BABY AT RISK

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MODULE OBJECTIVE

By the end of the module the learner should be able to:

1. Identify babies with special needs/babies at risk
2. Manage babies with special needs/babies at risk
3. Utilize the nursing process in managing babies with special needs /babies at risk.

Babies at risk

1. low birth weigh babies,
2. congenital abnormalities,
3. respiratory distress syndrome,
4. birth injuries and trauma,
5. neonatal jaundice,
6. Post term baby
7. neonatal sepsis,
8. hypothermia,
9. hypoglycemia,
10. haemorrhage,
11. babies of diabetic mother, opthalmia neonatorum
12. fetal compromise covered in abnormal midwifery

Definition

- **A high risk infant** is **any neonate , regardless of weight ,size or gestational age** who has a greater than average chance of morbidity, or mortality, , especially within the first 28 days of life.
- **Risk factors**: include
  - ✓**preconception,**
  - ✓**prenatal,**
  - ✓**natal, or**
  - ✓**postnatal** conditions or conditions that interfere with the normal birth process.

LOW BIRTH WEIGHT BABYIES

- **Low birth weight** refers to babies born with weight is less than 2500gms regardless of period of gestation.
- Category of low birth weight babies:
  - **Low-birth-weight infant**: infant with birth weight lower than 2500g (up to and including 2499g), regardless of gestational age.
  - **Very low-birth-weight infant:** infant with birth weight lower than 1500g (up to and including 1499g), regardless of gestational age.
  - **Extremely low-birth-weight infant**: infant with birth weight lower than 1000g (up to and including 999g), regardless of gestational age

Low birth weight babies are:

1. Premature babies
2. Light for gestation babies/ light for dates

1. PREMATURE BABY

- **Preterm baby** is defined as babies born alive before 37 weeks of pregnancy are completed.
- Some of them may have growth retardation and therefore be **small for gestation**, while others may **be exessively large for gestational age** (macrosomia).

Sub categories of premature births

Sub-categories of preterm birth, based on gestational age:

- Extremely preterm (<28 weeks)
- Very preterm (28 to <32 weeks)
- Moderate to late preterm (32 to <37 weeks).

Predisposing factors to prematurity

1. **Maternal factors:** Maternal age e.g. primigravida below 17 years or above 35 years ; maternal disease in pregnancy such as anaemia,hypertention,pre-eclampsia.
2. **Foetal factors:** Congenital abnormalities; multiple pregnancy and polyhydamnios due to over digestion of the uterus ;rhesus incompactibility interfering with foetal viability.
3. **Placental factors:** APH due to placenta praevia and placenta abruption.
4. **Social factors:** Straineous exercises, excessive drinking of alcohol and smoking, previous history of miscarriage, psychological stress.

Clinical Features Of A Premature Baby

- Small stature with low birth weight less than 2500 g
- Thin and sparsely distributed hair on the head

•Skin is reddish with plenty of laguno

•Widely open sutures

•Eyes are closed most of the time

•Pinnae of the ears are soft and fold easily on pressure and slow to uncoil.

•Narrow sinuses and and the nose a bit flat

•Swallowing and sucking reflexes absent or very weak

- Weak cry and there is no tears.

•Chest is small, soft with underdevelped breast tissues

•Poor muscle tone and the baby lies inactive most of the time

•In females,labis majora are widely separated and the libia minora is protruding in between

•In males, scrotal muscles are smooth and testes are undescended

•Palmer and planter creases are absent

•Grasp reflexes are absent

Physiology of the preterm baby

1. **Immunity is low due to:**
   - Low gamma globulins responsible for immunity
   - Delicate skin that is vulnerable to injuries and infection
   - Lack of passive immunity which usually develops around 38 weeks gestation
2. **Blood system**
   - Has poor peripheral circulation with high tendency to haemorrhage because of weak vascular walls.
   - Prone to haemorrhage due to lack of clotting factors.Vitamin K is administered to promote clotting.
   - Unable to store iron hence are at risk of iron deficiency anaemia
   - They have very few blood cells and may develop nonpitting oedema

3. **Weight**
    - Initially they lose up to 10% of their birth weight and start gaining and reach birth weight 2 – 3 weeks post delivery

4. **Temperature regulation is poor due to:**
    - Immature heat regulatory centre
    - Limited food intake and low metabolic rate
    - Inability to shiver and generate heat
    - Excessive heat loss due to little or no subcutaneous fat.The brown fat is usually in baby's body by 36 weeks gestation

5. **Respiratory system**
    - Underdeveloped respiratory centre leading to difficulty in initiation of respiration.
    - Frequent opnoeic attack with irregular respiration.
    - Abdominal movements more than chest movements.

7. **Renal system:**
    - Immature kidneys are unable to concentrate urine hence they excrete chlorides and phosphates
8. **Digestive system**
    - Absence of swallowing and sucking reflexes lead to poor feeding
    - Regurgitation after feeds due to underdeveloped cardiac sphincter.
9. **Nervous system**
    - All the regulatory centres are underdeveloped

Nursing management

1. **Warmth:** Delivery of a preterm baby should be conducted in a warm room and subsequently nursed in preterm incubator.
2. Temperatures of the incubator should be maintained within normal range of about 36 – 37°C. perform first examination of the baby to assess maturity.
3. **Feeding**: Fix NG tube and feed the baby with expressed breast milk (EBM) and substitute only where breast milk is not available.

3. Feeding

Feed the baby using the oral feeding regime,

a. Baby is given 60 – 65 m/s per kg of body weight in 24 hours in 8 divided doses eg 2.5 kg baby will have 2.5 x 60/8 = 18.99 mls per feeding thus baby should be fed 3 hourly.
b. Babies below 1500gms feed 2 hourly.
c. If the baby tolerates the feed can be increased.
d. If the baby cannot tolerate the oral feeds, give IV fluids e.g. 10% dextrose day one then (HSD/10%D ratio of 1:2) day 2 if there is normal renal function.
e. Introduce cup feeding gradually as the baby gains weight.
f. Aspirate the gastric content to rule out indigestion.

4. **Close observation to include:**
   - Vital signs Temperature, pulse and respiration
   - Respiration rhythm to note apnoeic attack
   - Umbilical stump for signs of infection.
   - Vomiting or retaining food
   - General activity and emotional status
5. **Prevention of infection** by care of IV lines i.e. Securing, cleaning and dressing, hand hygiene, cord care, giving prophylactic antibiotics, top tailing the infant daily.
6. **Give nutritional suplements** from 14 days i.e.
   - Folic acid 2.5mgs weekly for 6 months,
   - Multivitamin 2.5 mls daily for 6 months,
   - Vitmin D drops 400iu (2 drops) daily for 6 months,
   - Then at 28 days stat giving Iron suppliment 2.5mls daily for 6 months,

7. **Initiate kangaroo mother care** (KMC) for all babies below 2500gms, if the baby is stable and the mother mentally stable and is willing.

- ***Kangaroo Mother Care is defined as early, prolonged continuous skin-to-skin contact between a mother (or her surrogate) and her low birth weight infant.***
- ***It is a simple, inexpensive and safe method of caring for low birth weight infants.***
- ***Babies below 1200gms are nursed in an incubator (not stable for KMC)***

8. **Administer broad spectrum** antibiotics prophylactically for prevention of infection.
9. **Take weight** on alternate days to monitor the progress.
10. Teach the mother on how to care for the premature infant
11. **Discharge** the baby at 2000 – 2500 g on KMC.
12. **Give BCG vaccine** on discharge or advice the mother to take the child for immunization regardless of weight.
13. Advice the mother on family planning so that she gets another baby when the stress has reduced.

Complications of premature babies

1. Hypothermia neonatorum
2. Jaundice
3. Haemorrhagic disease of new born
4. Infections
5. Respiratory distress syndrome
6. Anaemia
7. Retrolental
8. Rickets
9. Failure to thrive

Prevention of premature birth

- One way to prevent premature births is to give early and continued prenatal care with stress on dietary and general hygienic education to the expectant mother.
- Prolonged bed rest should be encouraged, especially where the mother has any of the conditions that predispose to preterm labour
- Use of sedatives during preterm labour to ensure complete bed rest
- Avoidance of strenuous exercise and calming the mother, because any strain or stress may aggravate preterm labour

Kangaroo mother care

- Kangaroo Mother Care is defined as early, prolonged continuous skin-to-skin contact between a mother (or her surrogate) and her low birth weight infant.
- It is a simple, inexpensive and safe method of caring for low birth weight infants.

Benefits of KMC

1. Decreases the occurrence of apnoeic attacks and irregular breathing
2. Associated with less infections and when they occur, they are less severe
3. Decreases mortality of low birth weight babies
4. Increases mother’s confidence in caring for her small new-born and improves bonding
5. Reduces hospital stay for mother and baby (early discharge)

Benefits of KMC

6. Helps maintain an appropriate body temperature for the new-born
7. Promotes exclusive breastfeeding, resulting in a higher rate and longer duration of breastfeeding
8. Babies gain weight and grow faster as KMC promotes GI growth Reduces costs for the health facility and the mother/guardian as minimal equipment is required and is less expensive than incubator care
9. Enables fewer nursing staff to care for larger numbers of low birth weight new-borns

2. Small For Gestational baby /small for dates

- **Small for gestation/ small for dates**: This term refers to a baby whose birth weight is below 10 th centile for his gestational age.
- Commonly referred to as low birth weight but this includes preterm babies.

They are susceptible to various problem

- Congenital abnormalities
- Foetal hypoxia that may lead to intrapartal death
- Birth asphyxia due to inadequate perfusion, meconium aspiration leading to airway obstruction
- Hypothermia due to little subcutaneous tissue
- Apnoeic attacks
- Hypoglycaemia

Signs And Symptoms

- Mostly they are born after 37th week gestation
- Pale, dry, loose skin with wrinkles and have no lanugo
- Subcutaneous fat is minimal
- Show features of retarded gowth
- The abdomen appears sunken
- Sutures and fontanelles are normal
- Eyes are allert and has mature facial expression
- Skull bones are hard and allow little mobility
- Have strong cry
- Umbilical cord is thin
- Swallowing and sucking reflexes are present so they feed well
- Normal muscle tone and are active

Nursing management

•The baby is predisposed to the risks similar to those of preterm baby thus the management principles are the same:

1. Management should start in labour by closely monitoring foetal condition for signs of foetal distress
2. In case of fortal distress in first stage, administer oxygen to the mother and start IV drip of 10% dextrose as you prepare the mother for emergency c/s.
3. If in the second stage the delivery is hastened by giving a generous episiotomy.

4. Since the baby is prone to hypoglaecaemia, it should be started on breast feeding as soon as possible.
5. Gastric lavage should be done with warm dextrose before breastfeeding
6. Substitutes are given if there is no breast milk, the feed is calculated at 80mls/kg body weight in 24 hours in 8 divided doses ie 3 hourly feeding
7. Closely observe vital signs TPR and signs of infection, give vitamin K to prevent haemorrhagic disease of the newborn, TEO to prevent opthalmia neonatorium, and CHX for cord care.

8. The baby should be nursed in a warm environment to prevent hypothermia although it has temperature regulation mechanism.
9. Closely monitor blood sugar to rule out hypoglycaemia.
10. Weigh the baby on alternate days to monitor the progress. Usually weight loss is minimal and it gains weight more rapidly and steadily than preterm.
11. Teach the mother how to take care of the delicate skin that may be dry , cracked or peeling
12. Discharge at 2000-2500gms if newborn is stable.

complications

1. Hypoglycaemia
2. Respiratory distress syndrome
3. Aspiration pneumonia
4. Brain damage

3. ASPHIXIA NEONATORUM

- **Asphyxia** is a term used when the baby fails to breath at birth.

Types of Asphyxia :

•The degree of asphyxia is determined by **Apgar score** in which the following features are observed and scored 0-2

- **Appearance(A):** Note colour of the skin
- **Pulse (P)** (heart rate):
- **Grimance (G):** Note response to stimulation. Gently rub on to the sole of foot and note grimace.
- **Activity (A) :** Note activity and muscle tone of the baby by stimulating the arms and legs by pulling the
- **Respiration (R)** / respiratory effort: Note respiration by looking at the abdomen and chest.

For further reading on APGAR score refer NCK procedure manual pg 271

•A score between 8-10 does not show asphyxia.

Types of asphyxia

There are three types of asphyxia namely:

1. **Mild asphyxia:** Apgar score is 6 – 7 .It requires clearing of the airway and application of external stimuli to initiate breathing.
2. **Moderate asphyxia:** Apgar score is 4 – 5. It requires resuscitation , administration of oxygen and drugs to initiate breathing.
3. **Severe asphyxia:** Apgar score is 0 – 3 . It requires intensive resuscitative measures and intubation to survive.

Predisposing factors

1. **Any condition causing foetal distress** e.g. cord prolapse, prolonged labour, APH
2. **Intrauterine hypoxia** due to placental insufficiency, postmaturity, placenta abruption, anaemia and pre-eclampsia
3. **Prematurity due** to underdeveloped respiratory centre
4. **Blockage of airway** by mucus or liquor amni at birth.
5. **Birth injuries** e.g. intracranial injury
6. **Severe maternal disease** in pregnancy eg sickle cell anaemia, cardiac disease
7. **Depression of respiratory** centre due to drugs e.g. General Anaesthesia and narcotics

Signs and **symptoms of asphyxia**

Mild and moderate asphyxia

- Apex beat (pulse rate) 100/min or less
- Skin colour is pink with blue extremities
- Response to stimuli may be present
- Cry may be weak or strong
- Makes effort to breath and may gasp with irregular respiration

Severe asphyxia

- No attempt to breath and may gasp periodically
- It does not cry
- Entire body skin is blue ie. cyanosed
- No response to stimuli
- Pulse rate very slow or absent
- Poor muscle tone

Nursing management

1. **Clear the airway** as soon as the baby is born.
2. Nurse the baby in an incubator for at least 48 hours **to keep it warm** at body temperature.
3. **Resuscitation may be needed to promote ventilation** and ensure effective circulation to prevent acidosis,hypoglycaemia and intracranial haemorrhage
4. **Do suctioning whenever** necessary
5. **Closely observe** the baby for skin colour TPR
6. **Administer oxygen** by mask, ambu bag or nasal catheter whenever there is an apnoetic attack
7. Aspirate mucus to unblock the airway or may intubate the baby
8. **Give IV fluids 10%D for rehydration calculate as for feeds day 1**
9. **Give fluids with** electrolytes to maintain fluid – electrolyte balance i.e.half strength darrows day 2.
10. If the mother was given narcotics during labour, administer its antidote **Naloxone** through the umbilical vein,
11. **Give anticonvulsants** to control convulsions if present,

10. Administer the following drugs:
    - Sodium bicarbonate 1 – 2 mls to combat acidosis
    - Vitamin K 0.5 – 1 mg i.m to prevent haemorrhagic disorders
    - Aminophylline to strengthen heart muscles
11. Maintain accurate input output charts to prevent overhydration or underhydration
12. When the baby is stable, pass the NG tube and start feeding
13. Observe hand hygiene, aseptic technique to prevent cross infection
14. Administer broad spectrum antibiotics prophylatically

NURSING PROCESS CLASS PRESENTATION GROUP 2

Prevention of asphyxia

Antinatal period:

- Proper screening of mothers to detect those at risk and advice on delivery in hospital for proper management.
- Pelvic assesment should be done at 36 weeks to rule out cephalo pelvic dispropation (CPD)

Intrapartum:

- Drugs that depress respiratory centre eg.sedatives, GA ,narcotics should be avoided in late first stage;
- Early detection and management of foetal distress ;
- Clearing baby's airway as soon as the head is born;
- Avoid instrumental deliveries but rather prepare for c/s;

Complication

1. Brain damage
2. Cardiac arrest
3. Respiratory distress syndrome
4. Respiratory acidosis

Neonatal Emergency

- Neonatal emergencies are conditions or situations that require prompt and accurate action by the midwife.
- The speed of these actions will often help determine the outcome for the baby.
- It is usually a matter of life and death and midwife's knowledge, skill and correct attitude go a long way in successful management of the situation.
- Example of neonatal emergencies:
    1. Asphyxia neonatorum,
    2. Respiratory distress syndrome (RDS)
    3. Haemorrhagic diseases

RESUSCITATION OF A NEWBORN BABY

- **Definition:** Resuscitation is a series of actions taken to establish Normal Breathing, Heart Rate, Color, Tone and Activity in an infant who has not established breathing or crying or those suffering from birth asphyxia.
- OR resuscitation is an emergency measure taken to sustain life or to revive when life has just ceased.
- **Purpose** is to restore lung and heart functions through establishing and maintaining a clear airway, ensuring effective circulation, correcting acidosis and preventing hypothermia, hypoglycemia and haemorrhage.
- **Indications:**
  - All infants who do not breath well after delivery (birth asphyxia)
  - Babies who have an APGAR score of below 7 in 1 minute.
  - Any infant who stops breathing or has depressed vital signs at any time after delivery or in newborn unit

principles of newborn resuscitation

- First ensure that all the equipment's and drugs are ready then follow the principles of resuscitation **A, B, C, D, O**

1. **Airway** should be cleared either by suction or positioning the infant.
2. **Breathing**, that is, establish respiration if not breathing.
3. **Circulation** should be noted through pulse, colour of mucus membrane and heart beat. Start cardiac massage if there is no heart beat or pulse.
4. **Drugs**
5. **Observations** to make a diagnosis.

- **First level resuscitation** includes wiping of the face and body and flicking the soles of the feet to stimulate the baby

- **Second level resuscitation** involves: A,B,C,D,

1. **Keep the baby warm**:

- Place the baby on a firm, clean and warm surface.
- Inform the mother that the baby has difficulty breathing and that you will help the baby breath.
- Keep the baby wrapped and under radiant heater if possible.

2. **Open the airway:**

- Position the head so that it is slightly extended to open the airway. (neutral position).
- Overextension or flexion will collapse the pharyngeal airway. A towel folded to 2-3 cm thickness placed under the shoulders will help to achieve the correct position.
- If baby is floppy, use the jaw thrust to bring the tongue forward and open airway.
- If the baby has secretions suck the mouth and the nose,

- Introduce the suction tube into the newborn's mouth 5cm from lips and suck while withdrawing.
- Introduce the suction tube 3cm into each nostril and suck while withdrawing until no mucus.
- Repeat each suction if necessary but no more than twice and no more than 20 seconds in total.

3. BREATHING (If still no breathing, ventilate):

- Place a mask (attached to bag)to cover chin, mouth and nose form a seal between the mask and the newborn's face.
- Using the bag and mask give five inflation breaths each of 2-3 seconds (also known as rescue breaths).
- Check the rise of the chest. The chest may not rise during the first 1-3 inflation breaths which are needed displace fluid from the lungs.
- If chest is not raising **reposition the head, check mask seal** and **squeeze the bag harder**
- **Once chest is raising,** ventilate at 40 squeezes per minute until baby start breathing spontaneously.
- If breathing or crying stop ventilating, look for chest in drawing, count breaths, ct care

- If breaths are less than 30/min continue ventilating and arrange for referral inform the mother and reassure
- Re-assess heart rate after first five breath an increasing heart rate or heart rate above 100bpm is a sign of effective ventilation.

4. CIRCULATION :if there is no heart beat or heart is <60bpm, even when the chest is being ventilated, give chest compression (cardiac massage)

- The best way to give cardiac massage is to encircle the newborn's chest with two hands so that the thumbs meet on the sternum below the line between the nipples .
- Compress chest by 1/3 of its depth-three times for each inflation. 3 chest compression: 1 ventilation. 3:1
- Once heart rate is above 60bpm and rising , discontinue chest compression and continue with ventilation and assessing the response.

- If the newborn is breathing normally (30-60bpm) and there is no chest indrawing and no grunting

➢ Put baby into skin to skin with the mother;

➢ Observe breathing at quick intervals;

➢ Measure temperature and rewarm if 36 degrees;

➢ Encourage mother to initiate breast feeding

➢ Keep the baby under observations until she or he has been stable for at least 6 hours.

➢ Explain what has happened to the mother.

If there is no gasping or breathing at all after 20 min of ventilating stop ventilating and give emotional support to the family.

5. DRUGS do not give drugs as a routine during resuscitation if any drug is to be given give intravenously preferably adrenaline

6. OBSERVATION: perform observation to make a diagnosis APGAR SCORE then continue to assess response to intervention

Do not in any case

1. Do not Slap, blow on or pour cold water on the baby.
2. Do not Hold the baby up side down
3. Do not routinely suction the mouth nose of a well baby.
4. Do not Use heavy suctioning of the back of the throat of the baby.
5. Do not give injections of respiratory stimulants or routine sidium bicarbonate.

4. RESPIRATORY DISTRESS SYNDROME (RDS)

- **Respiratory Distress Syndrome:** is a condition that occurs due to lack of or inadequate surfactant in the lung tissue.
- Mature lungs have adequate surfactant that lowers surface tention in the alveoli,stabilises the alveoli and prevents them from adhering together and collapse.This leads to breathing with ease.
- Surfactant factor is produced slowly from 20 weeks gestation and reaches a surge at 30 – 34 weeks gestation and another surge at onset of labour.The premature infants lack this factor thus the alveoli wall pressure rises as he breathes out and alveoli collapse leading to severe difficulty in breathing.

RDS……

- **Other names used to refer to RDS:**
  - **Hyaline membrane disease**
  - **Pulmonary syndrome of the newborn**
  - **Developmental respiratory distress**

•Respiratory distress syndrome is a disease of prematurity and **self – limiting with recovery phase** or **death.**

Predisposing factors

- **RDS** may may be a complication of asphyxia and develops within **4 hours of birth**
- **Prematurity** due to inadequate surfactant factor
- **Prenatal hypoxia** eg due to APH which reduces surfactant synthesis
- **Trauma to CNS** due to difficult delivery or precipitate labour
- **Perinatal hypoxia**
- **Profound hypothermia:** leads to injury of cells that produce surfactant
- **Congenital heart disease**

Clinical Features

1. Difficulty in breathing (dyspnoea)
2. Flaring of alae nasi
3. Tachypnoea with respirations above 60/min normal (30 -60 bpm)
4. Hypothermia
5. Generalised cyanosis
6. Costal and sternal retraction
7. Grunting expirations
8. Reduced or increased heart rate
9. Chest x rays shows collapsed alveoli
10. The baby has poor muscle tones and is motionless
11. Poor digestion due to diminished bowel movement
12. Resolves or death occurs within 3 – 5 days

Nursing management

1. The principle of management during care of babies with RDS are **observations, oxygenation, positioning, nutrition, and hydration.**
2. Management is symptomatic until the disease dissolves
3. If RDS is anticipated,inform a paediatrician to resuscitate the baby.
4. Nurse the baby in an incubator to avoid hypothermia by controling body temperature
5. Administer oxygen or do artificial ventilation to prevent hypoxia
6. Closely monitor the blood pH to prevent acidosis and support pulmonary circulation because high carbon dioxide levels lead to constriction of pulmonary arterioles leading to poor pulmonary blood flow.
7. Incase there is acidosis , sodium bicarbonate is added to 10 % dextrose drip
8. Keep the baby nil per oral till the distress resolves
9. Administer IV fluids eg.10% dextrose and add calcium gluconate to strengthen heart muscles ; sodium bicarbonate to ensure fluid electrolyte balance

9. Check haematocrit (PVC) and if less than 40% transfuse with blood.
10. Maintain the normal BP with volume expanders
11. Position the baby to provide greatest air entry (prone position with extended head neutral ponormaly)
12. Suction and do postural drainage to remove secretions and keep the airway patent.
13. Close observations to monitor the process whether improving or deteroriating ie. heart rate,respiration,cyanosis.
14. When the condition resolves,introduce oral feeds gradually. In case the baby developes abdominal distension due to indigestion, stope oral feeds and start IV fluids.

Prevention of RDS

- Early detection and management of high risk pregnancies to prevent premature delivery.

•Conditions such as diabetes mellitus should be properly managed so that delivery can be prolonged to 36 – 38 weeks.The mother is then given Dexamethasone 4mg tds 48 hrs before c/s to stimulate lung maturity.

•Prevent perinatal hypoxia by ensuring there is no intracranial injury at birth.

•Effective resuscitation at birth of high risk babies.

•Assesment of gestational age and lung maturity through amniocentesis so that elective c/s or delivery can be delayed if lungs are not mature enough.

Complication

- Retrolental fibroplasia
- Hypothermia
- Hypoglycaemia
- Patent ductus arteriosus
- Abdominal distention
- Hypocalcaemia
- Intracrania hemorrhage
- infection

5. HYPOGLYCAEMIA

- This is a metabolic disorder in which the blood glucose level falls below 2.6mmol/l.
- At term,the baby's glucose level is almost equal to that of the mother but gradually drops within 3 – 4 hours after birth.
- This is why the baby has to be fed within one hour of life.
- The baby's blood glucose rises steadily following feeds to 2.8 – 4.5 mmol/l in 6 – 12 hrs.
- Term babies can maintain their energy requirements as long as they are kept warm.
- This condition is common in infants of diabetic mothers.

- Due to excess glucose, the foetus produces more insulin which increases its body fat and muscle mass leading to large babies (macrosomia).
- At birth the glucose level falls rapidly while insulin levels remail relatively high so the baby is at risk os hypoglycaemia.
- This is why such babies are admitted into NBU.
- Prolonged hypoglycaemia can lead to:
  - **Mental retardation,**
  - **Permanent neurological damage** and
  - **Death due to respiratory and metabolic** acidosis.

Predisposing factors to hypoglycaemia

- Low birth weight
- Prematurity
- Birth injuries
- Maternal diabetes mellitus
- Asphyxia
- Septicaemia
- Respiratory distress syndrome

Clinical features for hypoglycaemia

- Low blood glucose less than 2.6mmol/l
- Irritability
- Poor feeding
- Hypotonic muscle activity
- High pitched cry
- Hypothermia
- Lethargy
- Apnoea

Nursing management

- Give 10 % dextrose infusion untill normal glucose levels are achieved
- Encourage the mother to breastfeed the baby
- Feed through NG tube or cup feeding expressed breast milk
- If the hypoglycaemia is severe, put up 10% dextrose infusion and give 65 – 85 mls/kg of body weight in 24 hours.
- Give a bolus dose of 25% dextrose 2mls/kg body weight i.v slowly for 30 minutes.
- Closely monitor the glucose levels 1 hourly untill the general condition is stable or normal levels have been achieved.
- Once the normal levels are achieved, wean off the dextrose and observe closely for changes in the condition.

Prevention

- Taking blood glucose levels at birth and introducing glucose feeds eg. dextrose and breastfeeding within 1 hours of life.
- Prevent hypothermia
- Monitoring glucose levels 2hourly for the first 6 – 8 hours.
- Infants of diabetic mothers should be admitted to NBU and blood glucose level regularly checked.

Complications

- Hypothermia
- Convulsions
- Brain damage
- Neonatal death as an outcome.

6. NEONATAL HYPOTHERMIA

- This is a condition in which the neonates'body temperature falls below 36 ^{o}c.
- The infants surface area:body mass ratio pontentiates heat loss,especially from the head which comprises 25% of his size. **T**
- **he infants subcutaneous layer is thin** and provides poor insulation allowing transfer of core heat to the enviroment and also cooling of blood

hypothermia

The baby loses heat through:

- **Evaporation**
- **Conduction**
- **Radiation**
- **Convention**

1. **Evaporation :** cooling of the body by loss of fluid on the skin (amniotic fluid).
2. **Conduction:** Heat is lost when the baby is in contact with cold surfaces.
2. **Radiation:** loss of heat to cold objects in the enviroment
3. **Convention:** loss of heat caused by currents of cold air passing over the surface of the body.

Predisposing factors

- Prematurity
- Asphyxia neonatorum
- Maternal diabetes mellitus
- Respiratory distress syndrome
- Cold environment

Clinical features

- Rectal temperature is below 36 ^{o}c
- Baby feels cold on touch
- Paleness of extrimities and face
- Very weak cry
- Low respiration rate
- Baby not eager to feed (poor feeding

Nursing management

- Nurse the baby in a warm environment in a resuscitaire or wrap it in warm clothing or KMC
- Feed the baby with expressed breast milk via NG tube or cup if able to swallow.
- Give the baby extra glucose eg.dextrose
- Closely observe the baby for signs of hypoglycaemia and if present, give 10% dextrose
- Check for and treat convulsions with anticovulsants
- Continue With General Nursing Care In NBU **(warmth, feeding, prevention of infection, protection from injury, observation, involve the mother in the care of the newborn baby**)

Prevention Of Neonatal Hypothermia

- Delivery should be conducted in a room with controlled temperatures.
- Dry the baby immediately to prevent heat loss through evaporation.
- Put the baby on resuscitaire or incubator to compensate heat loss to the environment.
- Baby should not be bathed within 1 hour of life but top – tailing can be done after one hour.
- Encourage skin to skin contact (KMC) method when carrying the baby.
- Cover the baby with warmclothing and a cap
- Change diapers whenever soiled to prevent heat loss through conduction.

Complication

- Convulsions
- Hypoglycaemia
- Brain damage

Warm chain

1. Warm delivery room
2. Immediate drying the newborn thoroughly
3. Skin to skin contact
4. Breastfeeding the newborn within an hour
5. Bathing and weighing is postponed
6. Appropriate clothing and bending
7. Mother and baby together (rooming in)
8. Warm transportation (skin to skin)
9. Warm resuscitation
10. Training and awareness for the mother.

7. OPTHALMIA NEONATORUM

- This is a condition that occurs in neonates within 21 days of life and is characterised by purulent discharge from the eyes.
- It is common in infants of mothers who had vaginal discharge eg. gonorrhoea during pergnancy.
- Syphilis does not predispose an infant to opthalmia neonatorum but it causes congenital syphilis that is characterised by gross congenital malformation.

Causative organism

- Neisseria gonorrhoeae
- Chlamydia trachomatis
- Staphylococcus aureus
- Escherichia coli
- Haemophilus influenzae
- Streptococcus pneumoniae
- Pseudomonas spp
- klebsiella

Clinical features

- Eyes have sticky watery discharge
- Eyes are slightly red
- Oedematous eyelids
- Yellowish purulent discharge if the infection is by N. Gonorrhoeae

Nursing management

- All prenatal mothers presentig with vaginal discharge suggestive of gonorrhoea should be treated before delivery.

•Correctly swab the baby's eyes at birth.

•Instill 1% tracycline eye ointment (TEO) to all babies at birth prophylactically .

•All infected babies should be isolated take eye swab for culture and sensitivity.

•Administer drugs such as:

- Gentamicyn eye drops
- TEO but not systemic tetracycline
- Penicilin eye drops
- Kanamycin eye drops

•Swab the eyes with warm saline 3 times a day from inside outwards.

•Administer some broad spectrum systemic antibiotics but not tetracycline because it can cause deposits in bone leading to depressed bone growth.

Complications

•Partial or permanent blindness

8. NEONATAL JAUNDICE

- **Neonatal Jaundice** is a condition in neonates characterised by yellow discolouration of the skin, sclera and mucous membranes.
- It develops when there is excessive bilirubin levels in the blood stream.
- When there **is increased rate of haemolysis of RBC or decreased conjugation or ostruction of the flow of bile,** there will be high amounts of free bilirubin in circulation leading to jaundice.

Bilirubin Metabolism

- When aged, immature, malformed RBCs are broken down by hemolysis in the reticuloendothelial system (liver, spleen and the macrophages), they produce **haem and globulin**. Globulin is stored for reuse.
- The haeme part is broken down to **bilirubin and iron**. Iron is stored for re use and uncojugated bilirubin (**fat soluble)** is waste product which should be excreted.
- Unconjugated (indirect) bilirubin is fat soluble.
- Unconjugated bilirubin has to be converted to **water soluble form**. (**conjugated/ direct bilirubin) by a** process of conjugation for it to be excreted.
- Conjugation of bilirubin occurs in **the liver thus** it has to be transported to the liver by binding to transport **protien, albumin**.On arrival to the liver, bilirubin detaches itself from albumin attaches to x and y receptor proteins.

- Conjugation with **glucuronic acid** by means **of glucuronyl transferase enzyme** to become to become **bilirubin diglucoronide** that is water soluble.
- Excretion of bilirubin is done through the biliary system into the intestines.
- While in the intestines, it is converted to **stercobilinogen** by gut normal flora and excreted in stool (gives stool the colour).
- Some of it absorbed from the gut and becomes **urobilinogen** which is excreted in urine. If passage though the gut is slow some bilirubin will be unconjugated be **beta glucuronidase**
- If conjugation process is interfered with,there will be accumulation of unconjugated bilirubin leading to hyperbilirubinaemia and jaundice.
- This bilirubin (unconjugated bilirubin) may cross theBBB and cause brain damage,a condition known **as *Kernicterus*** that is characterised by seizures, hyper – tonicity , lethargy, stiff neck with hyper – extended head.

Types of jaundice

There two types of jaundice:

- **physiological**
- **pathological**

1. **PHYSIOLOGICAL JAUNDICE**

- Physiological jaundice affects **both pretem** and **term babies** in the first few days of life . It is a normal occurence but it may indicate a serious condition.

Characteristic of physiological jaundice:

- Jaundice never appears before 24 hours of age
- The serum bilirubin levels never exceeds 250 umol/l
- The highest serum bilirubin level occurs on the 3rd or 4th day of life
- The jaundice fades by the 7th day of life
- The baby is otherwise well

Causes of physiological jaundice

a) **Excessive haemolysis of RBCs** greater than conjugation rate. In utero the foetus high haemoglibin level (18-22g/dl)in order to attract sufficient oxygen across the placenta. The neonatal rbc's have a shorter life span (60-70days) than those of adults.
b) **Glucoronyl transferase enzyme deficiency** this is due to liver immaturity thus the liver can not cope with the increased haemolysis of rbc's
c) **Increased enterohepatic reabsorption:** peristalsis is slow until feeding is established and the new born gut is not yet colonised with the normal bacteria responsible for converting bilirubin digluconate to stercobilinogen. These allows apportunity for reabsorbtion
d) **Decreased albumin binding capacity:** thus less bilirubin is transported to the liver for conjugation.

Nursing management

- Admit the baby into the NBU and and asses the general condition.
- Start early and frequent breast feeding for;
  - *feending provides glucose to the liver cells*
  - *Feending also encourages bowel colonisation with normal flora which are important in formation of stercobilinogen for excretion in stool.*
  - *Early feeding also leads to increased gut motility leading to faster excretion of bilirubin.*
  - *Feeding also enhances enzyme production and conjugation.*
- Closely monitor serum bilirubin levels at 12 - 24 hr interval.
- If bilirubin levels take time to clear, put the baby on phototherapy.

Jaundice in preterm babies

- The preterm baby is more prone to jaundice than the term baby
- The parameters are slightly different
  - Jaundice tends to occur earlier
  - Peak later and last longer than the in full term baby
  - Haemolysis occur in the same way but the life of the rbc's is shorter (30-40 days)
  - There is likely to delay feeding of a preterm baby especially if sick
  - The gut is also immature thus peristalsis is reduced
  - Albumin binding capacity is affected by an increased tendency to hypoxia, acidosis, hypoglycemia, and hypoalbiminaemia
  - Liver immaturity
  - Likely to complicate due to jaundice and requires treatment for jaundice at a lower bilirubin than full term infants.

2. Pathological jaundice

- **Pathological jaundice** appears within 24 hrs of life and is not self-limiting thus may persist for long.
- There is rapid rise in serum bilirubin.
- It includes both obstructive and haemolytic jaundice.

Causes

- They include pathological disorders that increase **bilirubin production, reduces transportation** to and fro the liver or reduces rate of conjugation.

1. **Increased haemolysis** – Rhesus and ABO incompatibility, G6PD enzyme deficiency, baterial septicaemia.
2. **Non-haemolytic causes** of increased unconjugated bilirubin – CNS haemorrhage, cephalohaematoma, polycythaemia, exerggerated enterohepatic circulation of bilirubin due to functional ileus.
3. **Decreased rate of conjugation** – Cliggler Nagar Syndrome,Gilbert's syndrome.
4. **Hepatotoxic drugs**
5. **Biliary obstruction** that prevents transport of conjugated bilirubin to GIT for excretion

6. **Reduced bilirubin binding sites** on the albumin
7. **Malnutrition**
8. **Increased reconversion of conjugated** to unconjugated bilirubin if it stays in the GIT.

Nursing management

- Asses the baby to determine the degree of jaundice
- Do investigation on serum bilirubin levels and Hb
- Start the baby on phototherapy
- Order for blood exchange transfussion if necessary.
- Ct general nursing of newborn baby at risk

Complications of neonatal jaundice

- Retinal damage due to light used in treatment
- Anaemia
- Hyperthermia associated with phototherapy
- Hypocacaemia

- Kernicterus that is characterised by **seizures, hyper – tonicity , lethargy, stiff neck with hyper – extended head.**

Treatment modalities for neonatal jaundice

There are three main modalitie named :

- Phototherapy
- Blood exchange transfusion
- Protoporphyrins

A) Phototherapy

- Phototherapy this is the use of ultraviolet blue prevents bilirubin levels from going high enough to cross BBB and cause *kernicterus*
- *It is a safe and effective treatment with mild side effects*.

Mechanism Of Action: Blue fluorescent light at a given wavelength is absorbed by the unconjugated bilirubin in the skin and superficial capillary and unconjugated bilirubin (indirect) is converted into conjugated bilirubin (direct) which is water soluble and can be excreted in stool and urine.

Indications.

- Preterm with jaundice appearing after 48 hrs and bilirubin levels are 260 – 265 mol/l
- Preterm with weight less than 1500g and bilirubin levels are 85 – 114 mol/l
- Preterm with weight more than 1500g and bilirubin levels are 14 – 165 mol/l

Care of a Baby on Phototherapy

1. Expose the whole body of the baby to increase surface area exposed to light
2. Keep turning the baby 2 hourly to expose all parts to the fluorescent light.
3. Ensure the airway of the baby is patent by extending the head
4. Cover the eyes to prevent damage by direct rays of light
5. When breastfeeding the eyes are unpadded to encourage eye contact with the mother
6. Provide intermittent phototherapy i.e. 6hrs on and 6 hrs off but may be continuous.
7. Give phototherapy for 2 – 3 days and asses the serum bilirubin levels twice or three times a day

NB : Greatest reduction in bilirubin levels will be in the first 24 hrs of phototherapy.

8. Observe the eyes for weeping or discharge.
9. If photo therapy is continuous, give extra fluids to prevent dehydration and maintain accurate input output charts.
10. Change linen frequently because opening of bowels is increased. (loose stool)
11. Observe the feeding and sleeping behaviour of the baby.
12. Observations e.g temperature to rule out hyperthermia, skin colour to monitor the progress, apex beat, and respiration should be done 4 hourly, assess regularly for signs of dehydration.
13. Involve mother in the care of the baby

When to stop phototherapy

- When serum bilirubin levels is 50 umol/L.
- Repeat serum bilirubin measurements if necessary12-18 hours after ceasing phototherapy to check for rebound hyperbilirubinaemia.

Side effects

- loose stool due rapid interstinal transit
- poor feeding
- Hypocalcaemia
- Fragility
- Hyperthermia due to increased fluid loss and dehydration.
- Lethargy
- Retinal damage from intensity light
- Visual deprivation
- Irritability.
- Skin rashes and skin burns.

B) BLOOD EXCHANGE TRANSFUSION

- This is a treatment in which the baby's blood is gradually removed and replaced by donors blood.It is used as a difinitive treatment when bilirubin concentrations are approaching toxic levels,the baby has haemolytic disease or low Hb.

The transfusion has the following benefits :

- **It helps in increasing the baby's Hb**
- **Excessive bilirubin and unwanted antibodies are washed from the baby's circulation.**

•The donor's blood used for the transfusion should be Rhesus negative so that it does not alter the baby's blood group and to ensure that no antigen is introduced into baby's circulation that may lead to antibodies production.

•It should also be fresh and ABO compatible.

Indications

- Infants with haemolytic diseases
- Preterms with bilirubin levels of 300 – 400 mol/l
- Babies whose birth weight was less than 1500g and have bilirubin levels of 225 mol/l
- Term babies with bilirubin levels above 100 mol/l at birth or later 400 – 500 mol/l

Care of the baby post transfusion

- Put the baby back to phototherapy
- Closely observe the baby for bleeding from the umbilical cord
- If the baby was on infusion, continue for some time
- Reassure the mother and involve her in the care of the baby

C) PROTOPORPHYRINS

- These are haeme oxygenase inhibitors which are administered to inhibit the breakdown of haeme thus reduce bilirubin production.
- They are usually used in combination with phototherapy and/or blood exchange transfusion.

READ AND MAKE NOTES ON RHESUS AND ABO INCOMPATIBILITY, MANAGEMENT AND PREVENTION

9. HAEMORRHAGIC DISEASE OF THE NEW BORN.

- This bleeding that occurs during the first few days of life due to vitamin k deficiency.
- Vitamin K is synthesised by the bowel normal flora and its role is to convert clotting factors such as prothrombin, thrombokinase, thromboplastin.
- To prevent HDN, all neonates are given ***vitamin K 0.5 - 1 mg i.m*** *at birth*.

Predisposing factors

- Hereditary factors (clotting factor defect)
- Prematurity
- Birth trauma
- Treatment with antibiotics
- Respiratory distress syndrome
- Disseminated intravascular coagulopathy (DIC)
- Birth asphyxia
- Mothers who are on drugs like warfarin, heparin, phenobarbital

Clinical features

- Continuous oozing of blood from umbilical cord.
- There is spontaneous bleeding from various parts of the body.
- Bleeding in the mucous membranes of GIT and may present with maleana stool or haematemesis.
- Continuous bleeding from any punctured blood vessel or injection site thus when looking for venous access avoid puncturing femoral or juguolar veins which are the larget veins in the body.
- Haematuria or omphalorrhagia

Nursing Management

- Upon admission into NBU, administer vitamin K 0.5 – 1 mg I.M
- Preserve all linen soiled by blood for estimation of blood loss
- Administer vitamin K 1 – 2 mg to arrest bleeding immediately.
- Observe vital signs TPR ¼ hourly.
- If bleeding is severe, transfuse fresh blood or frozen plasma at 20 mls / kg of body weight.
- Observe for signs of shock and if present transfuse with packed cells and fresh whole blood at 75 – 100 mls/kg of body weight if the baby is term.
- General management is like any other baby in the unit.

complications

- Anaemia
- Hypovolaemic shock
- Brain damage

11. BIRTH INJURIES

- Birth injuries refer to trauma that a foetus sustains during birth.
- The structures commonly involved are:
  - **muscles,**
  - **nerves,**
  - **bones,**
  - **visceral organs**
  - **skin.**

TYPES OF BIRTH INJURIES

- **Internal organ injury**: spleen, liver, adrenal glands
- **Nerve injury** – mostly branchial plexus leading to Erb's paralysis, klumpke's
- **Soft tissue injury – genitalia, eyes**
- **Intracranial injuries** – intracranial haemorrhage, skull features
- **Extracranial injuries –** cephalohaematoma, caput succadenium.

Predisposing factors to birth injuries

- Prematurity
- Large for dates babies
- Cephalopelvic disproportion
- Malpresentation eg brow, breecch,face etc
- Congenital malformations eg hydrocephalus

A) HEAD TRAUMA

- Trauma to the head and scalp that occurs during the birth processis usually benign but occasionally results in more serious injuries.
- There are three main types of extracranial (out of the cranium, brain) haemorrhage which are :
    - Caput succedaneum
    - Cephalohaematoma
    - Subgaleal or subaponeurotic haemorrhage

CAPUT SUCCADENIUM AND CEPHALOHAEMOTOMA

1. **CAPUT SUCCADENIUM -** Is an oedematous swelling due to accumulation of serum fluid **under the foetal scalp.** it results from pressure of the presenting part of the scalp against the dilating cervix during delivery that leads to reduced venous blood and lymphatic drainage and part of serum escapes into the tissue .The swelling is **self - limiting** and **disappears** within **36 hours of life.**
2. **Cephalohaematoma** - is accumulation of blood between the periosteum and the skull bone.It is caused by friction between the foetal skull bones and pelvic bones eg.CPD

Difference between caput succedaneum and cephalohaematoma

Caput succadenium

1. Swelling under the scalp above the periosteum forms on the presenting part
2. Present at birth
3. Disappears within 36 hours
4. Diffuse and pits on pressure
5. May cross a suture line
6. Double caput is unilateral

cephalohaematoma

1. Effusion of blood under the periosteum due to friction btwn the skull and the maternal pelvis.
2. Appears after 4 hrs of life
3. May persist for 2 weeks
4. Circumscribed; doesn't pit on pressure
5. Never crosses suture lines
6. Double cephalohaematoma is bilateral

3. Subgaleal or subaponeurotic haemorrhage

- Subgaleal haemorrhage is bleeding into the subgaleal compartment.
- The injury occurs as a result of pressure through the head (of the infant) into the pelvic outlet
- It commonly associated with vacuum extraction
- Bleeding occurs below the epicranial aponeurosis.
- It can be confused with a caput succedaneum as the swelling extends across the suture line.
- Early detection is vital

Characteristic of subgaleal haemorrhage

1. It is present at birth
2. The swelling crosses the suture line
3. It increases in size
4. Resolves in 2-3 weeks
5. Firm fluctuant mass
6. Bleeding my extend into subcutaneous tissue of the neck and eyelids
7. Bruising may be apparent for days and sometimes weeks.

Nursing care

- Serial head circumference may detect any increase due to haemorrhage.
- The infant must be observed for signs of hyperbilirubinaemia and anaemia.
- If the haemorrhage is severe , blood transfusion may be necessary.
- Monitor the bleeding time and coagulation time.
- Assess the level of consciousness.
- Assess Haemoglobin and haematocrit
- Increase in bilirubin is expected due to blood lyses.
- Death due to massive haemorhage is a possibility.

B) NERVE TRAUMA/ INJURIES

- The most common are the facial nerve and branchial plexus injuries.

1. **Facial Nerve Injury:**
   - This is due damage of the facial nerve.
   - The eye of the affected side remains open & the mouth is drawn to the normal side.
   - Might cause feeding problems.
   - No treatment is required
   - Spontaneous improvement should be seen in 7 -10 days

2. Branchial Plexus Injuries:

- Branchial plexus nerves injury are caused by stretching or disruption of the nerve at the apex of the axilla, lying under the clavicle.
- Injuries can be cause by excessive lateral flexion of the head and neck in cases of shoulder dystocia or breech presentation.
- **There are three main types of injury**
    - **a) Erb's palsy**
    - **b) Klumpke's palsy**
    - **c) Total branchial plexus palsy**

a) Erb's palsy:

- This involves damage to the upper roots of the branchial plexus involving the 5^{th} and 6^{th} cervical nerve roots.
- The affect arm **is inwardly rotated, lies limply** by his side and he can not flex his elbow or lift his arm, the half-closed hand is turned outwards (waiter's tip position), but there is movement of arm and fingers.

b) Klumpke's palsy:

- Klumpke's palsy involves the lower arm, wrist and hand, with wrist drop and limp (no grasping reflex) fingers caused by damage to spinal roots C8 and T1.
- The shoulder and upper arm has normal movements
- The injury is caused by difficult birth e.g.in breech, large baby

c) Total brachial plexus palsy:

- There is complete paralysis of the shoulder, arm, wrist and hand & loss of sensation due to damage of all the brachial plexus nerve roots.

Treatment:

- Resting the arm for 7-10 days followed by gentle physiotherapy to avoid contracture.
- Parents should be taught a full range of passive movements for shoulder, elbow, and wrist.
- Complete spontaneous recovery is more common with Erb's palsy than in Klumpke's or total brachial palsy but may take several months up to 2 years
- Do follow up

3. Phrenic nerve injury:

- Commonly occurs in association with brachial plexus and less commonly as an isolated lesion.
- It may affect one or both sides of the diaphragm.

Treatment : varies from simple oxygen therapy to intermittent positive pressure ventilation

Complication: Hypostatic pneumonia

4. Horner's syndrome:

This is caused by damage to the cervical sympathetic nerves and is often associated **with klumpke's paralysis**

The syndrome occurs infrequently, presenting **with ptosis** (drooping or falling of the upper eyelid), **enophthalmos** (posterior displacement of the eyeball within the orbit) due to loss of function of the orbitalis muscle, **constriction of the pupil** and **absence of sweating** from the affected side of the head and face

C) FRACTURES

- **A** fracture can occur during delivery most common are : fractured of the **skull , clavicle, humerus and femur bones.**

1. SKULL FRACTURES:

- These are rare and majority are linear and asymptomatic.
- An overlying cephalohaematoma or skull deformation may be the only feature
- They may be associated with intracranial haemorrhage, seizures, and death as contusion of the underlying brain may have occurred

Treatment :

- symptomatic e.g. ant seizure drugs for seizure
- Antibiotics cover for patients with leak of Cerebral Spinal Fluid (CSF) from the nasal and auditory canal

2. CLAVICLE FRACTURE:

- this occurs due to shoulder dystocia and in breech delivery
- It is often asymptomatic and may go undiagnosed

Signs and symptoms:

- A crack is heard during delivery
- Feeling of distortion at the break
- Presence of crepitus
- In late phase by callus formation

Treatment :

- Figure of eight bandage if the infant shows signs of discomfort
- A stable union of the break usually occurs within 7-10 days

3. Fractured Humerus

- This may occur in shoulder dystocia or in extended arms in breech presentation

Signs and symptoms

- A crack may be heard at delivery or
- The infant may present with deformity or
- **Pseudoparesis** of the upper arm secondary to pain
- Confirm diagnosis by an x-ray

Treatment:

- by splinting the upper arm or bandaging the arm to the chest
- Stable union occurs 3-4 weeks

4. Fracture femur

- Fracture of the femur may occur during delivery of extended legs in breech presentation.

Signs and symtoms:

- A crack may be heard or felt at the time
- Fractures are usually in the mid shaft presenting with deformity
- Or pseudoparesis due to pain
- diagnosis confirmed by x-ray

Treatment :

- simple splinting and application of a firm a crepe bandage to the upper leg for 2-3 weeks.

5. Fracture spine: very rare but may also occur in breech deliver with extended head

D) MUSCLE INJURIES

TORTICOLIS :

- This results from injury to the sternomastoid muscle (sternocleidomastoid muscle) during birth when the muscle is either torn or its blood supply is impaired.
- It may occur during the delivery of the anterior shoulder in vertex presentation or while rotating the shoulders in breech presentation.

E) soft tissue injuries in the newborn.

- Soft tissue injuries usually occurs when there is some degree of disproportion between the presenting part and the maternal pelvis (cephalopelvic disproportion).

Causes of soft tissue injuries

- Dystocia
- Cephalopelvic disproportion
- Forceps delivery
- Enlarged fetus
- Vacuum delivery
- Improper episiotomy technique
- Caesarean section (rare)

signs , symptoms and feature of soft tissue injuries

- Bruising with excoriation can occur in breech and face presentation
- In face presentation the face is **congested** and **bruised** and the **eyelids** and **lips edematous.**
- **In breech presentation** there is **bruising and edema** of the **vulva** area in female child and **scrotum in male.**

Nursing care for soft tissue injury.

- Assess the newborn for bleeding from the injury site.
- The soft tissue injury usually fade (disappear) spontaneously within few days, without treatment.
- Explain, reassure and provide health information to the parents about these injuries.

General management of birth injuries

- Intrapartally ,predisposing factors should be diagnosed and managed early eg.preterm labour,malpresentation,prolonged labour.
- Obseve the baby closely for skin colour, twitching, rolling of eyes, convulsions
- Keep the baby warm
- Administer vitamin K 0.5 – 1mg i.m for they are predisposed to haemorrhage
- Maintain 2hrly turning of the baby
- Provide intermitent oxygen therapy when neccessary (PRN)
- Give fluids eg.10% dextrose for the first 24 hours then introduce oral feeds if the condition improves.
- Give symptomatic management.
- Have resuscitative equipment ready incase of emergency
- Administer anticonvulsants eg. Phenobarbital prophylactically

Complications

- Musculoskeletal deformities
- Brain damage
- Respiratory distress
- Hyperbilirubinaemia (jaundice)
- Hypogycaemia

12. NEONATAL INFECTIONS/NEONATAL SEPSIS

Definition: Neonatal sepsis is a clinical syndrome characterized by signs and symptoms of infection with or without accompanying bacteremia in the first month of life.

- It encompasses :
    1. **various *systemic* infections** of the newborn such as **septicemia, meningitis, pneumonia, arthritis, osteomyelitis**, and **urinary tract infections**.
    2. **Superficial infections** like conjunctivitis and oral thrush are not usually included under neonatal sepsis.

Vulnerability Of The Newborn To Infection

1. The defense mechanism of the newborn infant **are imperfectly under developed,** More pronounced in the preterm baby, small for gestation or born after prolonged labour or prolonged rupture of membranes.
2. **Skin and mucus membranes** are thin and easily damaged,
3. The baby is virtually free from organisms and lacking a **protective resistant flora.**
4. There is decreased **cellular immunity** due to a reduced number of T- cell lymphocytes.
5. Phagocytosis is less efficient.
6. **Immunoglobins (1g) are deficient**, only 1gG is transported across the placenta in the second half of pregnancy, this protects the infant against those infections to which the mother is immune. 1gM only produced by the foetus if he is exposed to intrauterine infections and 1gA is not manufactured until birth.

Modes of acquiring infections

- **Across the placenta** e.g. Rubella virus, HIV, histoplasmosis, syphilis, cytomegalovirus (CMV), listeria monocytogens
- **Intrapartum transmission:** herpes simplex virus, hepatitis B, candida albicans, Ophthalmia neonatorum, pneumonia
- **Infections acquired after birth** from the environment, from contaminated equipment's or from people handling the baby:

Infections acquired after birth from the environment, from contaminated equipment's or from people handling the baby:

- Eye Infections,
- Mouth-candiba Albicans ,
- Buttocks Peri-anal Thrush,
- Skin Infections Mostly By Staphylococcus Aureus (Septic Spots, Paronychia, Pemphigus Neonatorum),
- Omphalitis,
- Neonatal Mastitis,
- Respiratory Infections
- Nasopharyngitis,
- Rhinitis,
- Pneumonia,
- Gastro Enteritis,
- Necrotizing Enterocolitis (NEC),
- Urinary Tract Infections,
- Meningitis

12. CLASSIFICATION OF NEONATAL SEPSIS

Neonatal sepsis can be classified into two major categories depending up on the onset of symptoms: **Early Neonatal Sepsis** And **Late Neonatal Sepsis**

1. ***Early Onset Sepsis (EOS):***
   - It presents within the first 72 hours of life.
   - In severe cases, the neonate may be symptomatic *at birth*.
   - Infants with EOS usually present with respiratory distress and pneumonia.
   - The source of infection is generally the maternal genital tract.
   - Some maternal/ perinatal conditions have been associated with an increased risk of EOS. Knowledge about these potential risk factors would help in early diagnosis of sepsis.

Risk Of Early Onset Sepsis

1. Low birth weight (<2500 grams) or prematurity
2. Febrile illness in the mother with evidence of bacterial infection within 2 weeks prior to delivery
3. Foul smelling and/or meconium stained liquor
4. Rupture of membranes >24 hours
5. Single unclean or > 3 sterile vaginal examination(s) during labor
6. Prolonged labor (sum of 1st and 2nd stage of labor > 24 hrs)
7. Perinatal asphyxia (Apgar score <4 at 1 minute)

- Presence of foul smelling liquor or three of the above mentioned risk factors warrant initiation of antibiotic treatment.
- Infants with two risk factors should be investigated and then treated accordingly.

2. *Late Onset Sepsis (LOS):*

- It usually presents after 72 hours of age.
- The source of infection in LOS is either **nosocomial (hospital-acquired) or community-acquired** and neonates usually present with septicemia, pneumonia or meningitis.

Risk factors for nosocomial sepsis include:

- Low birth weight,
- Prematurity,
- Admission in intensive care unit,
- Mechanical ventilation,
- Invasive procedures,
- Administration of parenteral fluids,
- Use of stock solutions.

Risk factors for community-acquired late onset neonatal sepsis (LOS) include:

- poor hygiene,
- poor cord care,
- bottle-feeding,
- prelacteal feeds e.g 10% dextrose, glucose, nun
- In contrast, breastfeeding helps in prevention of infections.

Clinical features of neonatal sepsis

1. ***Non-specific features*:**

- The earliest signs of sepsis are often subtle and nonspecific:
- Neonates with sepsis may present with one or more of the following symptoms and signs:
    - (a) Hypothermia or fever (former is more common in preterm low birth weight infants)
    - (b) Lethargy, poor cry, refusal to suck
    - (c) Poor perfusion, prolonged capillary refill time
    - (d) Hypotonia, absent neonatal reflexes
    - (e) Brady/tachycardia
    - (f) Respiratory distress, apnea and gasping respiration
    - (g) Hypo/hyperglycemia
    - (h) Metabolic acidosis.

Clinical features of neonatal sepsis

2. ***Specific features related to various systems*:**
    a) **Central nervous system (CNS):** Bulging anterior fontanelle, vacant stare, high-pitched cry, excess irritability, stupor/coma, seizures, neck retraction. Presence of these features should raise a clinical suspicion of meningitis
    b) **Cardiac:** Hypotension, poor perfusion, shock
    c) **Gastrointestinal**: Feed intolerance, vomiting, diarrhea, abdominal distension, paralytic ileus, necrotizing enterocolitis (NEC) ,oral thrush
    d) **Hepatic:** Hepatomegaly, direct hyperbilirubinemia (especially with urinary tract infections)
    e) **Renal:** Acute renal failure
    f) **Hematological:** Bleeding, petechiae, purpura
    g) **Skin changes**: Multiple pustules, abscess, sclerema, mottling, umbilical redness and discharge (omphalitis), perianal thrush.
    h) **Respiratory system:** nasopharingitis, rhinitis, pneumonia

Investigations

- Blood cultures
- Septic screen
- Lumbar puncture
- Radiological studies
- Urine for culture and sensitivity
- Stool specimen

Antibiotic treatment

- **FIRST LINE**: Penicillin or Ampicillin and Gentamicin
- **SECOND LINE**: Ampicillin or Cloxacillin and Gentamicin or Amikacin
- **THIRD LINE:** Cefotaxime or Piperacillin-Tazobactam

Indications for starting antibiotics

The indications for starting antibiotics in neonates at risk of Early Onset Sepsis (EOS) include any one of the following:

a) Presence of >3 risk factors for early onset sepsis (*see above*)
b) Presence of foul smelling liquor
c) Presence of 2 antenatal risk factor(s) *and* a positive septic screen
d) Strong clinical suspicion of sepsis.

a) The indications for starting antibiotics in Late Onset Sepsis (LOS) include:
    a) Positive septic screen and/or
    b) Strong clinical suspicion of sepsis.

summary of a sick infant's care

R= Recordings of respiration, apex beat, colour, movement, temperature and passage of urine and stool

E= Elevate the head slightly, particulary if there is respiratory problems

S= Specimen of blood, urine, stool, and cerebrospinal fluid for laboratory investigations.

P= Protect against **hypothermia, hypoglycaemia, hypoxia, further infection and cross-infection** (physiotherapy if required)

I= Incubator care for observation and temperature control

R= Respiratory assistant as required

A= Airway must be kept clear

T= Total intake must be recorded and circulatory overload avoided

O= Oxygen therapy and other drugs

Prevention of neonatal sepsis

1. **Preconception:**
   - Rubella vaccination to mother who are not already immune
   - HIV positive client are advised to conceive when viral load is undetectable
   - General health of mother should be observe.
   - Genetic screening
2. **During pregnancy**
   - Antenatal profile
   - Early detection treatment of any infections before delivery

3. **During labour and delivery**
   - Hand washing by birth attendant
   - Clean and safe delivery by maintaining sterility during delivery
   - Use of Disinfectant and sterilization of equipment's
   - Minimization of vaginal examination
   - Prompt diagnosis and treatment of prolonged labour.
   - Management of mother using a partoghraph for early identification and management of complications
   - Prophylaxis antibiotics for mothers with PROM

prevention of neonatal sepsis

4. **After delivery**

- Early and exclusive breast feeding
- Cord care using chlorhexidine
- Application of tetracycline eye ointment to all babies after birth
- Neonatal immunization
- Antibiotic prophylaxis for babies at risk of neonatal sepsis e.g. foul smelling liquor, baby born by mothers with fever.
- Avoidance of trauma to the skin and the mucus membrane
- Maintaining a clean and safe environment, regular changing of equipment and clothing for baby and cot
- Hand washing

13. Heavy –for- dates baby?/macrosomia/

- **Definition;** a heavy for gestation baby is one whose intra-uterine growth has been excessive, the birth weight will be above 90th centile and he is therefore termed large for gestation.

Causes:

- Maternal diabetes
- Gestational diabetes
  - Macrosomia is considered to be due to maternal hyperglycemia leading foetal hyperglycemia which triggers fetal insulin production
  - hyperinsulinism in turn caused increased growth and fat deposition.
  - The extent of the macrosomia will depend on how well the maternal diabetes is controlled during pregnancy
- Other cause of macrosomia is Beckwith-wiedemann syndrome (infant is a giant)

Appearance

- The infant is large, fat, and cherubic in appearance,
- Many are preterm
- Infant of diabetic mother have a higher incidence of congenital abnormality ,
- Features of beckwith-weidemann syndrome , this is an over growth disorder characterized by macrosomia, omphalocele , exomphalos or gastroschisis in conjunction with a large tongue (macroglossia) and enlarged kidneys and liver.

complication

Complications of baby's born by diabetic mothers:

1. Hypoglycaemia
2. Resiratory distress syndrome
3. Infections
4. Most are delivered at 36-37 weeks of gestation or even earlier so they may be premature

Management macrosomia/ heavy for gestation infant

Labour and delivery:

- Assessment of the pelvis to role out Cephalopelvic disproportion
- If in doubt caesarean section is recommended
- close monitoring of the maternal blood sugars one hourly.
- A paediatrician should be available during labour incase the infant may need resuscitation
- Admit the newborn in the NBU at least for 24-48 hours for monitoring and early management of complications.
- Monitor blood glucose levels on admission and 2 hourly
- Initiate early feed
- Continue with other observation, protection from infection and injuries, warmth, ensure baby is breathing spontaneously, provide any medication as needed, monitor input and output, care for bladder and bowel.

Admission criteria in a new born unit

- The newborn unit does not only admit babies at risk but also offers accomodation to normal neonates due to unstable maternal condition or death of the mother.

Reasons for admitting the baby into the nursery include the following :

1. Prematurity
2. Small for gestation
3. Asphyxia neonatorum
4. Heamorrhagic disease of new born
5. Ophthalmia neonatorum
6. Birth injuries
7. Conjenital abnormalities eg.hydrocephalus
8. Respiratory distress syndrome
9. Infants of diabetic mothers (risk of hypoglycaemia)
10. Maternal death
11. Unstable maternal condition

Infection Prevention And Control In NBU

- *Due **to low immunity of the baby in NBU**, infection control is critical to protect the babies from infection during their stay in the unit.This necessitates high infection control measures within the unit.*

The following are some of the ways of ensuring infection control in the nursery :

1. Keep the unit clean, free from dust. The windows should remain closed at all times to prevent flowing in of dusty air.
2. Daily dump dusting and cleaning of incubators and cots.
3. Isolation of infected babies for barrier nursing
4. Restriction of visitors to ensure adequate control of human traffic into the nursery.

5. Visitors should see the babies through the glass.
6. Strictly observing aseptic technique while performing procedures like fixing branulars, feeding tubes and feeding
7. Feeding utensils should be rinsed (remove the milk), decontaminated, cleaned thoroughly in soapy water and kept in presept (disnifectant tablets) till the next feed
8. Staff working in the isolation room should   should not move into other nurseries
9. Cleaning of incubators upon discharge or death of the baby, before the next baby is put in.
10. Mothers changing clothes whenever they come to feed the babies.
11. Health educating the mothers on the importance of personal hygiene and care of the baby.