomerulonephritis. As streptococci are extremely sensitive to penicillin it is sufficient reason to treat tonsillitis of this type with penicillin.

Clinical Features:

1. Fever, feeling unwell, sometimes vomiting, diarrhea, and abdominal pain
2. Refusal of food, difficulty in swallowing, may or may not complain of sore throat.
3. Tonsilar glands at the angle of the jaw are often swellen and tender
4. Streptococal tonsilitis has high fever, pus on tonsilar surface and marked cervical lymp gland swelling
5. Viral tonsilitis has no fever, no pus on tonsilar surface and no marked cervical lymph gland swelling

Complications:

A. Otitis media
B. Peritonsilar abscess (in older children only)
C. Cervical lymphadenitis may develop into abcess
D. Rheumatic fever or acute glomerulonephritis after streptococcal infection

Treatment:

1. PPF 50 000 u/kg /day for 7 days
2. Viral tonsilitis require no antibiotic treatment
3. Gargles and aspirins may be given for high fever and pain

8.8 Chronic Tonsilitis and Adenoditis

The lymph tissues in the tonsils as well as those behaind the nasopharnyx serve as a bareier against bacteria trying to unvade the body via the mouth. In children around 4 years of age especially these tissues are rather prominent. Sometimes this mechanism does not function properly and insteady of a barrier the chronically infected tonsils and adenoids become a focus of infection

Clinical features

1. Recurrent rhinitis, tonsilitis, otitis media
2. In case of marked adenoids, snoring, sleeping with open mouth, nasal speech, and pus from infected adenoids driping into the trachea causing cough

3. General symptoms of chronich infection (tiredness, poor appetite are common

Indication for Adenoidectomy or /and tonsilectomy (over 3 years only)

a. Recurrent otitis media, tonsilitis, cervical adenitis= several times a year
b. Peritonsilar abscess
c. Enlarged adenoid should be removed
   i. if giving rise to recurrent infection
   ii. if there is loss of hearing
   iii. if nose breathing is continuously observed

8.9 Ear Infections:

Ear infections in children are classified into 3 categories:

- Mastoiditis
- Acute ear infection
- Chronic ear infection

A child with painful or tender swelling behind the ear is classified as having Mastoiditis. In a young infant the swelling might be above the ear.

- The child should be urgently referred after a first dose of antibiotic

Table 7. Assessment of ear problem

Ask	Look	
- Does the child have ear pain? - Does the child have pus draining from the ear? For how long?		- Look for pus draining from the ear or red immobile ardrum feeling for tender swelling.
Signs - Tender swelling behind the ear	- Pus drainage from the ear <2 weeks or ear pain or red immobile ear drum	Pus draining from the ear 2 weeks or more
Mastoiditis	Acute ear infection	Chronic ear infection
Treatment - Refer urgently to hospital - Give first dose or antibiotic - Paracetamol for pain, treat fever	- Give oral antibiotic - Dry the ear by wicking - Reassess in five days - Treat fever if present - Paracetamol for pain	- Dry the ear by wicking - Paracetamol for pain treat fever

Study Questions

1. What steps would you take for a child with a very severe disease or sever pneumonia before referral?
2. What advice would you give to the mother for home treatment of ARI before she leave the health unit?
3. If you think the mother will not take the child who need referral or if the referral will be delayed, what steps will you take?
4. What are the criteria for referring a child with ARI?

CHAPTER NINE

CONTROL OF DIARRHEA DISEASE

Learning Objectives:

After studying the material in this chapter the student will be able to:-

- Identify different forms of diarrhea and their management
- Recognize different causes of diarrhea and its prevention
- Assess and classify a child with diarrhea for dehydration and treat as indicated
- Teach parents and community on the ways of preventing diarrhea among children
- Recognize different forms of a solution to prevent and treat dehydration

9.1 Introduction:

Diarrhea means passing of three or more loose or watery stools in a day. Diarrheal disease is among the leading causes of morbidity and mortality among children < 5 years of age in Ethiopia. Diarrhea is most common in children, especially those between 6 months and 2 years of age. It is also common in babies under 6 months who are not breast-fed.

9.2 Types of diarrhea:

Diarrhea can be classified by its duration as acute or persistent and dysentery

- Acute diarrhea – starts suddenly and may continue for several days but < 2 weeks
- Persistent diarrhea lasts >2 weeks and may vary from day to day
- If the stool contains blood the diarrhea is called dysentery

9.3 Why is diarrhea dangerous?

Acute diarrhea causes death because of dehydration

Dysentery causes death because of a number of severe and potentially fatal complications occurring during dysentery such as

Intestinal perforation

- Toxic mega colon
- Convulsions
- Septicemia
- Prolonged hyponatremia
- Diarrhea is worse in person with malnutrition. Diarrhea can also cause malnutrition and make it worse because
- Nutrients are lost from the body during diarrhea
- Nutrients are used to repair damaged tissue rather than for growth

- A person with diarrhea may not be hungry
- Mothers may not feed children during diarrhea or even for some days after diarrhea stops

To prevent malnutrition, food should be given to children with diarrhea as soon as, they eat it.

9.4. How does diarrhea cause dehydration?

The body normally takes in water and salts it needs through drinks and food. When the bowel is healthy, water and salts pass from bowel into the blood. When there is diarrhea, the bowel does not work normally. Less water and salts pass into the blood, and more passes from the blood into the bowel. Thus, more than the normal amount of water and salts passed in the stool results in dehydration. Dehydration also can be caused by a lot of vomiting, which often accompanies diarrhea.

9.5. Treating Diarrhea:

The most important measures in treating diarrhea are to:

- Prevent dehydration from occurring if possible
- Treat dehydration quickly and well if it does occur
- Feed the child

9.6. Prevention of dehydration:

- Drinking extra fluids as soon as diarrhea starts
- Home fluids as well as ORS if available
- Food based fluids containing salt are most effective. eg. Rice water
- If fluids do not contain salt, give food that is salted to taste
- If dehydration occurs, the child should be treated with ORS at health institution
- In severe dehydration, first treat with IV fluid, but ORS should be used in addition as soon as the patient can drink
- ORS alone when the signs of severe dehydration are gone

9.7 Feeding:

Feeding during diarrhea episode provides nutrients that the children need to be strong and grow

- Breast-fed children should be given the breast more frequently
- Other children should be given their usual feedings
- Children of 6 months or older should be given small amounts of nutritious and easily digestible foods more frequently
- After the diarrhea has stopped, an extra meal each day for 2 weesk to help the child regain weight lost during the illness

9.8 Oral rehydration therapy:

Recommended home fluids

- Breast milk
- Cow milk
- Cereal-based gruel (eg.' Muk', 'attimit')
- Soup ('shorba')
- Yogurt ('ergo')
- Whey ('aguat', 'arera')
- Rice water
- Fresh fruit juice
- Plain water with food

Recommended foods

- Milk and milk products
- Eggs
- Porridge ('genffo') from mixture of one third legumes and two third cereal
- 'Alicha fitfit'

How to prepare ORS:

- Wash your hands with soap and water
- Measure 1 liter of clean water. It is best to boil and cool the water before use but if this is not possible use clean drinking water available
- Pour all the powder from one packet of ORS into a clean container

- Pour the water into the container. Mix well with a clean spoon until the powder is dissolved
- Taste the solution so that you would know its taste like salt
- Then give the child frequent small sips out of a cup or spoon. If the child vomits, wait for 5-10 minutes, then continue giving ORS slowly
- Mix fresh ORS each day in a clean container. Keep the container covered.

9.9 Assessment of a child with diarrhea:

To identify a case of diarrhea ask the mother
Has the child had loose or watery stool?
For how long?
Have there been loose stools with blood?
If the answer to either question is 'yes', use the following management chart to assess, classify and treat the child

Calcifying Dehydration:

- There are three possible calcifications of dehydrations for a child with diarrhea.
- SEVERE DEHYDRATION
- SOME DEHYDRATION
- NO DEHYDRATION

Table 8. Chart for assessing dehydration in patients with diarrhea

Two of the following signs: -Lethargic or unconscious - Sunken eyes -Not able to drink or drinking poorly -Skin pinch goes back very slowly.	SEVERE DEHYDRATION	- If a child has no other severe classification - Give fluid for severe dehydration (plan C) or if a child also has another server calcification: - Refer urgently to hospital with mother giving frequent sips or ORS on the way. Advise mother to continue breast-feeding.
Two of the following signs: - Restless, irritable - Sunken eyes - Drinks eagerly, thirsty - Skin pinch goes back slowly	SOME DEHYDRATION	Give fluid and food for some dehydration (Plan B) If child also has severe clacification: Refer urgently to hospital with mother giving frequent sips of ORS on the way. Advise the mother to continue breast-feeding. Advice mother when to return immediately. - Follow up in five days if not improving
Not enough signs to classify as some or severe dehydration	NO DEHYDRATION	- Give fluid and food to treat diarrhea at home (Plan A). - Advise mother when to return immediately - Follow up in five days if not improving.

When going through the assessment chart:

Ask the following questions:

- For how long has the child had diarrhea?
- How many liquid stool, has the child passed in 24 hrs?
- Is there any blood in the stool?

Has the child been vomiting?

- If so, has the child vomited more than a small amount?
- How often has the child vomited in 24 hrs?
    - Is the child able to drink?
    - If so, is the child thirsty than usual?

Look for the following conditions

- What is the child's general condition?
- Is the child:
- Well and alert?
- Unwell, sleepy or irritable?
- Very sleepy, floppy or unconscious?
- Having fits?
    - Does the child have tears when he or she cries?
    - Are the child's eyes normal, sunken or very dry sunken?
    - Are the child's mouth and tongue wet, dry or very dry?
    - Is the child's breathing normal, faster than normal, very fast and deep?
    - When water is offered to drink, is it taken normally, eagerly or is the patient unable to drink?

Feeling for the following conditions:

When the skin is pinched:

- Does it go back quickly?
- Does it go back slowly?
- Does it go back very slowly? (>2 seconds)
- Pinch the skin over the abdomen and thigh
- Can the pulse be felt? (Normal 100-120/min) faster, or weak?
- Is the fontanel normal? Depressed or very depressed in young infants.
- Ask for other problems than dehydration:
- Ask about blood in the stool

If blood is present, treat for 5 days with an oral antibiotic recommended for shigella in your area.

- See the child again after 2 days if:
- Under 1 year of age
- Initially dehydrated
- There is still blood in stool
- Not getting better

If the stool is bloody after 2 days, change to a second oral antibiotic recommended for shigella in your area. Give it for 5 days.

If diarrhea has lasted at least for 14 days:

- Refer to hospital if:
- The child is under 6 months old
- Dehydration is present (refer after treatment of dehydration)

Otherwise, teach the mother to feed her child as in plan A
Look for severe under nutrition If the child has severe under nutrition:

- Do not attempt rehydration: refer to hospital for management
- Provide the mother with ORS solution and show her how to give it
- A teaspoon every 1– 2 minutes for less than 2 years child
- Frequent sips from a cup for an older child

Ask about fever and take temperature

1. If the temperature is 39, give paracetamol
2. If there is Falciparum malaria in the area and the child has any fever (38 or above) or history of fever in the past 5 days give anti-malarial treatment according to malaria program recommendation in your area

9.10. Treatment of Diarrhea

Decide on appropriate treatment:

After the examination, decide how to treat the child

- if the child has any of the signs in the column labeled “for other problems” specific treatment is needed in addition to treatment given for dehydration
- if there is blood in the stool and diarrhea for less than 14 days, the child has dysentry and appropriate antibiotics should be given
- if there is diarrhea for longer than 14 days with or without blood in the stool and/or if there is severe under nutrition, continue feeding the child and refer for treatment.

Determine the degree of dehydration

Look at the upper row, the assessing and classifying chart. If two or more of the signs listed are present, it means that the child has severe dehydration

- If two or more signs from upper row are not present, look at the middle row
- If two or more of the signs listed in this row are present, it means that the child has some dehydration
- If two or more signs from the middle row or upper rows are not present, it means that the child has no signs of dehydration

Select the appropriate treatment plan based on the degree of dehydration

- For no signs of dehydration, select treatment plan A to treat diarrhea at home
- For some dehydration, select treatment plan B to treat dehydration in ORT corner
- For severe dehydration, select treatment plan C to treat severe dehydration quickly

9.11. To treat diarrhea at home use treatment plan A

There are three rules for treating diarrhea in the home

Rule 1: give the child more fluid than usual

- Give the recommended home fluid or food based fluid, such as (cow milk, 'shorba', 'atmit', ORS etc)
- If an infant is breast-fed, continue to breast feed and try to do so more often than usual at least every 3 hours

Rule 2: Continue to feed the child

Feeding during the diarrhea episode provides nutrients the child needs, helps preventing weight loss, shorten the duration and decreases the severity of diarrhea

- During and after diarrhea a child should be given nutritious food frequently. Even if the absorption of nutrients from food is somewhat decreased during diarrhea, most of it will be absorbed

Rule 3: Take your child to the health worker if the child is not getting better

The mother should take the child to a health worker if the child does not get better in 3 days or develops one of the following:

- Passes many stools
- Does not eat or drink normally
- Has fever
- Is very thirsty
- Vomits repeatedly
- There is blood or mucus in the stool
- Is not passing urine for > 6-8 hours
- Seems not getting better

Children should be given ORS solution at home if:

They have been on treatment plan B or C

They cannot return to the health worker if the diarrhea gets worse

Show the mother how much ORS to give after each loose stool and give her enough packets for 2 days.

Table 9. Amount of estimated ORS solution.

Age	Amount of ORS to give after each loose stool	Amount of ORS to provide for use at home
< 24 months	50-100ml	500 ml/day
2-10 years	100-200 ml	1000 ml/day
10 years or more	As much as wanted	20000/day

Describe and show the amount to be given after each stool using a local measure

- Give a teaspoonful 1-2 minutes for a child < 2 years
- Give frequent sips from a cup for an older child
- If the child vomits, wait for 10 minutes, then give the solution more slowly (a spoonful ORS every 2-3 minutes)

Use the patient's age only when you do not know the weight

- If the child wants more ORS than shown, give more
- Encourage the mother to continue breast-feeding
- For infants < 6 months children who are not breast fed, give 100-200 ml clean water during this period

After 4 hours, reassess the child using the assessment chart, then select plan A,B or C to continue treatment

- If there are not signs of dehydration, shift to plan A
- If signs indicating some dehydration are still present repeat plan B, but start to offer food, milk and juice as described in plan A
- If signs indicating severe dehydration have appeared, shift to plan C

If the mother must leave before completing plan B

- Show her how much ORS to give to finish the 4 hours treatment at home
- Give her enough ORS Packets to complete rehydration,

and for 2 more days as shown in plan A

- Show her how to prepare ORS solution
- Explain to her the three rules in plan A:

1. To give ORS or other fluid until diarrhea stops
2. To feed the child
3. To bring the child back to the health worker if necessary

Table 10. Treatment Plan-C To Treat Severe Dehydration Quickly

Age	First give 30 ml/kg IV	Then give 70 ml/kg
Infants (<12 months)	1 hour	5 hours
Older	30 minutes	2 ½ hours

Guidelines for rehyderation therapy for severe dehydrations

- Start IV immediately
- If the patient can drink, give ORS by mouth while the drip is set up
- Give 100 ml/kg Ringers lactate or normal saline in divided dose as above.
- Repeat once if radial pulse is still very weak or not detectable
- Reassess the patient every 1-2 hours. If hydration is not improving give the IV more rapidly.

- Also give ORS about 5 ml/kg/hr as soon as the patient can drink; usually after 3-4 hours (infant) or 1-2 hour (older pts)
- Reassess after 6 hours infant) or 3 hours (older patients) and choose the appropriate plan (A,B,C)
- If there are no signs of dehydration use treatment plan A
- If some of the sign of dehydration are still present but the child is improving, give ORS for another 6 hours specified in the treatment PlanB.
- If the signs of dehydration are worse or remain unchanged rehydration therapy with treatment plan C should be continued.

In particular attention should be given to:

- The number and volume of stool
- The extent of vomiting
- The presence and changes in the sign of dehydration
- Whether the rehyderation fluid (oral and or IV) is being successfully given and is adequate amount.

Study Questions

1. What are most important points to be considered in treating diarrhea?
2. How does diarrhea cause dehydration?
3. What important measures should be taken to prevent dehydration in children with diarrhea?
4. What steps would you follow when assessing a child with diarrhea?
5. What important pieces of advice would you give to the mother for home treatment of diarrhea?
6. How would you treat a child with severe dehydration?

CHAPTER TEN

SYSTEMIC DISEASES

Learning Objectives

After studying the material in this unit the student will be able to:-

- Identify different forms of systemic diseases affecting children
- Manage different forms of systemic diseases
- Prevent complications arising from systemic diseases
- Evaluate the effectiveness of care and treatment
- Identify danger signs of systemic diseases and take appropriate action

10.1. Cardiovascular system (CVS) disorder

Most heart diseases in young children are congenital. Older children are more likely to have acquired heart diseases such as rheumatic fever, endomyocardial fibrosis. The heart may also be affected in many systemic disorders i.e. infections, malnutrition, anemia etc.

Symptoms and signs related to cardiovascular diseases:

- Cyanosis is a bluish discoloration of the skin as result of reduced amount of hemoglobin in the circulating blood. Cyanosis can best be detected under the fingernails or on the mucus membranes of the mouth (lips, under side of the tongue).
- Clubbing of fingers and toes often occurs. One of the main causes of this is chronic under saturation of the blood with oxygen.

Signs of Cardiac Failure:

- Tachycardia-rapid pulse
- Tachyponea-rapid respiration
- Dyspnea-shortness of breath
- Edema and other signs of raised venous pressure
- Fatigue and failure to thrive
- Arrhythmia-irregular heart beat
- Systolic and more frequently diastolic murmurs
- Cough
- Orthophea

Management:

Any child with congestive heart failure should be referred to hospital whenever possible. In all cases where you have to start treatment:

- check weight of the child ,record the pulse and respiration carefully at 2 hours intervals and indicate the exact time of any drugs given.

Treatment:

A. bed rest
B. sedation (phenobarbitone 5mg/kg/day in 2-3 divided dose im or rectally)
C. Oxygen if available
D. Diuretics 10 mg in stat in acute cardiac failure.
E. Digitalization is most important

In order to achieve effective blood levels quickly a digitizing dose is calculated and given over 24 hours.

- 1/2 of the calculated dose is given initially
- 1/4 8 hours later
- 1/4 after another 8 hours

Then continue with the maintenance dose, which is usually ¼ of the digitizing dose

Congenital Heart Disease:

Congenital heart disease is a structural malformation of the heart or great blood vessels present at birth. In most congenital heart diseases the cause is unknown. The only known cause is damage to the fetus by rubella Virus, when the mother is one to three months pregnant, or by chromosomal abnormality in children with Down's syndrome.

Pathophysiology:

Anatomically the following principal defects may be found.

a. Abnormal communication in the heart or between big vessels

- Atrial septal defect
- Ventricular septal defect
- Patent ductus arteriosus

In these due to the highest pressure in the left heart, there is a shunt from left to right heart with an increased blood load in lesser circulation. In this group of disease there is no cyanosis.

b. Congenital obstruction of the blood flow

- pulmonary stenosis
- aortic stenosis coarctation of the aorta)

c. Combination of abnormal communication and stenosis (pallot's disease is one example)

Clinical Features:

Besides the above-mentioned symptoms, failure of normal growth and development, repeated attacks of respiratory tract infections, and a loud murmur is usually present.

Management:

A. Any child with congestive heart failure should be referred to hospital whenever possible**.** In all cases where you have to start treatment:
   - check weight of the child ,record the pulse and respiration carefully at 2 hours intervals and indicate the exact time of any drugs given.

B. Respiratory tract infections are readily treated with penicillin in normal doses.
C. Give chloroquine in case of fever after taking blood film.
D. Treat anemia if present.
E. Arrange a well-timed comprehensive vaccination program.
F. Give prophylaxis against subacute bacterial endocarditis

Prognosis: Many children with congenital heart disease die in early childhood. The prognosis is particularly poor in children with cyanotic heart disease.

Rheumatic Heart Disease:

Rheumatic fever is an inflammatory disease related to streptococcal infection affecting mostly the heart and joints, but also other tissues including the brain and skin. It occurs most commonly in children between 3 and 15 years.

Pathogenesis:

Rheumatic fever usually follows about 2 weeks after an infection of the throat or skin with beta-hemolytic streptococci. This is due to a specific reaction of tissues, mainly the heart and the joints, to the streptococcal toxins.

Clinical Features:

Painful swelling of one or more big joints (knee, ankle, elbow, shoulder) may last for one day or longer, subside and another joint may then be affected (rheumatic polyarthritis)

- Fever
- malaise
- rheumatic carditis (heart become enlarged murmur develops and sign
- Of congestive heart failure may occur.

1) Relapses are very likely to occur

Treatment/ management:

A. bed rest particularly in patients with rheumatic carditis until signs of active disease disapear (fever, pain…)
B. aspirin 100 mg/kg/day in three divided doses for 4-6 weeks
C. penicillin 1 million units/day for one week to treat streptococcal infection
D. if cardiac failure occurs referred to hospital whenever possible.

Congestive Heart Failure:

Congestive heart failure occurs when the cardiac output is inadequate to meet the metabolic need of the body and results in accumulation of excessive blood volume in the pulmonary and/or systemic venous system.

Etiology:

a) Congenital heart disease (in the first 3 years of life)
b) Acquired heart disease (rheumatic heart disease)
c) Non cardiovascular causes (anemia, pulmonary disease...)

Clinical manifestations:

1) Dyspnea and tachypnea
2) Tachycardia
3) Orthopnoa, Peripheral edema (sacral or periorbital)
4) Restlessness
5) Tire easily
6) Pallor
7) Weight gain
8) Diaphoresis
9) Growth failure
10) Nonproductive irrelative cough
11) Neck vein distension
12) Hepatomegally

Pathophysilogy:

a) For any number of reasons, cardiac output is inadequate to meet the oxygenation and nutritional requirement of vital organs
b) various compensatory mechanisms occur (Tachycardia)
c) Cardiac output decreases further as a compensatory mechanism fail
d) There is diminished blood return to the heart, with venous congestion and a rise in venous pressure.

Diagnostic evaluation:

a. Palpation (may have weak peripheral pulse)

Auscultation (gallop rhythm, cardiac murmur may or may not be present)

Chest x-ray (cardiomegally may be present)

Nursing Care:

1. Administer digoxin as ordered to improve myocardial efficiency
2. Provide uninterrupted rest to reduce energy requirement.
3. Administer diuretics as prescribed to remove accumulated sodium and fluid and restrict sodium intake.
4. Administer oxygen therapy to improve tissue oxygenation.
5. Provide foods to meet calorie requirement of the child
6. Practice careful hand washing technique to decrease the dangers of infection

7. Monitor vital signs frequently and report any significant changes to observe signs off disease progress or response to treatment

10.2. Central nervous system Diseases

Meningitis: Meningitis is an inflammation of the meninges (membranes surrounding the brain and spinal cord) and is caused by a viral, bacterial or fungal organisms. Meningitis is further classified as aseptic, septic and tuberculosis meningitis. Aseptic meningitis refers either viral or other causes of meningeal irritation such as brain abscess or blood in the subarachnoid spaces. Septic meningitis refers to meningitis caused by bacterial organisms such as meningococcus, Staphylococcus, or influenza bacillus. Tubercles meningitis is caused by the tubercle bacillus.

Meningeal infections generally originate in one of two ways either through the blood stream as a consequence of other infections such as cellulites or by direct extension after traumatic injury to the facial bones. In a small number of cases the cause is iatrogenic or secondary to invasive procedures (e.g. lumbar puncture).

Clinical Manifestations:

The symptom of meningitis results from infection and increased intracranial pressure (ICP). Headache and fever:

Are frequently the initial symptoms. Change in level of consciousness: Are associated with bacterial meningitis. As the illness progresses, lethargy, unresponsiveness, and coma may develop. Stiff neck (rigidity): Is an early sign. Any attempts at flexion of the head are difficult and causes severe pain. Positive kerning sign: When the patient is lying with the thigh flexed on the abdomen, the leg cannot be completely extended. Positive Brudzink's sign: When the patient's neck is flexed, flexion of the knees and hips is produced. Photophobia: Extreme sensitivity to light is present Seizures and increased ICP: Seizures occur secondary to focal area of cortical irritability while increased ICP results from cerebral edema characterized by headache, vomiting and depressed level of consciousness.

Diagnostic Evaluation:

A lumbar puncture is carried out by inserting a needle into the lumbar subarachnoid space through the third and fourth or fourth and fifth lumbar interspace to withdraw CSF for diagnostic and therapeutic purposes. The purposes are to obtain CSF for examination, measure and reduce CSF pressure determine the presence or absence blood in the CSF etc.

Assisting with a Lumbar puncture procedure:

1. Assure the patient that inserting the needle into the spine will not cause paralysis

2. See that the patient's bowel and bladder are emptied
3. Position the patient on one side with back towards the physician
4. The thighs and legs are flexed as much as possible to increase the space between the spines of the vertebrae for easier entry into the subarachnoid space
5. Small pillow is placed under the patient's head to maintain the spine in horizontal position
6. Assist the patient to maintain the position to avoid sudden movement, which can produce trauma
7. Instruct the patient to breathe normally, because hyperventilation may lower an elevated pressure

Post procedure Care:

1. Instruct the patient to lie prone 2-3 hours to reduce the leakage of CSF.
2. Encourage increased fluid intake to reduce the risk of post procedure headache.
3. Cheek the puncture site for any leakage/bleeding

Examination of the CSF:

CSF should be clear and colorless. Pink blood-tinged or grossly bloody CSF may indicate a cerebral contusion, laceration, or subarachnoid hemorrhage. Sometimes with a difficult lumbar puncture the CSF initially is bloody because of local trauma but then becomes clearer.

Usually specimens are obtained for cell count, culture, glucose and protein. The specimen should be sent to the laboratory immediately because changes will take place and alter the result if the specimens are allowed to stand.

10.3 Epilepsy/ Seizure

Epilepsy/ Seizure is the recurrent occurrence of convulsion or fit.

Causes:

1. **Idiopathic:**
   - Genetic defects
   - Developmental defects
2. **Acquired:**
   - -Brain hypoxia
   - Fever (childhood)
   - Head injury
   - CNS infection

Clinical Manifestations:

A, Few seconds before convulsion begins the patient has a warning sign (aura) such as

- Strange pain in the abdomen or
- Strange movement of the arm or

- His may be affected Immediately after warning sign patient become completely unconscious:
- Falls to ground suddenly or
- Falls into open fire
- Muscles are tightly clenched

This is the first part of fit or convulsion and lasts only a few seconds (Need formatting)

Following this

- All muscles contract and relax quickly
- The tongue may be bitten
- Urine and faces may be passed

This is the second part of fit or convulsion and the convulsion lasts only few minutes.

These jerky movements are called Convulsions and are diagnostic of major or Grand mal epilepsy.

When convulsions are prolonged or repeated the condition is known as “Status epilepticus”. Such convulsions are very exhausting and unless controlled may lead to patient death.

During the third part of the fit or convulsion

- Patient lies quietly
- Muscles are relaxed
- He is still unconscious

This part lasts from a few minutes to an hour or more. Then

- Patient return to consciousness
- He may have bad headache
- Remembers nothing of the fit
- Often feels very sleepy

B, Some patients do not show the first or second part of the fit, and suddenly become unconscious for only a few seconds. The eye may stare but see nothing and these are the 'lesser fit of epilepsy (petit Mal)".

Medical Management:

1. Phenobarbitone from 30 mg daily to 120 mg three times a day or
2. Phenytoin sodium from 45 mg daily to 180 mg three times a day may be given

Nursing Management during seizure:

- Provide privacy
- Protect head injury by placing pillow under head and neck
- Loosen constrictive clothing's
- Remove any furniture from patient side
- Remove denture if any
- Place padded tongue blade teethes to prevent tongue bit
- Do not attempt to restrain the patient during attack
- If possible place patient on side

Nursing Management after seizure:

- Prevent aspiration by placing on side
- Admister medication as ordered to control the seizure
- Remove hard toes from the bed to protect the child from injury during convulsion
- Donot give any thing by mouth during convulsion
- Place the child where he can be watched closely to observe for recurrent seiures
- On awaking re-orient the patient to the environment. Re-assure and calm the patient

10.4 Diseases of genitourinary tract

- Acute Glomerlonephritis:

Glomerlonephritis refers to inflamation of the kidneys caused by an antigen antibody reaction following an infection in some part of the body. Acute glomerlonephritis is predominately a disease of childhood and is the most common type of nephritis in children.

Etiology:

1. Antigen antibody reaction secondary to an infection elsewhere in the body.
2. Initial infection of (upper respiratory system or skin) most frequently a beta hemolytic streptococcus and other bacteria's and viruses.

Pathophysiology:

1. Antibodies produced to fight the invading organism also react against the glomerular tissue
2. The antigen antibdy combination results in an inflamatory reaction I the kidney.
3. General vascular disturbances, including loss of capillary integrity and spasm of arterioles, are secondary to kidney changes and are responsible for much of the symptomatolgy of the disease.

Clinical Manifestations:

1. Onset is usually 1-3 weeks after the onset of the initating infection
2. Sign and symptoms

- Decreased urine out put
- Blood or brown color urine
- Edema result in most patients
- Hypertension present in 50 % of patients (in 4-5 days of illness)
- Variable fever and mild headache
- GI disturbances (anorexia and vomiting often with loin pain).

Diagnostic evaluation:

1. Urinalysis (decreased out put, hematuria, high specific gravity, protein urea, white cells, casts) may be reported

2. Blood urea nitrogen and cretinin often elevated
3. Sedimentation rate –elevated
4. Chest x-ray may show pulmonary congestion and cardiac enlargement

Complications:

1. Hypertensive-encephalopathy (restlessness, stupor, convulsions, vomiting severe headache, visual disturbances) occur frequently.
2. Congestive heart failure- may occur due to persistent hypertension, hypervolaemia and perirenal vasoconstriction
3. uremia-manifested by drowsiness, coma, stupor, muscular twitching and convulsion may occur.
4. Anemia- usually caused by hypervolaemia rather than red blood cells in the urine may occur.

Nursing Care:

1. Maintain bed rest during the acute phase of the illness
2. Protect the child from infection
3. Provide adequate diet recommended
4. Maintain a complete record of the child's intake and output
5. Weigh the child daily
6. Record B/P at regular interval
7. Observe for signs of complication (edema, vomiting..)
8. Record appearance of urine

10.5 Nephritic Syndrome:

Nephrotic syndrome refers to a common complex characterized by edema, marked proteinuria hypercholesterolaemia, and hypoalbuminaemia. Although there are many types of the diseases lipid nephrosis is the most common in children.

Etiology: The exact cause is not known, but the symptom complex results from large loss of protein in the urine, too great to the body to replenish by albumin synthesis.

Pathophysiology:

1. Protein, especially albumine, leaks through the membrane and is lost in the urine
2. Plasma protein decreases as protein uria increases
3. Over production of aldestrone causes retention of sodium and results in accumulation of fluid in the inertial spaces
4. Decreased gamaglobine results in increased susceptibility for infection
5. Generalized edema is responsible for (respiratory distress, GI symptoms, loss of body tissue, malnutrition.)

Clinical Manifestations:

1. Insidious onset of edema
2. GI symptoms (vomiting, anorexia,)
3. Severe recurrent infection

4. Marked edema
5. Profound weight gain
6. Decreased urine out put during the edematous phase
7. Nephrotic crisis (albuminuria, fever, Erysipeloid skin eruption may be possible)

Nursing Care:

1. Administer steroids as prescribed by the pediatrician
2. Administer immunosuppressive as prescribed by the pediatrician
3. Administer diuretics as prescribed by the pediatrician
4. Maintain the child at bed rest during periods of severe edema
5. Administer diet low in sodium and high in potassium
6. Restrict fluid as requested by the pediatrician
7. Provide meticulous skin care to the edematous area of the body
8. Provide a high protein, high calorie diet and offer in small amounts in frequent interval.
9. Observe the child's entire body at frequent intervals for edema
10. Observe for side effects of all medications.

10.6 Urinary Tract Infection:

Urinary tract infection refer to an infection within urinary system. The lower urinary tract (urtetha,bladder,or the lower portion of the ureters0 or the upper urinary tract (upper portion of the ureters, or kidney) or both may be involved.

Etiologic agents:

1. GI flora Organisms responssible for 75 % of all cases.
   - E.Coli (most common causative agent)
   - Proteus
   - Aerobacter
   - Entrobacter
   - kelbsella
   - Psudomonus
2. Streptococci and staphylococci causes most other cases.
3. Contributing causes
   - obstruction
   - infection elsewhere in the body
   - poor perineal hygiene
   - Short female urethra
   - Catheteriztion

Path physiology:

Inflammatory changes occur in the affected portion of the urinary tract

Inflammation results in urine retention and stats is of urine in the bladder

There are inflammatory changes in the renal pelvis and throughout the kidney when this organ is involved:

The kidney may become large and swollen

Eventually, the kidney become small, tissue is destroyed, and renal function fails.

Incidence:

1. Most common renal disease in children
2. More common in females than in males, ratio 6:1 except in the neonatal period, when both sexes are equally affected.

Clinical Manifestations:

1. Fever may be accompanied by chills or convulsion
2. Anorexia and general malaise
3. Urinary frequency, urgency, dysuria
4. Dull or sharp pain in the kidney area
5. Vomiting
6. Failure to thrive in infancy

Diagnostic Evaluation:

1. Urinalysis
2. Urine culture
3. Renal concentrating ability decreases
4. Urological and radiological studies

Nursing Care:

1. Obtain mid-stream urine specimen whenever possible and send to Lab. Immediately for examination
2. Administer antibiotics as prescribed by the pediatrician
3. Maintain bed rest, administer analgesics and antipyretic drugs as prescribed, encourage fluid to reduce fever and dilute the concentration of urine during the febrile period
4. Monitor and record vital signs to observe the progress of disease

10.7 Tuberculosis

Tuberculosis in children almost always results from primary infection with Mycobacterium tuberculosis rather than reactivation of latent disease as found in adults. Tuberculosis in a child indicates exposure to an adult with contagious disease and should prompt identification and treatment of the source case.

Most children infected with M. tuberculosis are asymptomatic and are only identified a positive tuberculin skin reaction. Tuberculin skin testing consists of the intradermal injection of 5 tuberculin units of purified protein derivatives

Definition of a positive Mantoux skin test in children:

A reaction greater than or equal to 5mm is POSITIVE in:

- Children in close contact with person who have known or
- Suspected infectious tuberculosis
- Children suspected to have tuberculosis disease including those
- With clinical evidence or a consistent chest radiography or
- Children who are immuno suppressed or who have HIV infection

A reaction greater than or equal to 10 mm is POSITIVE in:

- Children younger than 4 years of age
- Children at risk of disseminated tuberculosis including those with chronic diseases like malnutrition, diabetes mellitus, chronic renal failure
- Children born in areas where tuberculosis highly prevalent
- Children exposed to adults at risk of tuberculosis, including adults who are HIV infected, or live in poor living condition etc.

A reaction greater than or equal to 15 mm is POSITIVE in:

Children over 4 years of age with no risk factors .Previous

immunization with BCG does not alter these definitions. The presence of clinical manifestations distinguishes tuberculosis disease from tubercle infection. A chest radiography usually service to distinguish children with the disease from those with the infection. Because the sputum of children with pulmonary tuberculosis is usually negative for mycobacterium, either by acid-fast stain or culture, these children are non infectious.

Extrapulmonary tuberculosis: including cervical amenities, tuberculosis meningitis, and milary tuberculosis occurs in app. One quarter of cases of children with tuberculosis disease. Infants and young children who immunocompromised or malnourished are at risk of the serious and often fatal form of miliary or tuberculosis meningitis. Children with tuberculosis infection (without evidence of disease) should receive isoniazid prophylaxis for 9 months. Children with pulmonary tuberculosis are usually treated with a 6-month regimen consisting of isoniazid, rifampin, and pyrazinamide for the first 2 months and isoniazid and rifampin the remaining 4 months. In areas where isoniazid and refampin resistance is prevalent, a fourth drug should be added to the regimen (usually ethambutol, or streptomycin).

10.8 Disease of the Skin

Burns: Burns are a frequent form of childhood injury. A second degree burn of 10 % or more of the body surface in a child younger than 5 year or a second degree burn of 15 % or more of the body surface in a child over 1 year is considered a very serious injury. The effects of burn are not limited to the burn area.

Causes of Burn in Children:

1. Burns from hot water
2. Burns from open faire
3. Electrical burns
4. Acid or alkali burns of mouth and esophagus
5. Chemical burns of the skin
6. Burns inflicted upon the child as a result of child abuse

Clinical Manifestations:

The characteristics of burn wounds are classified as follows

A . First degree burns involves superficial epidermis; the skin is red or pink in appearance,and is painful to touch.

B. Second degree burn involve the entire epidermis; the skin is red, blistered, moist with exudate, and painful to touch.

C. Third degree burn involve the dermis or underlying fat, muscle or bone, the skin appears white,dry and is

painless to touch1.Symptoms of shock (rapid pulse, subnormal temprature,pallor, prostration, low BP) appear soon after the burn.

2. Symptoms of toxemia (Prostration, fever, rapid pulse, cyanosis, vomiting, edema) may develop within 1-2 days after initial burn. These symptoms may progress to coma or death.

3. Burns of the upper respiratory tract result in symptoms of upper respiratory tract obstruction resulting from edema and inflammation of the glottis, vocal cords, and upper trachea.

Treatment:

The objective of treatment are to:

- replace fluid loss from burn surface
- maintain circulation
- prevent renal failure
- prevent or treat infection
- aim toward early repair of the burn wound
- restore the child to the best possible state of physical and psychological functioning

Complications:

Acute:

- Infection
- wound sepsis
- pneumonia

- urinary tract infection
- Renal failure
- Respirator failure
- Post-burn seizure
- Anemia and malnutrition etc

Long-term:

- Malnutrition
- Scaring
- Contracture
- Psychological trauma

Nursing Care:

1. Monitor vital signs as ordered
2. Monitor the administration of IV fluid
3. Maintain an accurate record of intake and output
4. Provide adequate oxygenation
5. Provide sedation to relieve pain
6. Determine the for tetanus inoculation
7. Observe for symptoms of respiratory distress and take measures to alleviate if any.
8. Position the child and turn him frequently
9. Administer antibiotics as prescribed
10. Provide high protein, calorie diet in order to provide nutrition necessary for healing and for the growth and development need of the child.

10.9 Other problems

A. Pediatrics HIV infection and AIDS:

In children older than 15 months; HIV infection is defined by detection of anti-HIV antibody alone. The WHO case definition for AIDS surveillance in children where HIV testing is not available is fulfilled in the presence of at least 2 major signs and 2 minor signs (if no other known cause of immunosuppresion).

Major Signs:

- Weight loss or abnormally slow growth
- Chronic diarrhea (> 1 month)
- Prolonged fever (> 1 month)

Minor Signs:

- Generalized lymph node enlargement
- Oropharyngeal candidiasis
- Recurrent common infections, e.g. ear infections, pharyngitis
- Persistent cough
- Generalized rash

The WHO case definition for AIDS surveillance in children where HIV testing is available is complex and depends on advanced clinical and laboratory diagnostic facilities.

B. Neonatal HIV Infection:

- Infants of HIV seropositive mothers have:
- Increased anti- HIV IgG levels in most of them
- Anti HIV IgM is present in about 50 %
- HIV infection may be present in 60-70 %; of the 50 % develop AIDS
- Infants may present with AIDS or ARC
- most infants with AIDS present within 6 months of age

Maternal HIV antibody:

- Mean age at loss of maternal antibody is 10 months; 75 % loss maternal IgG by 12 months
- Loss of maternal IgG does not exclude infection. Some infants with HIV infection may be negative for antibody.
- -Infants may acquire infection in utero or perinataly
- In the first 2 years of life definite diagnosis of HIV infection is by viral culture
- from peripheral blood vessels
- loss of HIV anti-body is reported in some children infected with HIV

Presentation of pediatric AIDS:

Commonly with

- Severe recurrent bacterial infection and
- failure to thrive
- Chronic lymphoid interstitial pneumonitis

- Generalized lyphadenopathy, hepatosplanomegaly
- Oral candidiasis, recurrent diarrhea, otitis media.
- Neurological deficits-encephalopathy
- Cardiac involvement with myocardial dysfunction.

Prevention of HIV Infection:

The public should be accurately and well informed

- Avoiding sexual transmission of HIV
- Use of HIV free Blood or blood products
- IV drug users should not share syringes and needles
- Disinfecting of the equipment appropriately
- Protection from accidental inoculation with HIV
- Protection from infected secretions

10.10 Ophthalmic neonatrum

Ophthalmic neonatorum is an eye caused by the Neisseria gonorrhea; chalmydia from genital tract during delivery, or from the infected hands of personnel. The newborn acquires the infection during birth process by direct contact with infected material from vagina of the mother.

Clinical Manifestations:

The onset is usually within two or three days after birth, but symptoms may appear earlier. There is redness and swelling of the lids and a profuse, purulent discharge.

Complications:

The common complication is corneal ulceration with resulting opacity and partial or complete loss of vision. The extent of the handicap depends on the duration and severity of untreated condition.

Treatment:

The treatments of Opthalmia neonatorum include: prompt antibiotic injections and antibiotic eye ointments or drops to prevent eye damage and isolation of the infant.

Responsibility of the nurse:

The must be sure that:

1. The drops are instilled within the lids during the treatment
2. Prevent the infant from rubbing the infected eye
3. The purulent discharge must irrigate and removed frequently by directing the flow of fluid from the inner cantus outward.
4. Extreme care must be taken that no drops of the return flow splash into the nurse's eyes.
5. Antibiotic eye ointments are administered to all newborns immediately after birth as prophylaxis.

10.11 Congenital Syphilis

Congenital syphilis is a Transplacental infection of the fetus before the fourth month of pregnancy by the spirochete Treponema pallidum. It may result in miscarriage, still-birth, or manifest itself in early infancy.

Clinical features:

- Rhinitis with purulent or even bloody discharge
- Lesions on the (large blisters on palms and soles) and mucocutaneous junctions (mouth, nostrils anogenital)
- Signs of systemic involvement: hepatosplenomegaly, prolonged jaundice, and anemia.
- Painful swelling of long bones with characteristic x-ray changes
- Positive serological test for syphilis in mother and child

Management

1. PPF 100,000u/kg/day im for 10 days
2. Check the whole family for syphilis

Prevention:

All measures which decrease the incidence of acquired syphilis in adults

serological tests for syphilis in all pregnant women is desirable.

CHAPTER ELEVEN

VACCINE PREVENTABLE DISEASES

Learning Objectives:

After studying the material in this unit the students will be able to:-

- Identify vaccine preventable childhood diseases
- Recognize different forms of antigens used to protect against vaccine preventable diseases
- Recognize contraindications and adverse effects of immunization
- Immunize children at appropriate age
- Teach parents and care givers to immunize their children against vaccine preventable diseases

11.1 Justifications for immunization:

Of every 1000 children born in the world, about:

- grow up crippled by poliomyelitis
- die of neonatal tetanus

- 20 die of whooping cough
- 30 or more die of measles and its complication

Yet effective vaccinations against the disease exist.

The purpose of immunization is to protect against infectious diseases before they attack any individual. Immunization is the cost-effective method of infectious disease control. Once an immunization program has been established, it must continue or the disease will return to affect large numbers of unprotected individuals. The aims is to immunize in the first year of life against those infections that cause severe disease in infants and children; and to follow up it up with reinforcing (booster) inoculations and additional vaccines according to age. The most serious diseases of infants are whooping cough, (Pertusis), diphtheria, tetanus, tuberculosis, measles, poliomyelitis.

11.2. Immunization Schedules:

Immunization schedules are determined by:

The immunogenicity of the vaccine: good immunogenic vaccine (measles, BCG) need only one injection to produce long lasting immunity, weak immunogens (DPT, cholera) require several injections to establish protective antibody levels-ensure protection against the disease.

The epidomiology of the disease-when the disease occurs at an early age, immunization must be given early tuberculosis (BCG), polio vaccine, pertusis).

11.3. Hazards of Immunization:

a. Complications of immunization:

- Normal toxicity or reactivity- fever, malaise, local swelling
- Bacterial contamination-septicemia, abscess, tuberculosis
- Allergic reaction-anaphylaxis

b. Contraindications to immunizations:

1. Inactivated vaccine

- Major febrile illness
- Major intercurrent infections
- Severe reaction to previous dose
- Specific contraindication to pertusis and DPT

2. Attenuated (live) vaccines

- Major febrile illness
- Major intercurrent infections
- BCG to tuberculin individuals-severe local react

3. BCG Vaccination:0.05 ml of vaccine is injected

intradermal in the newborn

- 0.1 ml is used in all other ages
- Recommended site- just above the insertion of the deltoid muscle
- If tuberculin positive individuals are given BCG
- the skin reaction will be more rapid-noticeable in 3 days
- the inflammatory reaction will be more intense and likely to ulcerate

Complications of BCG vaccinations:

- Local abscess formation and ulceration
- Regional lymphadenitis
- Local granulomatous lesions
- Hypertrophied scars and keloids

4. DPT and DT Vaccines:

DPT is a combination of Diphtheria taxied-killed pertusis organisms, and Tetanus toxoid. DPt is given by IM or deep SC injections. It is the pertusis component that causes severe reaction to DPT.

a. Contraindication to the DT vaccine

- Major febrile illness
- Significant intercurrent infection
- Allergy to vaccine contents
- Severe reaction to previous dose

b. Contraindications to pertusis immunization (as DPT)

History of severe local or generalized reaction to previous dose

History of fits or convulsions

Current progressive neurological disease

5. Polio Vaccines:

Oral poliovirus vaccine (OPV).

Provides greater herd immunity-spreads to immunize contact of the vaccine

Is easier to administer and less expensive

At least three doses are required in primary immunization to establish protection against the 3 poliomyelitis serotypes 1,2,3. Any of the serotypes can cause paralytic disease.

6. Measles Vaccines:

Natural measles infection is a serious disease with greater risk of morbidity and mortality than the vaccine.

Measles vaccine:

Early vaccination produces a poor response in some children because of maternal antibody still in the child's circulation. By 6-9 months of age seroconvertion rates are satisfactory. Measles is given at 6-9 months in measles endemic areas; and after 12 months elsewhere. Children immunized before 12 months need a second dose after 14 months of age to ensure individual protection

Indication for measles vaccination:

- All children in measles endemic area
- To interrupt a measles outbreak
- the incubation period for the vaccine is shorter than that of the natural disease
- measles vaccine given within days of contact stops the spread of the disease

Contraindication to measles vaccine:

- Sensitivity to vaccine content (e.g. chicken egg)
- Personal and family history of convulsions
- Immunodeficiency diseases
- Acute tuberculosis

Adverse reaction to measles vaccine:

- 10-20 % of children get a mild illness 7-14 days after the vaccine (fever, cough, and occasionally a rash)
- Convulsion in association with fever
- Encephalitis and encephalopathy (rare after vaccine)

Study Questions

1. What are the common vaccine preventable diseases?
2. What are the adverse effects of vaccinations and measures to be taken?
3. List the most common contraindications for vaccination?
4. Discuss the importance of vaccines.
5. List the types of vaccines commonly used in developing countries?

CHAPTER TWELVE

EXPANDED PROGRAM ON IMMUNIZATION (EPI)

Learning Objectives:

After studying the material in this chapter, the student will be able to:

- Recognize the six vaccine preventable diseases and their annual incidence rate in Ethiopia.
- State the objectives of EPI and its target groups
- Identify vaccine schedule for each target diseases and provide vaccinations as scheduled.
- Realize the dangers of unsterile vaccination equipment and use appropriate sterilization methods before using it.

Communicable diseases are among the major causes of child mortality in Ethiopia. The estimated annual incidence rates per 100,000 live births for six EPI target diseases are as follows:

- Measles 400
- Pertusis 400

- Poliomyelistis 12
- Tuberculosis 77
- Diphtheria 17
- Neonatal tetanus 840

Mortality by these diseases is highly aggravated by:

- Ignorance
- Undernutrition and
- Poor environmental hygiene. The six vaccine preventable diseases are estimated to account for at least one-third of infant and child disability and mortality.

The objective of EPI is making immunization available to all infants and women of childbearing age (15-49).

12.1 Strategies of EPI Service Delivery:

- Permanent health units (static)
- Scheduled sessions at out-reach sites and
- By mobile vaccine teams to control/epidemics such as measles and meningitis.

Table 11. Child immunization scheme

Contact	Age of child	Vaccine
1.	At birth	BCG and OPV Zero
2.	6 Weeks	DPT1 and OPV1
3.	10 Weeks	DPT2 and OPV2
4.	14 Weeks	DPT3 and OPV3
5.	9 Months	Measles

The immunization schedules for the six “EPI” antigens are given in the tables above. These tables reflect the ideal situation for immunization. Often mothers bring their children at less frequent intervals than those suggested here. If the child is first seen at a later stage than indicated in the immunization scheme, the immunization is started with vaccines 1,2,3 and 4, given with four weeks interval. If the child is 9 months or older, the 5th injection, measles is given four weeks after DPT3. The vaccination scheme should be started on all children under 2. BCG and measles should be given to all under 5. BCG and measles may then be given at the same time. Tetanus Vaccination: some women have certificate that they had DPTs. They need only one injection at each of their two first pregnancies.

Table 12. Type of Immunization, dosage and route for administration.

Vaccine	Route of administration	Dose
BCG	Intradermal injection	0.05 ml 0.1 ml after 1 year of age
Polio (OPV)	By mouth	2 drops each time
DPT	Intramuscularly injection into the thigh	0.5 ml each time
Measles	Subcutaneous injection left upper arm	0.5 ml

12.2. Contraindications:

There are only three contraindications to immunizations.

1. Give no BCG vaccine to a child with clinical AIDS
2. Do not give DPT2 and DPT3 to a child who has had convulsions or shock within three days of the previous dose
3. Do not vaccinate in the presence of severe illness. Vaccinate at later occasion when the child has recovered. Children with diarrhea should be given OPV. This dose should not be counted.

12.3. Sterilization:

Contaminated needles and syringes can transmit AIDs virus and the Hepatitis virus. Applying the following rules can prevent the spread of these viruses.

1. Reusable needles and syringes should be sterilized correctly (steam sterilization or boiling for 20 minutes)
2. If possible used syringes and needles should be destroyed after each use
3. A single sterile needle and syringe should be used for each injection

12.4 Principles of the immunization program

The aim of the EPI program is to improve management of immunization activities at all levels. To achieve this EPI uses the following principles:

- integration in MCH program
- health education
- disease surveillance
- monitoring and evaluation
- operational research

Study Questions

1. What are the strategies used to achieve the objectives of EPI in Ethiopia?
2. What are the dangers of using contaminated syringes and needles during vaccination and what are the steps to be used to prevent it?
3. The vaccine preventable diseases estimated to account for one third of infant and child disability and mortality in Ethiopia. What factors do you think contributed to this?

CHAPTER THIRTEEN

COMMON GENETIC PROBLEMS OF CHILDREN

Learning Objectives:

After studying the material in this unit, the student will be able to:-

- Identify the most common genetic problems of children
- Manage children with different genetic problems
- Support parents of children with genetic problems
- Help children with mental retardation to be trained basic skills

13.1. Mental Retardation:

If a child is significantly retarded in his psychomotor development (milestones)

we suspect subnormal intelligence and speak of mental retardation. Several degree of mental retardation is seen. Severe, moderate, mild. In very mild case there may be only minimal brain damage giving rise to slight delay only and less than optimal intelligence may only become obvious in school.

Minimal brain damage, hardly recognized, but probably much more frequent than severe damage may will be a much bigger burden to the society. A child is considered mentally retarded if (without other obvious reasons):

a. He can not sit without support at age 9 months, can not stand at at age 15 months, can not walk at age 18 months

b. He can not lough loudly at age 6 months, speak three words at age 2 years, and follow a few simple directions at age 3 years

c. He can not grasp actively at age 6 months, and take small objects with thumb and finger at age 1 year.

Causes:

a. Inherited abnormalities or subnormalities of the brain like in microcephalus, hydrocephalus.

b. An abnormality of chromosomes the carrier of inheritance in the cellular nucleus the feature of mongolism (Down's syndrome) characteristic faces with slanting eyes, a small flat nose a protruding tongue, low set ears and small head.

c. Perinatal problems (prematurity, asphyxia) , or disease acquired after the neonatal period (meningitis, encephalitis, cerebral malaria) may damage the brain

d. Hypothyroidism (cretinism)

e. Environmental factors (pronounced parental neglect)

f. Deafness can mimic mental retardation

Management:

Since there is no treatment of the cause

1. In moderate retardation habit training – eating, walking, and putting on cloths
2. In mild retardation special attention in schools or ideally special school can of value
3. For any degree of mental retardation parents should be supported

13.2. Cerebral Palsy

Cerebral palsy is a syndrom- a combination of symptoms. It is a term used for all permanent, no-progressive, generalized brain damage in children irrespective of the cause. Usually some degree of spasticity symptoms are combined with mental retardation, but sometimes the mental retardation is minimal or even abscent.

Causes:

a. Prenatal: acquired disease such as congenital infection Perinatal: (shortly before or after delivery) : asphyxia, cerebral hemorrhage,
b. prematurity and severe jaundice are the most common causes of cerebral palsy
c. After the first week of life: meningitis, encephalitis, cerebral malaria can also cause cerebral palsy

Clinical Features:

1. Spastic paralysis if the lesion unilateral or spastic paraplegia if the lesion bilateral
2. Mental retardation may or may not be present
3. Ataxia is prominent
4. Deafness and blindness can occur as well
5. Squint is common

Management:

1. Regular exercise under the guidance of physiotherapist help in preventing deformity and contracture
2. Simple home training must be initiated
3. Parents of such children support and reassurance

Prevention:

- Proper antenatal and perinatal care,
- early recognition of meningitis etc

13.3. Down's Syndrome:

Down's syndrome is a chromosomal abnormality involving an extra chromosome (number 21) characterized by a typical physical appearance and mental handicap.

Etiology:

1. An error in cell division
2. Associated with advanced maternal age
3. Abnormal attachment of chrosomes inherited from parents

Clinical Manifestations:

1. Eyes slant upward and outward
2. Excess skin on back of neck
3. Flatened nasal bridge and flat facial profile
4. Small ears often incompletely developed
5. Short broad feet
6. small male genitalia
7. Absence of moro reflex

Complications:

1. Recurrent infection of upper respiratory tract
2. Skin infection
3. Serious behavioral problems

Nursing Responsibility:

1. Establishing and maintaining adequate nutrition
2. Recording and reporting any sign of physical complaints
3. Providing a safe environment for the infant
4. Providing appropriate stimulation according to child's age
5. Encouraging parental participation in caring for and handling the infant
6. Working effectively with parents

13.4 Cretinism/ hypothyroidism:

Defects or complete absence of the thyroid gland with insufficient production thyroid hormone causes severe retardation of physical and mental development of the child, sometimes known as cretinism. Earl detection and proper treatment can provide a normal life.

Clinical Features:

1. Delayed growth and development
2. Signs of slow metabolism (hair and skin dry, thick and coarse)
3. Goiter may be present or thyroid gland may be absent

Management:

1. Thyroid hormone treatment should be continued for life
2. If diagnosed within the first month of life and substitution with thyroid hormone continued regularly the child will have a normal life
3. With late diagnosis and inadequate treatment the child will be severely retarded and handicapped

13.5 Juvenile Diabetes Mellitus:

The characteristics of juvenile diabetes millitus differ from those when the onset is latter in life.

Symptoms:

The onset can be insidious with loss of appetite, weight loss, abdominal cramps, vomiting, emotional disturbance and lassitude. Polyuria, and polydipsia in young children are symptoms to make you think of diabetes mellitus which is not uncommon and is often overlooked

Findings of sugar in urine, and an increased blood sugar prove the diagnosis.

Treatment:

1. Insulin injection must be given for life
2. Lengthy hospital admission is often necessary
3. If a child is comatose and the test for sugar in the urine is strongly positive

- set IV drip with normal saline
- give 1u/kg crystalline insulin im
- refer the child urgently to hospital

Prognosis:

The prognosis is poor because the management is difficult and complications like hypoglycemia and vascular changes occur frequently.

Study Question

1. Discuss the differences between severe, moderate, and mild mental retardation.
2. What are the criteria's to consider a child as mentally retarded?
3. What are the possible causes of mental retardation?
4. What are the common causes of Cerebral palsy?
5. What are the possible causes of Down's syndrome?
6. List the clinical features of Down's syndrome.