University of Mosul / College of Nursing

Pediatric Nursing

Year Three /Semester Two

General Nursing Program

2024–2025

Prepared by

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The Child with Cardiovascular Dysfunction

L e a r n i n g O b j e c t i v e s

1. Describe the common cardiovascular disorders of childhood.
2. Assess a child with a cardiovascular dysfunction.
3. Implement nursing care for a child with a cardiovascular disorder such as teaching about the importance of taking prescribed medication.

Congenital Heart Disorders

The prevalence of CHD ranges from 6 to 13 per 1,000 live births; premature infants have a higher rate. The most common chromosome defects associated with CHD are trisomy 21 (Down syndrome) and Turner syndrome. Overall, these disorders affect equal numbers of male and female infants. The usual cause of congenital heart disorders is failure of a heart structure to progress beyond an early stage of embryonic development. Maternal rubella is an example of an infection known to lead to disorders such as patent ductus arteriosus, pulmonary or aortic stenosis, atrial or ventricular septal defects, or pulmonary stenosis. Atrial and ventricular septal defects can also be familial.

Complications of CHD include heart failure, hypoxemia, growth retardation, developmental delay, and pulmonary vascular disease. Children with severe anomalies frequently experience failure to thrive.

Classification:

Formerly, congenital heart disorders were classified based on the physical sign of cyanosis, or these disorders were classified as either **cyanotic or acyanotic** disorder.

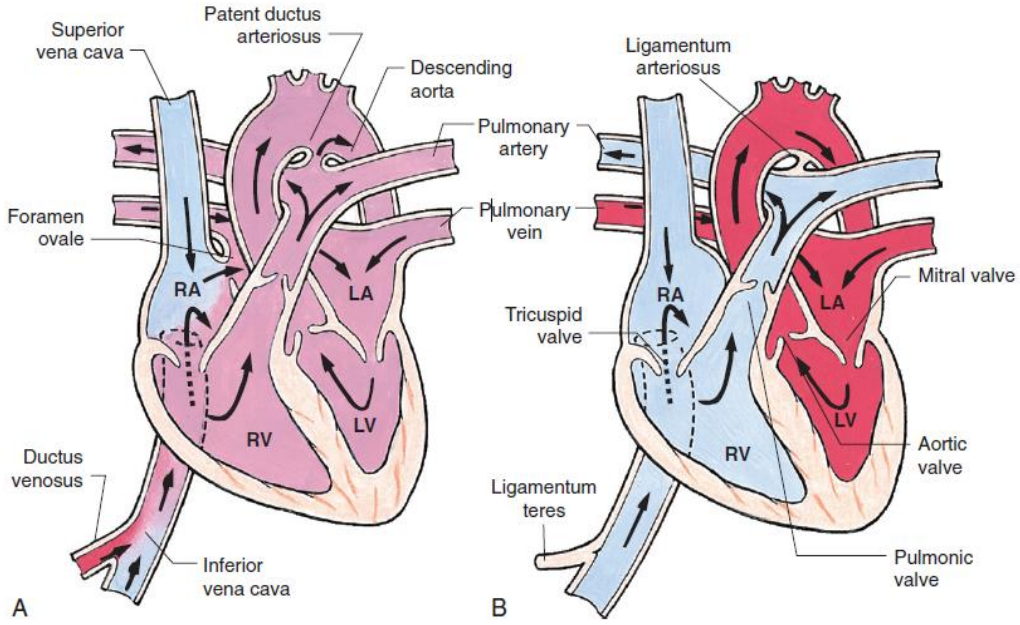
As identified by this system, the four classifications identify disorders with:

• Increased pulmonary blood flow

• Obstruction to blood flow leaving the heart

• Mixed blood flow (oxygenated and deoxygenated blood mixing in the heart or great vessels)

• Decreased pulmonary blood flow.



Disorders With Increased Pulmonary Blood Flow

Excessive blood flow to the lungs can produce a compensatory response such as tachypnea or tachycardia. Tachypnea increases caloric expenditure; poor cellular nutrition from decreased peripheral blood flow leads to feeding problems. Subsequently, the infant experiences poor weight gain, which retards overall growth and development. Increased pulmonary blood flow results in decreased systemic blood flow, so sodium and fluid retention may occur. Increased pulmonary blood flow also places the child at higher risk for pulmonary infections. As the child grows, the continuous increased pulmonary blood flow will cause vasoconstriction of the pulmonary vessels, actually decreasing the pulmonary blood flow. This may lead to pulmonary hypertension. For children with congenital defects with increased pulmonary blood flow, oxygen supplementation is not helpful.

Ventricular Septal Defect:

VSD, the most common type of congenital cardiac disorder seen, accounts for about 30% of all instances of congenital heart disease, or about 2 in every 1000 live births. With this defect, an opening is present in the septum between the two ventricles. Because pressure in the left ventricle is greater than that in the right ventricle, blood shunts from left to right across the septum (acyanotic disorder). This impairs the effort of the heart because blood that should go into the aorta and out to the body is shunted back into the pulmonary circulation, resulting in right ventricular hypertrophy and increased pressure in the pulmonary artery.

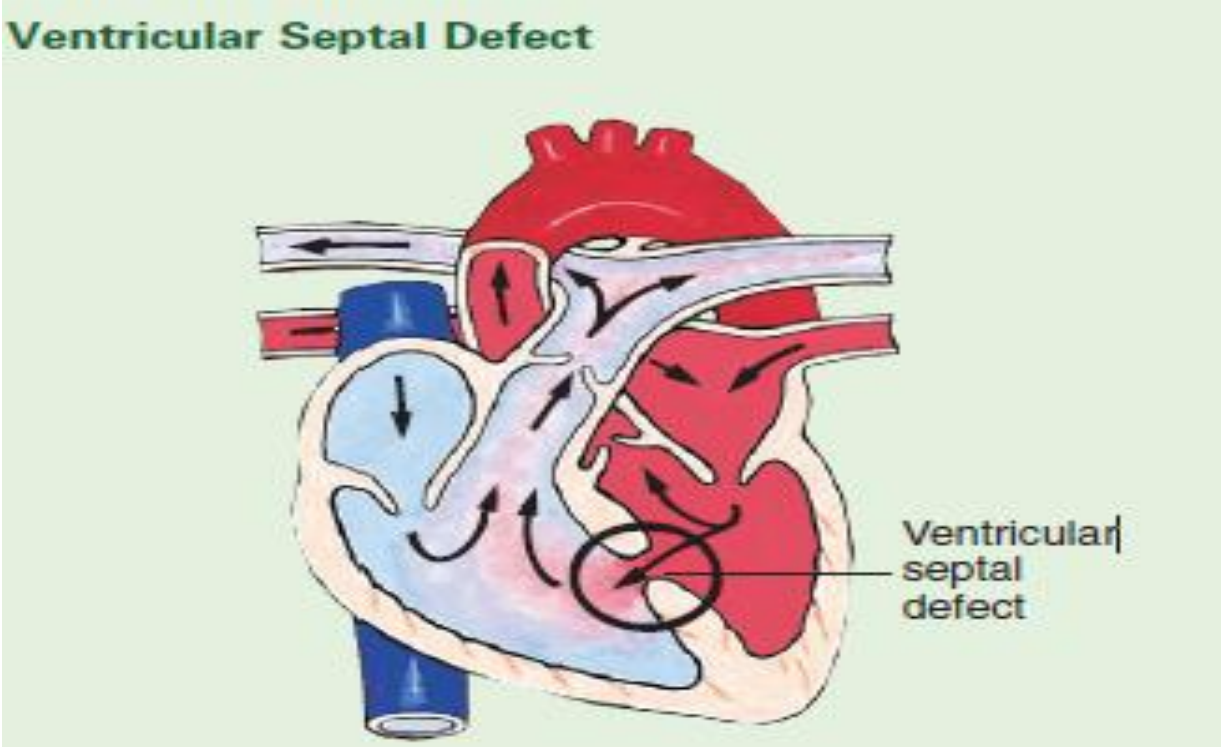
Assessment:

A VSD may not be evident at birth. With incomplete opening of the alveoli, there is still high pulmonary artery resistance, so little blood is shunted through the defect. At about 4 to 8 weeks of age, as shunting begins, the infant demonstrates easy fatigue, and a loud, harsh pan systolic murmur becomes evident along the left sternal border at the third or fourth interspace. This typical murmur is generally widely transmitted. A thrill (vibration) also may be palpable. The diagnosis of VSD is based on examination by echocardiography with color flow Doppler or MRI, which reveals right ventricular hypertrophy and possibly pulmonary artery dilatation from the increased blood flow. An ECG will also reveal right ventricular hypertrophy.

Therapeutic Management:

Up to 85% of VSDs are so small (< 5mm diameter) they close spontaneously. Those that are moderate in size (5mm-9mm) may be closed during cardiac catheterization. Larger ones (over 10mm) require open heart surgery. This is usually scheduled before 2 years of age to

prevent pulmonary artery hypertension. Closure is important because if the defect is left open, cardiac failure from the artery hypertension can result.

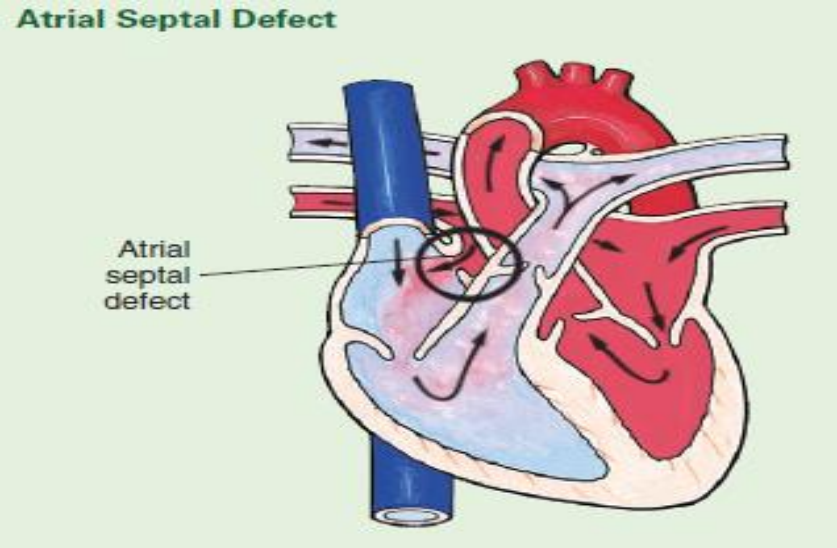


Atrial Septal Defect:

An ASD is a passage way or hole in the wall (septum) that divides the right atrium from the left atrium. Three types of ASDs are identified based on the location of the opening:

- **Ostium primum (ASD1):** The opening is at the lower portion of the septum.
- **Ostium secundum (ASD2): The** opening is near the center of the septum.
- **Sinus venosus defect:** The opening is near the junction of the superior vena cava and the right atrium. When the ASD is small, most infants may have a spontaneous closure within the first 18 months of life. If it does not spontaneously close by age 3, the child will most likely need corrective surgery.

An ASD is an abnormal communication between the two atria, allowing blood to shift from the left to the right atrium (a cyanotic defect). It is more common in girls than boys. Blood flow is from left to right (oxygenated to deoxygenated) because of the stronger contraction of the left side of the heart. This causes an increase in the volume in the right side of the heart and generally results in ventricular hypertrophy and increased pulmonary artery blood flow, the same as with a VSD.



Assessment:

1- A harsh systolic murmur is heard over the second or third interspace (the pulmonic area) because of the extra amount of shunted blood that crosses the pulmonic valve.

2- Echocardiography with color flow Doppler will generally reveal the enlarged right side of the heart and the increased pulmonary circulation.

3- Cardiac catheterization, although rarely needed for diagnosis, would reveal the separation in the atrial septum and the increased oxygen saturation in the right atrium.

Therapeutic Management:

Surgery to close the defect is done electively between 1 and 3 years of age. Closure is important because without it, a child is at risk for infectious endocarditis and eventual heart

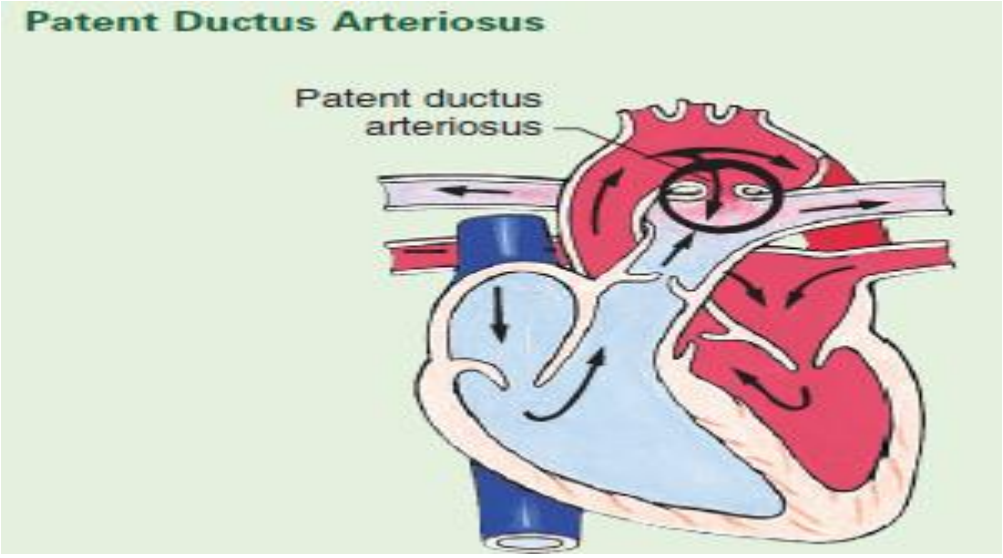
failure. It is particularly important that ASDs be repaired in girls, because they can cause emboli during pregnancy.

Patent Ductus Arteriosus:

The ductus arteriosus is an accessory fetal structure that connects the pulmonary artery to the aorta. If it fails to close at birth (closure begins with the first breath, and is usually complete between 7 to 14 days of age, although full closure may not occur until 3 months of age), blood will shunt from the aorta (oxygenated blood) to the pulmonary artery (deoxygenated blood) because of the increased pressure in the aorta. The shunted blood returns to the left atrium of the heart, passes to the left ventricle, out to the aorta, and shunts back to the pulmonary artery. This causes increased pressure in the pulmonary circulation from the extra shunted blood; this leads to right ventricle hypertrophy and ineffective heart action.

Assessment:

PDAs are twice as common in girls as boys and occur at a higher incidence at higher altitudes. In preterm infants, the incidence may be as high as 20% to 60% and accounts for about 10% of all heart disease. On physical examination, the child usually has a wide pulse pressure (the difference between systolic and diastolic blood pressures). An ECG is generally normal, although it may show ventricle enlargement if the shunt is large. Echocardiography provides good visualization of the patent ductus. Cardiac catheterization is generally not necessary for diagnosis but may be performed to rule out associated defects.



Therapeutic Management:

One reason that the ductus arteriosus remains open in fetal life is stimulation by prostaglandins, particularly PGE1, from the placenta and the low oxygen level of fetal blood. After birth, when the PGE1 level falls and the oxygen level increases, the ductus arteriosus is stimulated to close. If it does not close spontaneously, an infant may be prescribed IV indomethacin or ibuprofen, prostaglandin inhibitors. These lower the PGE1 level and encourage ductus closure. If medical management fails to bring about closure of the ductus arteriosus, the disorder can be closed by insertion of Dacron-coated stainless-steel coils by interventional cardiac catheterization when the child is 6 months to 1 year of age.

Disorders With Obstruction to Blood Flow

A number of congenital anomalies cause the blood flow leaving the heart to be obstructed because a vessel or a valve is narrower than usual. Obstructive defects of this category include **pulmonary stenosis and aortic stenosis.**

Pulmonary Stenosis:

Pulmonary stenosis is narrowing of the pulmonary valve or the pulmonary artery just distal to the valve. It accounts for about 10% of congenital heart anomalies. Inability of the right ventricle to evacuate blood by way of the pulmonary artery because of the obstruction leads to right ventricular hypertrophy.

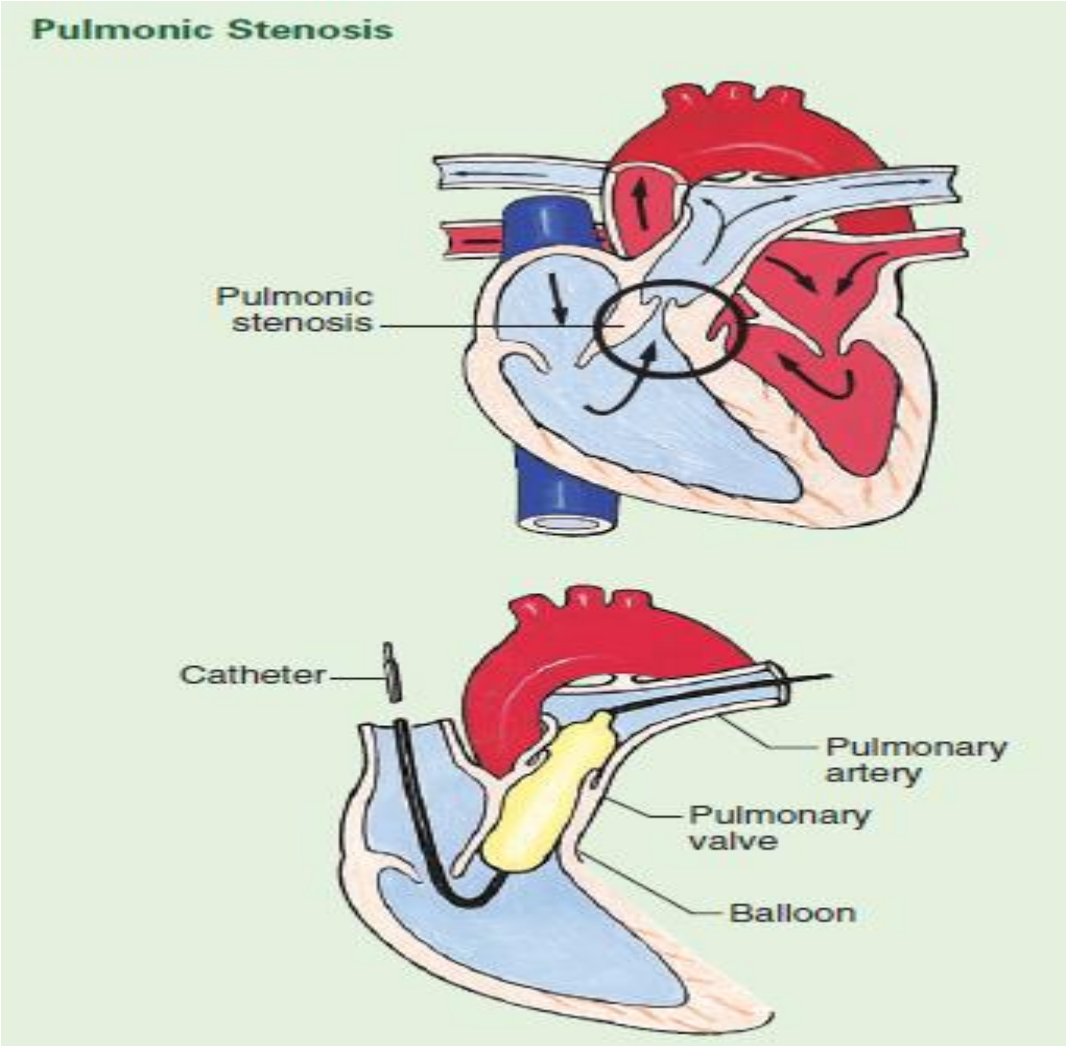
Assessment:

Infants with pulmonary artery stenosis may be asymptomatic or have signs of mild (right-sided) heart failure. If the narrowing is severe, cyanosis may be present from inability of adequate blood to reach the lungs for oxygenation or right-to-left shunting across the foramen ovale because of the increased right-sided heart pressure. An ECG or echocardiography will reveal right ventricular hypertrophy. Cardiac catheterization is rarely necessary for diagnosis but is used for interventional enlargement of the stenosed valve.

Therapeutic Management:

Management of the defect depends on the severity of the stenosis and the child's age.

Balloon angioplasty by way of cardiac catheterization is the procedure of choice. With this procedure, a catheter with an un inflated balloon at its tip is inserted and passed through the heart into the stenosed valve. As the balloon is inflated, it breaks valve adhesions and relieves the stenosis.



Aortic Stenosis:

Stenosis, or stricture, of the aortic valve prevents blood from passing freely from the left ventricle of the heart into the aorta. Because the heart cannot force blood through the structured valve, increased pressure and hypertrophy of the left ventricle occur. If the left ventricular pressure becomes acute, pressure in the left atrium also increases, resulting in back-pressure in pulmonary veins and possibly pulmonary edema. Aortic stenosis accounts for about 7% of congenital cardiac abnormalities.

Assessment:

Most children with aortic stenosis are asymptomatic, but physical assessment generally reveals a typical murmur. The murmur may be transmitted to the right shoulder, clavicle, and up the vessels of the neck; it may also be transmitted to the heart's apex. thrill may be present, particularly at the suprasternal notch. If severe, decreased cardiac output evidenced by faint pulses, hypotension, tachycardia, and inability to suck for long periods may be present. When the child is active, chest pain similar to angina occurs, because the coronary arteries receive inadequate blood. Sudden death can occur when the amount of oxygen needed by the heart muscle on exertion far exceeds what is available. ECG or echocardiography will reveal left ventricular hypertrophy.

Therapeutic Management:

Stabilization with a beta-blocker or a calcium channel blocker may be necessary to reduce cardiac hypertrophy before the defect is corrected. Balloon valvuloplasty is the surgical treatment of choice. Some children will need artificial valve replacement for correction.

Disorders With Decreased Pulmonary Blood Flow

Tetralogy of Fallot is usually diagnosed during the first weeks of life due to the presence of a murmur and/or cyanosis. Some newborns may be acutely cyanotic, while others may exhibit only mild cyanosis that gradually becomes more severe, particularly during times of stress as the child grows older. Most often, infants with tetralogy of Fallot have a PDA at birth, providing additional pulmonary blood flow and thereby decreasing the severity of the initial cyanosis. Later, as the ductus arteriosus closes, such as within the first days of life, more severe cyanosis can occur.

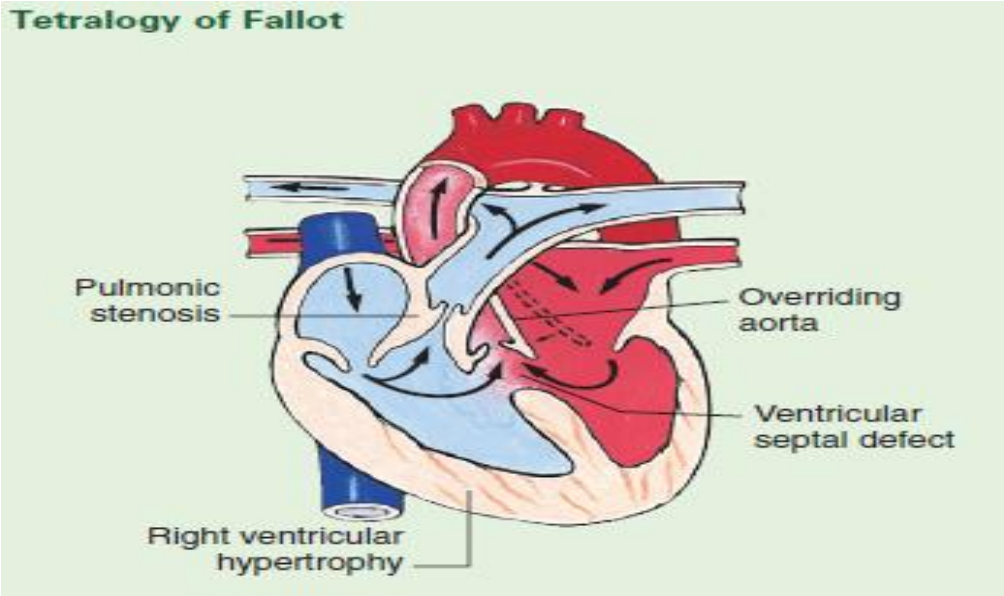
Tetralogy of Fallot TOF (Cyanotic heart disease)

Tetralogy of Fallot, one of the first types of congenital heart disease described, occurs in about 10% of children with congenital cardiac disease. It is called a tetralogy because four anomalies are present: pulmonary stenosis, VSD (usually large), dextro position (overriding) of the aorta, and hypertrophy of the right ventricle. Because of the pulmonary stenosis, pressure builds up in the right side of the heart. Blood then shunts from this area of increased pressure into the left ventricle and the overriding aorta. A number of children with this disorder show a deletion abnormality of chromosome 22.

Assessment:

Although this is an extremely serious form of heart disease, newborns may not exhibit a high degree of cyanosis immediately after birth. As they become more active, however, their skin acquires a bluish tint as cyanosis begins. Polycythemia (an increase in the number of red blood cells) occurs as the body attempts to provide enough red blood cells to supply oxygen to all body parts. This is an additional potential danger because the increased concentration of red blood cells causes the blood to become thick (increased viscosity), and clots in blood vessels may occur, with complications such as thrombophlebitis, embolism, or cerebrovascular accident. Heart failure is not a feature of TOF as it does not progress to heart failure.

Tetralogy of Fallot TOF is diagnosed based on the history and physical symptoms, echocardiography, ECG, cardiac catheterization and laboratory findings that reveal polycythemia, increased hemoglobin, hematocrit, and total red blood cell count as well as reduced oxygen saturation.



Echocardiography and ECG both show the enlarged chamber of the right side of the heart. Echocardiography also shows the decrease in the size of the pulmonary artery and the reduced blood flow through the lungs.

Therapeutic Management:

Management of tetralogy of Fallot is surgery to correct the heart defects, done at 1 to 2 years of age. Parents need to try to keep hyper cyanotic episodes to a minimum during this waiting time. If a baby begins to have a hypoxic episode, administering oxygen, placing the baby in a knee–chest position (to trap blood in the lower extremities and keep the heart from being overwhelmed), and administering morphine sulfate generally reduces symptoms.

Transposition of the Great Vessels (Arteries):

TGV is a congenital heart defect in which the pulmonary artery and the aorta are transposed from their normal positions. The aorta arises from the right ventricle instead of the left ventricle and the pulmonary artery arises from the left ventricle instead of the right ventricle. TGV accounts about 5% of all CHD cases. It is most often diagnosed in the first few days of life when the infant manifests cyanosis, which indicates decreased oxygenation.

As the ductus arteriosus closes, the symptoms will worsen. Corrective surgery is usually performed by age 4 to 7 days. Often the ductus arteriosus remains patent, allowing for some mixing of blood. Similarly, if a VSD is also present, mixing of blood may occur and cyanosis will be delayed. However, these associated defects can lead to increased pulmonary blood flow that increases pressure in the pulmonary circulation. This predisposes the child to heart failure. Significant cyanosis without a murmur in the newborn period is highly indicative of TGV. In some infants, cyanosis will not develop until several days of age as the PDA closes. In infants with septal defects, cyanosis may be further delayed.

Congestive Heart Failure

Congestive heart failure (CHF) usually occurs as a result of a congenital heart disorder or a disease such as rheumatic fever, Kawasaki disease, or infectious endocarditis. This occurs when the myocardium of the heart cannot pump and circulate enough blood to supply oxygen and nutrients to body cells. Severe anemia, hypocalcemia, and myocarditis may contribute to the heart's inability to function effectively. CHF is most apt to occur in children under 1 year of age. Sympathetic nervous system stimulation causes the frequently seen symptoms of excessive sweating and pallor.

As blood flow to the kidneys decreases, the glomerular filtration rate slows, resulting in stimulation of the renin angiotensin system, which causes fluid and sodium retention. Aldosterone secretion by the adrenal glands further promotes sodium retention in an attempt to increase blood flow to the kidneys. Antidiuretic hormone secretion by the pituitary is also increased to help retain fluid. This additional fluid results independent edema.

Assessment:

One of the first signs of CHF is tachycardia as the heart attempts to beat faster to move blood forward more effectively; this is quickly followed by tachypnea or rapid breathing. Heart failure may be confirmed by echocardiography, which reveals the enlarged heart. Ventricular hypertrophy can be confirmed by ECG.

Therapeutic Management:

Therapy for heart failure consists of reducing the workload of the heart by measures such as evacuating the accumulated fluid (reduces preload) with diuretics, slowing the heart rate and

strengthening cardiac function (increases contractility) by administering an inotropic (heart-strengthening) drug, and reducing afterload with a vasodilator. Commonly used diuretics include furosemide (Lasix) and spironolactone (Aldactone). The most common drug used to increase contractility and slow tachycardia is digoxin.

Nursing Diagnoses and Related Interventions

Nursing Diagnosis: Ineffective cardiopulmonary and peripheral tissue perfusion related to inadequate heart function.

Nursing Interventions:

Provide for Rest Periods. Rest, a major aspect of care for a child with heart failure, reduces the metabolic rate, decreasing myocardial and body oxygen demand. Most children with heart failure feel more comfortable in a semi-Fowler's position than in a supine position. This chest-elevated position lowers the abdominal contents, enlarging the thoracic cavity and allowing for easier, more comfortable lung expansion. Babies are most comfortable in an infant seat, which supports them in a semi-Fowler's position. Sedation with morphine may be necessary to encourage bed rest in some children.

Provide Oxygen as Necessary. If a child has dyspnea, hypoxemia, or cyanosis, supplemental oxygen by way of hood, mask, or nasal prongs is usually necessary.

Administer Drugs as Prescribed to Improve Heart Action.

Digoxin, a cardiac glycoside made from digitalis, acts directly on the heart to increase the contractility of the myocardium (and the force of contraction). Digoxin is a potent drug, so doses must be prepared with extreme accuracy. For safest administration, digoxin should be prescribed with the dose designated in both milligrams and milliliters. Digoxin preparations are typically administered IV first in a large dose (the digitalizing dose). Six to 8 hours later, one fourth of the initial dose is given; another one fourth is given again in 6 to 8 more hours. An ECG and serum digoxin level are generally obtained before the second or third dose of digoxin to assess the adequacy of the dose. Following this, maintenance doses are given once daily. For children under 10 years of age, the dosage could be divided into two doses given at 12-hour intervals.

Nursing Diagnosis: Risk for imbalanced nutrition, less than body requirements, related to fatigue.

Nursing Interventions:

1- Maintaining proper nutrition may be a problem for children with heart failure because they tire easily. Eating six to eight small meals daily is often less tiring than eating three large meals. Smaller meals also prevent the child's stomach from pressing upward on the diaphragm and compromising an enlarged heart.
2- Sucking is hard work, so infants may need to drink smaller amounts frequently to maintain adequate fluid intake or receive a higher-calorie formula to allow for adequate calories without added fluid volume.

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The Child with Genitourinary dysfunction

Learning Objectives

1. Distinguish alterations in urinary elimination and genitourinary disorders common in infants, children, and adolescents.
2. Identify appropriate nursing assessments and interventions related to medications and treatments for alterations in urinary elimination, genitourinary, and reproductive system disorders in children.
3. Develop an individualized nursing care plan or concept map for the child with an alteration in urinary elimination or genitourinary disorder.

Urinary Tract Infection

UTI is an infection of the urinary tract, most commonly affecting the bladder. UTI occurs most often because of bacteria ascending to the bladder via the urethra. About 8% of girls and 2% of boys will experience at least one UTI during childhood. One explanation for the more common occurrence in females is that the female's shorter urethra allows bacteria to have easier access to the bladder. The urethra is also located quite close to the vagina and anus in females, allowing spread of bacteria from those areas. UTI presents differently in infants than it does in children. Infants may exhibit fever, irritability, vomiting, failure to thrive, or jaundice. Children may also experience fever and vomiting, but also may have dysuria, frequency, hesitancy, urgency, and/or pain.

Pathophysiology:

Escherichia coli most commonly causes UTI, as it is usually found in the perineal and anal regions, close to the urethral opening. Other organisms include *Klebsiella, Staphylococcus aureus, Proteus, Pseudomonas, and Haemophilus.* Numerous factors may contribute to bacterial proliferation. Numerous factors may contribute to bacterial proliferation. Urinary stasis contributes to the development of a UTI once the bacteria have gained entry. Urine that remains in the bladder after voiding allows bacteria to grow rapidly. A decreased fluid intake also contributes to bacterial growth, as the bacteria become more concentrated. If the

urine is alkaline, bacteria are better able to flourish. Untreated bladder infection may allow reflux of infected urine up the ureters to the kidneys and result in pyelonephritis, a more serious infection.

The Common symptoms:

1. Fever
2. Nausea or vomiting
3. Chills
4. Abdomen, back, or flank pain
5. Lethargy
6. Jaundice (in the neonate)
7. Poor feeding or "just not acting right" (in the infant)
8. Urinary urgency or frequency
9. Burning or stinging with urination (the infant may cry with urination; the toddler may grab the diaper)
10. Foul-smelling urine
11. Poor appetite (child)
12. Enuresis or incontinence in a previously toilet-trained child
13. Blood in the urine

Therapeutic Management:

UTIs are treated with either oral or intravenous antibiotics, depending on the severity of the infection. Urine culture and sensitivity determine the appropriate antibiotic. A 7- to 14-day course of antibiotics is often prescribed, though 2- to 5-day courses may be as effective. Adequate fluid intake is necessary to flush the bacteria from the bladder. Fever management may also be needed.

Laboratory and Diagnostic Tests:

Common laboratory and diagnostic studies ordered for the assessment of UTI include:

1. Urinalysis (clean-catch, suprapubic, or catheterized): may be positive for blood, white blood cells, or bacteria (bacteriuria)
2. Urine culture: will be positive for infecting organism.
3. Renal ultrasound: may show hydronephrosis if child also has a structural defect.

Nursing Management:

Goals for nursing management include eradicating infection, promoting comfort, and preventing recurrence of infection.

1. Eradicating Infection:

The child who can tolerate oral intake will be prescribed an oral antibiotic. The child who has protracted vomiting related to the UTI or who has suspected pyelonephritis will require hospitalization and intravenous antibiotics. Children younger than 3 months, and those with dehydration, a toxic appearance, or sepsis should also be hospitalized for administration of intravenous antibiotics. Administer oral or intravenous antibiotics as prescribed. Urge the parent to complete the entire course of oral antibiotic at home, even though the child is feeling better. Administer intravenous fluids as ordered or encourage generous oral fluid intake to help flush the bacteria from the bladder.

2. Promoting Comfort:

Administer antipyretics such as acetaminophen or ibuprofen to reduce fever. A heating pad or warm compress may help relieve abdomen or flank pain. If the child is afraid to urinate due to burning or stinging, encourage voiding in a warm sitz or tub bath.

3. Preventing Recurrence of Infection:

Encourage the parents to return as ordered for a repeat urine culture after completion of the antibiotic course to ensure eradication of bacteria.

Nephrotic Syndrome

Nephrotic syndrome occurs as a result of increased glomerular basement membrane permeability, which allows abnormal loss of protein in the urine. Nephrotic syndrome generally occurs in three forms—congenital, idiopathic, and secondary. Congenital nephrotic syndrome is an inherited disorder; it is rare and occurs primarily in families of Finnish descent. Nephrotic syndrome may also occur secondary to another condition such diabetes.

Idiopathic nephrotic syndrome is the most commonly occurring type in children and is also called minimal change nephrotic syndrome (MCNS). MCNS most often has its onset in children by age 6 years. Complications of nephrotic syndrome include anemia, infection, poor growth, peritonitis, thrombosis, and renal failure.

Pathophysiology:

Increased glomerular permeability results in the passage of larger plasma proteins through the glomerular basement membrane. This results in excess loss of protein (albumin) in the urine (proteinuria) and decreased protein and albumin (hypoalbuminemia) in the bloodstream. Protein loss in nephrotic syndrome tends to be almost exclusively albumin. Hypoalbuminemia results in a change in osmotic pressure, and fluid shifts from the bloodstream into the interstitial tissue (causing edema). This decrease in blood volume triggers the kidneys to respond by conserving sodium and water, leading to further edema. The liver senses the protein loss and increases production of lipoproteins. Hyperlipidemia then develops as the excess lipids cannot be excreted in the urine. Hyperlipidemia associated with nephrotic syndrome may be quite severe, yet cholesterol levels may decrease when the nephrotic syndrome is in remission, only to rise significantly again with a relapse.

Children with nephrotic syndrome are at increased risk for clotting (thromboembolism) because of the decreased intravascular volume. They are also at increased risk for the development of serious infection, most commonly pneumococcal pneumonia, sepsis, or spontaneous peritonitis. Steroid-resistant nephrotic syndrome may result in acute renal failure.

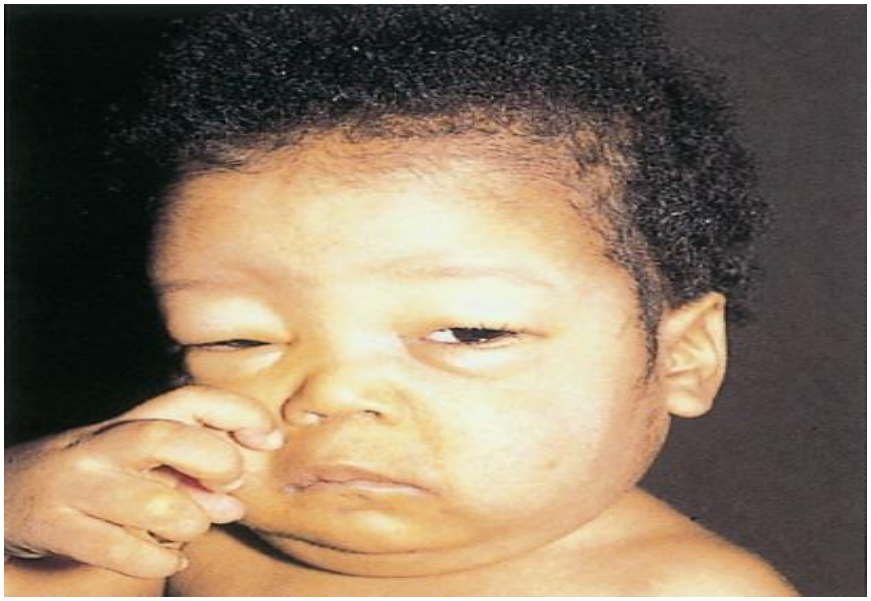
Therapeutic Management:

Medical management of MCNS usually involves the use of corticosteroids. Intravenous albumin may be used in the severely edematous child. Diuretics are also required in the edematous phase. Long-term therapy is usually required to induce remission. The nephrologist will determine the length of therapy based on the child's response. Children who have steroid-responsive MCNS generally have a favorable prognosis. Some children with MCNS exhibit a minimal response to steroid therapy or experience remissions and the MCNS is steroid resistant.

The Common symptoms:

1. Nausea or vomiting (may be related to ascites)
2. Recent weight gain
3. History of periorbital edema upon waking, progressing to generalized edema throughout the day
4. Weakness or fatigue

5. Irritability or fussiness



Note marked edema associated with nephrotic syndrome.

Nursing Management:

Goals for nursing management include promoting diuresis, preventing infection, promoting adequate nutrition, and educating the parents about ongoing care at home. As with other chronic disorders, provide ongoing emotional support to the child and family.

1. Promoting Diuresis

Administer corticosteroids as ordered. Tapering or weaning doses are required when the time comes to stop corticosteroid therapy. Administer diuretics if ordered, usually furosemide. Children may develop hypokalemia because of potassium loss as an adverse effect of furosemide. Those children may require potassium supplementation or a diet higher in potassium-containing foods.

Monitor urine output and the amount of protein in the urine Weigh the child daily on the same scale either naked or wearing the same amount of clothing. Assess for resolution of edema. Measure pulse rate and blood pressure every 4 hours to detect hypovolemia resulting from excessive fluid shifts. Enforce oral fluid restrictions if ordered.

In cases of severe hypoalbuminemia, intravenous albumin may be administered. Increases in the serum albumin level cause fluid to shift from the subcutaneous spaces back into the bloodstream. A diuretic such as furosemide administered immediately after the albumin infusion allows for optimal diuresis and prevents fluid overload.

2. Preventing Infection:

Monitor the child's temperature. Administer prophylactic antibiotics, if prescribed. Delay administering live vaccines until at least 2 weeks after corticosteroid or other immunosuppressive medication therapy ceases.

3. Encouraging Adequate Nutrition and Growth:

Encourage a nutrient-rich diet within prescribed restrictions. Fluid restriction is reserved for children with massive edema. Sodium intake may be restricted in the edematous child in an effort to prevent further fluid retention. Encourage protein-rich snacks. Consult with the child and family in planning meals and snacks that the child likes and will be likely to consume. Use of nutritional supplement shakes may be helpful for some children.

4. Providing Emotional Support:

Nephrotic syndrome is often a chronic condition, Frequent hospitalizations require the child to miss school and the parents to miss work; this creates further stress for the family. The child may experience social isolation because he or she must avoid exposure to infections or because of self-esteem problems. The child may be dissatisfied with his or her appearance because of edema and weight gain, short stature, and the classic "Moon face" associated with chronic steroid use. Provide emotional support to the child and family. Encourage them in them efforts to maintain the treatment plan. Introduce the child to other youngsters with chronic renal conditions.

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Nursing Care of a Family with a High-Risk Newborn

Learning Objectives

1. Define the common classifications of high-risk infants and describe common illnesses that occur in these classifications of newborns

2. Assess a high-risk newborn to determine whether safe transition to extrauterine life has occurred.

3. Formulate nursing diagnoses related to a high-risk newborn and family.

4. Plan nursing care focused on priorities to stabilize a high-risk newborn's body systems.

NEWBORN PRIORITIES IN FIRST DAYS OF LIFE

All newborns have eight priority needs in the first few days of life:

1. Initiation and maintenance of respirations

2. Establishment of extrauterine circulation

3. Control of body temperature

4. Intake of adequate nourishment

5. Establishment of waste elimination

6. Prevention of infection

7. Establishment of an infant–parent relationship

8. Developmental care, or care that balances physiologic needs and stimulation for best development.

THE NEWBORN AT RISK BECAUSE OF ALTERED GESTATIONAL AGE OR BIRTH WEIGHT:

Infants need to be evaluated as soon as possible after birth to determine their weight and gestational age as classification by growth charts and gestational history is important to determine immediate health care needs and to help anticipate possible problems. Infants

born after the beginning of week 38 and before week 42 of pregnancy (calculated from the first day of the last menstrual period) are classified as ***term infants*.** Approximately 90% of all live births are term. Infants born before term (less than the full 37th week of pregnancy) account for approximately 7% to 19% of all births and are classified as **preterm infants,** regardless of their birth weight. Infants born after the onset of week 43 of pregnancy are classified as post term, dysmature, or post mature. Normally, birth weight varies for each gestational week of age. Infants who fall between the 10th and 90th percentiles of weight for their age regardless of gestational age are considered **appropriate for gestational age (AGA).** Infants who fall below the 10th percentile of weight for their age are considered **small for gestational age (SGA).** Those who fall above the 90th percentile in weight are considered **large for gestational age (LGA).** Other terms used include:

- **Low–birth-weight (LBW) infant**: one weighing less than 2,500 g at birth
- **Very-low-birth-weight (VLBW) infant**: one weighing less than 1500 g at birth
- **Extremely-low-birth-weight (ELBW) infant**: one weighing less than 1,000 g at birth Infants in

Factors Predisposing Infants to Respiratory Difficulty in the First Few Days of Life:

1. Low birth weight 2. Intrauterine growth restriction 3. Maternal history of diabetes.
4. Premature rupture of membranes 5. Maternal use of barbiturates or narcotics close to birth
6. Meconium staining Irregularities detected by fetal heart monitor during labor
7. Cord prolapses 8. Lowered Apgar score (<7) at 1 or 5 minutes

9. Post maturity (post term) 10. Small for gestational age
11. Breech birth 12. Multiple birth
12. Chest, heart, or respiratory tract anomalies

The Small-for-Gestational-Age Infant

An infant is SGA if the birth weight is below the 10th percentile on an intrauterine growth curve for that age. SGA infants may be born preterm (before week 38 of gestation), term (between weeks 38 and 42), or post term (past 42 weeks).

Etiology

1. A woman's nutrition during pregnancy plays a major role in fetal growth, so lack of adequate nutrition may be a major contributor to IUGR.
2. Pregnant adolescents have a high incidence of SGA infants. Because adolescents must meet their own nutritional and growth needs, needs of a growing fetus can be compromised.
3. The most common cause of IUGR is a placental anomaly: either the placenta did not obtain sufficient nutrients from the uterine arteries or it was inefficient at transporting nutrients to the fetus. Placental damage, such as partial placental separation with bleeding.
4. Women with systemic diseases that decrease blood flow to the placenta, such as severe diabetes mellitus or pregnancy induced hypertension.
5. Women who smoke heavily or use narcotics also tend to have SGA infants.

the placental supply of nutrients is adequate but an infant cannot use them because the infant has contracted an intrauterine infection such as rubella or toxoplasmosis or has a chromosomal abnormality.

Assessment:

Generally, an infant who suffers nutritional deprivation early in pregnancy, when fetal growth consists primarily of an increase in the number of body cells, is below average in weight, length, and head circumference. The child may have a small liver, which can cause difficulty regulating glucose, protein, and bilirubin levels after birth. The infant also may have poor skin turgor and generally appear to have a large head because the rest of the body is so small. The abdomen may be sunken. The umbilical cord often appears dry and may be stained yellow. The SGA infant needs careful assessment for possible congenital anomalies occurring as a result of the poor nutritional intrauterine environment. Polycythemia increased RBC count due to intrauterine hypoxia.

Nursing Diagnoses and Related Interventions

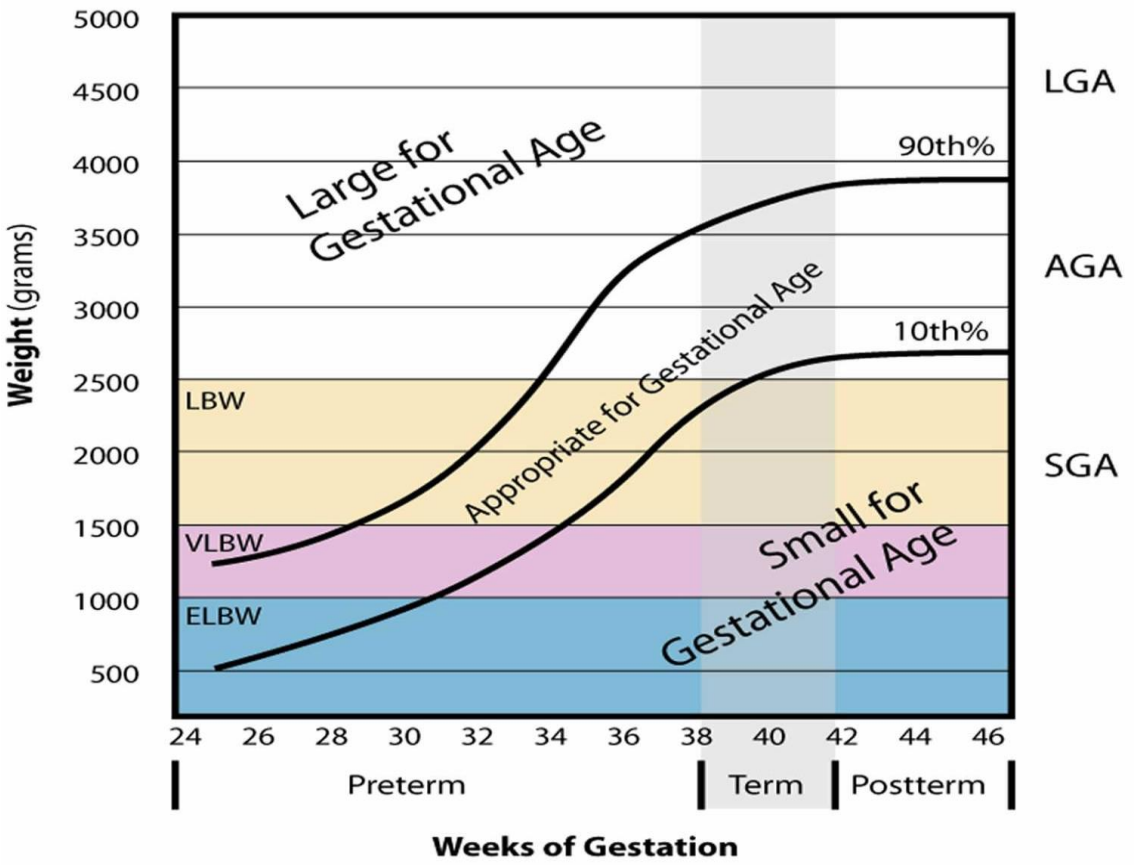
Nursing Diagnosis: Ineffective breathing pattern may be related to underdeveloped lung at birth in premature babies:

Because SGA infants have decreased glycogen stores, one of the most common problems is hypoglycemia (decreased blood glucose, or a level below 45 mg/dL). Such infants may need intravenous glucose to sustain blood sugar until they are able to suck vigorously enough to take sufficient oral feedings.

Nursing Intervention: Birth asphyxia is a common problem for SGA infants if there is placental problem with insufficient supply of oxygen to the baby immediately before delivery are at risk for developing meconium aspiration syndrome as a result of intrauterine hypoxia or during process of difficult labor. For this reason, many SGA infants require resuscitation at birth.

Nursing Diagnosis: Risk for ineffective thermoregulation related to lack of subcutaneous fat.

Nursing Intervention: SGA infants are less able to control body temperature than other newborns because they lack subcutaneous fat. A carefully controlled environment is essential to keep the infant‘s body temperature in a neutral zone.



The Large-for-Gestational-Age Infant

An infant is LGA (also termed **macrosomia)** if the birth weight is above the 90th percentile (>4 kg WT) on an intrauterine growth chart for that gestational age. Such a baby appears deceptively healthy at birth because of the weight, but a gestational age examination will reveal immature development.

Etiology

Infants who are LGA have been subjected to an overproduction of growth hormone in utero. This happens most often to infants of women with diabetes mellitus or women who are obese. Extreme macrosomia occurs in fetuses of diabetic women whose symptoms are poorly controlled, because these fetuses are exposed to high glucose levels.

If cyanosis is present, it may be a sign of poor heart function, but it could also be from transposition of the great vessels, a serious heart anomaly associated with macrosomia

Assessment: At birth, LGA infants may show immature reflexes and low scores on gestational age examinations in relation to their size. Because the head is large, it may have been exposed to more than the usual amount of pressure during birth, causing a prominent caput succedaneum, cephalhematoma, molding, nerve palsy and fracture of bones.

Hypoglycemia

LGA infants also need to be carefully assessed for hypoglycemia in the early hours of life because large infants require large amounts of nutritional stores to sustain their weight. If the mother had diabetes that was poorly controlled (the cause of the large size), the infant would have had an increased blood glucose level in utero to match the mother's glucose level; this caused the infant to produce elevated levels of insulin. After birth, these increased insulin levels will continue for up to 24 hours of life, possibly causing rebound hypoglycemia.

Nursing Diagnoses and Related Interventions:

Nursing Diagnosis: Risk of hypoglycemia in infant of diabetic mother in case of large weight baby requires frequent feedings to maintain normal glucose level and prevent hypoglycemia

Nursing Intervention:

As a rule, an LGA infant needs to be breastfed immediately and frequently to prevent hypoglycemia. The infant may need supplemental formula feedings after breastfeeding to supply enough fluid and glucose for the larger-than normal size baby during the first few days.

Cardiovascular Dysfunction. Observe LGA infants closely for signs of hyperbilirubinemia (increased serum bilirubin level), which may result from absorption of blood from bruising and polycythemia. Polycythemia has been caused by an infant's system attempting to fully oxygenate all body tissues. This effort puts extra stress on the heart, so the heart rate of LGA infants should be carefully observed. If cyanosis is present, it may be a sign of transposition of the great vessels, a serious heart anomaly associated with macrosomia.

Such infants may seem as if they should be able to suck well because they are already the size of a 2-month-old. However, the infant is not experienced newborn, so sucking may not be effective enough to obtain the larger-than-usual an amount of milk which is needed.

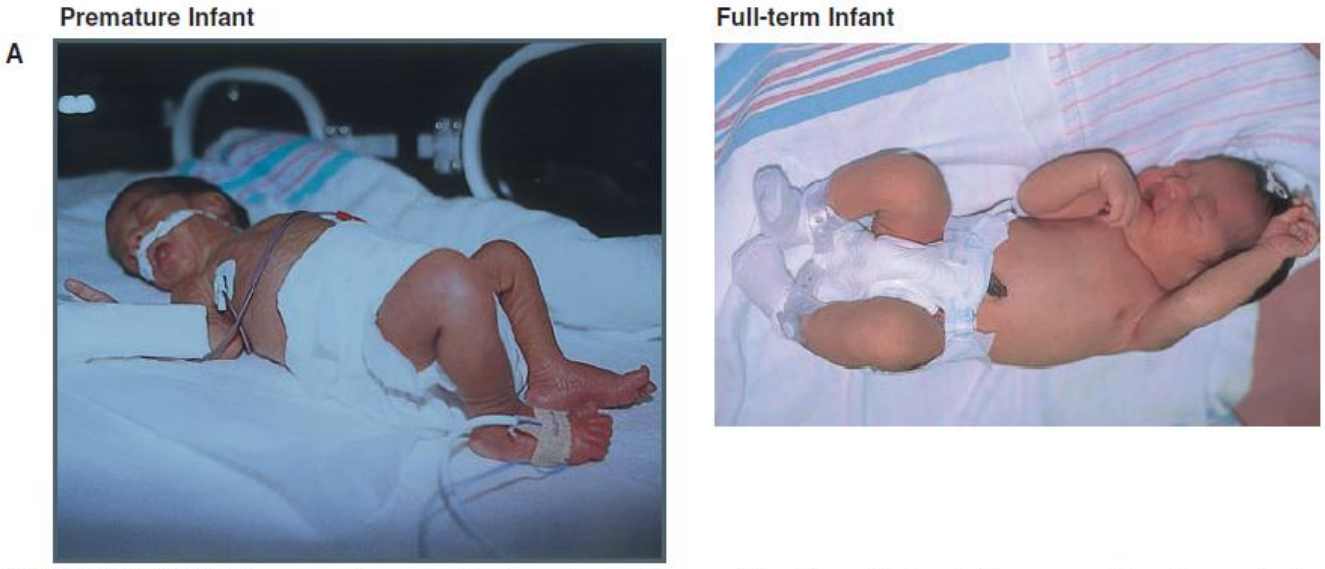
A Preterm Infant:

A preterm infant is traditionally defined as a live-born infant born before the end of week 37 of gestation; another criterion used is a weight of less than 2500 g at birth. Most preterm infants need intensive care from the moment of birth to give them their best chance of survival without neurologic after effects because they are more prone than others to hypoglycemia and intracranial hemorrhage. Lack of lung surfactant, because this does not form until about the 34th week of pregnancy, makes them extremely vulnerable to respiratory distress syndrome.

Common Factors Associated with Preterm Birth:

• Low socioeconomic level
• Poor nutritional status
• Lack of prenatal care
• Multiple pregnancy
• Previous early birth
•Cigarette smoking
• Age of the mother (highest incidence is in mothers younger than age 20).
• Abnormalities of the mother's reproductive system, such as intrauterine septum
• Infections (especially urinary tract infection)
• Obstetric complications, such as premature rupture of membranes or premature separation of the placenta
• Early induction of labor.
• Elective cesarean birth.

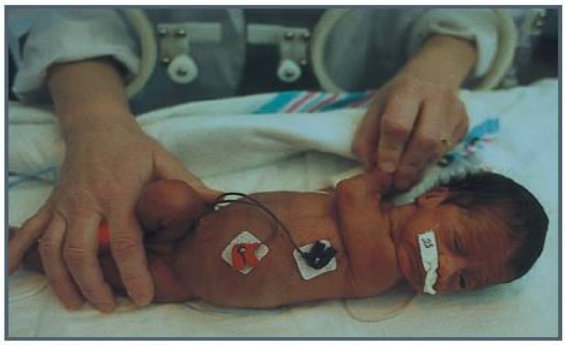
Differences Between Small-for-Gestational-Age and Preterm Infants		
Characteristic	**Small-for-Gestational-Age Infant**	**Preterm Infant**
Gestational age	24–44 wk	<37 wk
Birth weight	<10th percentile	Normal for age
Congenital malformations	Strong possibility	Possibility
Pulmonary problems	Meconium aspiration, pulmonary hemorrhage, pneumothorax	Respiratory distress syndrome
Hyperbilirubinemia	Possibility	Very strong possibility
Hypoglycemia	Very strong possibility	Possibility



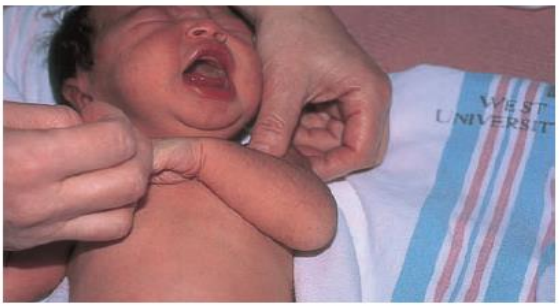
RESTING POSTURE *The premature infant is characterized by very little, if any, flexion in the upper extremities and only partial flexion of the lower extremities. The full-term infant exhibits flexion in all four extremities.*

D

Premature Infant



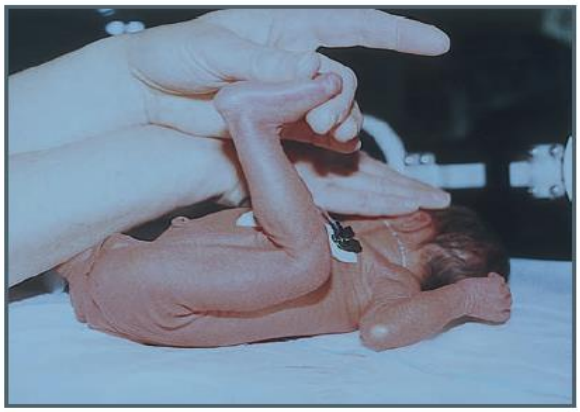
Full-term Infant



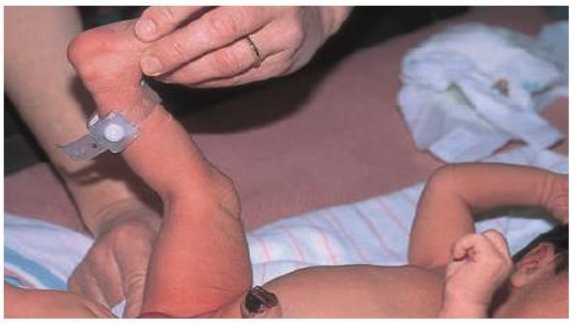
SCARF SIGN *Hold the baby supine, take the hand, and try to place it around the neck and above the opposite shoulder as far posteriorly as possible. Assist this maneuver by lifting the elbow across the body. See how far across the chest the elbow will go. In the premature infant the elbow will reach near or across the midline. In the full-term infant the elbow will not reach the midline.*

E

Premature Infant



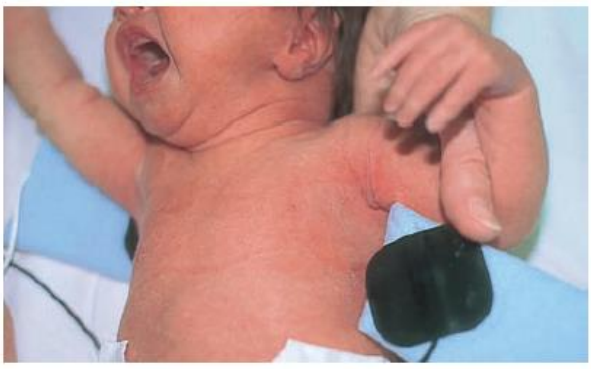
Full-term Infant



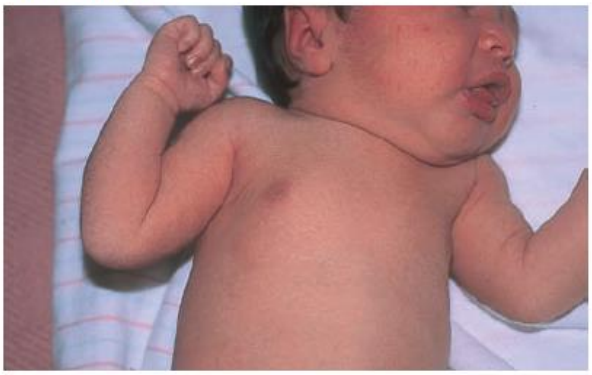
HEEL TO EAR *With the baby supine and the hips positioned flat on the bed, draw the baby's foot as near to the ear as it will go without forcing it. Observe the distance between the foot and head as well as the degree of extension at the knee. In the premature infant very little resistance will be met. In the full-term infant there will be marked resistance; it will be impossible to draw the baby's foot to the ear.*

G

Premature Infant



Full-term Infant



BREAST TISSUE *In infants younger than 34 weeks' gestation the areola and nipple are barely visible. After 34 weeks the areola becomes raised. Also, an infant of less than 36 weeks' gestation has no breast tissue. Breast tissue arises with increasing gestational age because of maternal hormonal stimulation. Thus, an infant of 39–40 weeks will have 5–6 mm of breast tissue, and this amount will increase with age.*

Potential Complications:

Anemia of Prematurity. Many preterm infants develop a normochromic, normocytic anemia <7g HB (normal cells, just few in number). The reticulocyte count is low because the

bone marrow does not increase its production until approximately 32 weeks. due to less amount of erythropoietin hormone which is normally secreted from the kidney and stimulate the bone marrow to form RBCS. in addition, the needs for repeated drawing of blood samplings may lead to anemia in premature babies. The infant will appear pale and may be lethargic.

Acute Bilirubin Encephalopathy:

Acute bilirubin encephalopathy (ABE) is destruction of brain cells by invasion of indirect bilirubin. Preterm infants are more prone to the condition than term infants because with the acidosis that occurs from poor respiratory exchange, brain cells are more susceptible to the effect of indirect bilirubin than usually. Preterm infants also have less serum albumin available to bind indirect bilirubin and inactivate its effect. Because of this, kernicterus may occur at lower levels (as low as 12 mg per 100 mL of indirect bilirubin) in these infants. If jaundice occurs, phototherapy or exchange transfusion can be initiated to prevent excessively high indirect bilirubin levels.

Persistent Patent Ductus Arteriosus. Because preterm infants lack surfactant, their lungs are noncompliant, so it is more difficult for them to move blood from the pulmonary artery into the lungs. This condition leads to pulmonary artery hypertension, which may interfere with closure of the ductus arteriosus. It is a common complication due to still immature baby to close the duct.

Nursing Diagnoses and Related Interventions:

Nursing Diagnosis: Impaired gas exchange related to immature pulmonary functioning.

Nursing Interventions:

1- Because preterm infants cannot initiate effective respirations as quickly as mature infants, they are susceptible to apnea. Birthing room teams need to be prepared with preterm-size laryngoscopes, Ambu bag or endotracheal tubes, suction catheters, and synthetic

surfactant to be administered by the endotracheal tube so resuscitation can be accomplished within 2 minutes.

2- Infants must be kept warm during resuscitation procedures so they are not expending extra energy to increase metabolic rate to maintain body temperature.

3- All procedures must be carried out gently; a preterm infant's tissues are extremely sensitive to trauma and can be damaged or bruised easily by an oxygen mask. When blood from bruising is hemolyzed and reabsorbed, this could lead to hyperbilirubinemia, yet another problem.

Nursing Diagnosis: Risk for deficient fluid volume related to insensible water loss at birth and small stomach Capacity.

Nursing Interventions:

1- A preterm newborn experience a high insensible water loss because of a large body surface relative to total body weight. Preterm infants also cannot concentrate urine well because of immature kidney function. Because of this, a high proportion of body fluid is excreted. All these factors make it important for a preterm baby to receive up to 160 to 200 mL of fluid per kilogram of body weight daily (higher than the term infant). Intravenous fluid administration typically begins within hours after birth to fulfill this fluid requirement and provide glucose to prevent hypoglycemia.

2- Most preterm infants void and pass meconium within 24 hours after birth, although this is delayed in very small infants. Measure urine output by weighing diapers rather than using urine collection bags, as disposable collection bags can lead to skin irritation and breakdown from frequent changing and leaking.

3- A preterm infant needs 115 to 140 calories per kilogram of body weight per day, compared with 100 to 110 needed by a term infant. Protein requirements are 3 to 3.5 g

per kilogram of body weight, compared with 2.0 to 2.5 for a term newborn. Because preterm infants have a smaller stomach capacity than term neonates, they cannot take large feedings and so must be fed more frequently with smaller amounts. Feedings may be as small as 1 or 2 mL every 2 to 3 hours.

The Post term Infant

A post term infant is one born after the 42nd week of a pregnancy. An infant who stays in utero past week 42 of pregnancy is at special risk because a placenta appears to function effectively for only 40 weeks. After that time, it seems to lose its ability to carry nutrients effectively to the fetus, and the fetus begins to lose weight (post term syndrome). At birth, the post term baby is likely to have difficulty establishing respirations, especially if meconium aspiration occurred. In the first hours of life, hypoglycemia may develop because the fetus had to use stores of glycogen for nourishment in the last weeks of intrauterine life. Subcutaneous fat levels may also be low, having been used in utero. This can make temperature regulation difficult, making it important to prevent a post term infant from becoming chilled at birth or during transport. Polycythemia may have developed from decreased oxygenation in the final weeks.

Illnesses That Occur in Newborns:

A number of illnesses occur specifically in newborns that automatically cause the infant to be classified as high risk.

Respiratory Distress Syndrome:

Respiratory distress syndrome (RDS) of the newborn, formerly termed hyaline membrane disease, most often occurs in preterm infants, infants of diabetic mothers, infants born by cesarean birth, or those who for any reason have decreased blood perfusion of the lungs,

such as occurs with meconium aspiration. The cause of RDS is a low level or absence of surfactant, the phospholipid that normally lines the alveoli and reduces surface tension to keep the alveoli from collapsing on expiration. Because surfactant does not form until the 34th week of gestation, as many as 30% of low-birth-weight infants and as many as 50% of very-low-birth-weight infants are susceptible to this complication.

Assessment:

Most infants who develop RDS have difficulty initiating respirations at birth. After resuscitation, they require days until become free of symptoms when initial release of surfactant start. They may need intubation and replacement of surfactant therapy via the endotracheal tube and may need respiratory support by mechanical ventilator. During this time, however, subtle signs may appear:

- Low body temperature
- Nasal flaring
- Grunting انين
- Sternal and subcostal retractions
- Tachypnea (more than 60 respirations per minute)
- Cyanotic mucous membranes.
- Apnea (stop breathing) may occur.

Therapeutic Management

Surfactant Replacement. As a preventive measure, synthetic surfactant is sprayed into the lungs by a syringe or catheter through an endotracheal tube at birth as 1-up to 3 doses; each dose every 6-12 hours. while an infant is first positioned with the head held upright and then tilted downward. It is important an infant's airway not

be suctioned for as long a period as possible after administration of surfactant to avoid suctioning the drug away.

RDS rarely occurs in mature (full term) infants.

Oxygen Administration. Administration of oxygen is necessary to maintain correct PO2 and pH levels.

Meconium Aspiration Syndrome:

Meconium is present in the fetal bowel as early as 10 weeks 'gestation. If hypoxia occurs, a vagal reflex is stimulated, resulting in relaxation of the rectal sphincter associated with agitation of the baby leading to release of meconium while intrauterine immediately before birth. This releases meconium into the amniotic fluid. An infant may aspirate meconium either in utero or with the first breath at the time of birth. Meconium can cause severe respiratory distress in three ways: it causes inflammation of bronchioles because it is a foreign substance block small bronchioles by mechanical small ball-like particles plugging; and it can cause a remove of surfactant from the alveoli and small bronchioles, causing collapses leading to hypoxemia, carbon dioxide retention, and intrapulmonary and extra pulmonary vascular flow shunting occur before oxygenation of venous blood. A secondary infection of injured tissue may lead to pneumonia. Meconium aspiration syndrome occurs more in full-term than preterm.

Therapeutic Management

1- Some infants are scheduled to be borne by emergency cesarean birth when meconium- stained amniotic fluid becomes evident during labor.

2- After birth and tracheal suction, infants may need to be treated with oxygen administration and assisted ventilation.

3- Antibiotic therapy may be used to prevent the development of pneumonia as a secondary problem.

4- Sometimes Surfactant may be administered via endotracheal tube.

Hyperbilirubinemia:

The term **Hyperbilirubinemia** refers to an excessive level of accumulated bilirubin in the blood and is characterized by **jaundice**, or **icterus**, Hyperbilirubinemia may result from increased unconjugated or conjugated bilirubin. The unconjugated form or indirect Hyperbilirubinemia is the type most commonly seen in newborns.

Possible causes of hyperbilirubinemia in newborns are:

• Physiologic (developmental) factors (prematurity)

• An association with breastfeeding or breast milk

• Excess production of bilirubin (e.g., hemolytic disease, biochemical defects, bruises)

• Disturbed capacity of the liver to secrete conjugated bilirubin (e.g., enzyme deficiency, bile duct obstruction)

• Combined overproduction and undersecretion (e.g., sepsis)

• Some disease states (e.g., hypothyroidism, galactosemia, infant of a diabetic mother).

Diagnostic Evaluation:

The degree of jaundice is determined by serum bilirubin measurements. Normal values of unconjugated bilirubin are 0.2 to 1.4 mg/dl. In newborns, levels must exceed 5 mg/dl before jaundice (icterus) is observable. It is important to note, however, that the evaluation of jaundice **is not based solely on serum bilirubin levels** but also on the timing of the appearance of clinical jaundice; gestational age at birth; age in days since birth; family history, including maternal Rh factor; evidence of hemolysis; feeding method; infant's physiologic status; and the progression of serial serum bilirubin levels. It is not an all-inclusive list; other factors are also evaluated:

• Persistent jaundice over 2 weeks in a full-term formula-fed infant

- Total serum bilirubin levels over 12.9 mg/dl (term infant) or over 15 mg/dl (preterm infant); the upper limit for breastfed infant is 15 mg/dl
- Increase in serum bilirubin by 5 mg/dl/day
- Direct bilirubin exceeding 1.5 to 2 mg/dl.

Therapeutic Management:

The primary goals in the treatment of hyperbilirubinemia are to identify infants at high risk for hyperbilirubinemia; monitor serum bilirubin levels; prevent bilirubin encephalopathy; and, as in any blood group incompatibility, to reverse the hemolytic process. The main form of treatment involves the use of phototherapy. Exchange transfusion is generally used for reducing dangerously high bilirubin levels that may occur with hemolytic disease.

The aim of phototherapy is to decrease the level of unconjugated bilirubin in order to prevent acute bilirubin encephalopathy, hearing loss and kernicterus. Position phototherapy units no more than 30.5 cm from the patient.

Recommendations for prevention and management of early–onset jaundice in breastfed infants include encouraging frequent breastfeeding, preferably every 2 hours; avoiding glucose water, formula, and water supplementation; and monitoring for early stooling.

Position:

Position of baby in incubator from over light phototherapy tubes of phototherapy units should be no more than 30.5 cm from the surface of the baby.

Eye care:

For infant comfort, eye protection (phototherapy masks) must be used for all babies nursed under overhead phototherapy. Cover the eyes with appropriate opaque eye covers.

Ensure eye covers are removed 4-6 hourly for eye care during infant cares or feeding. Observe for discharge/infection/damage and document any changes.

***Skin Care*:**

1- A more rapid response to treatment can be achieved by exposing larger surface areas to the phototherapy light. For infants with a rapidly rising serum bilirubin level, for example ABO incompatibility, the maximum area of skin should be exposed.

2- Keep the infant clean and dry. Zinc and Castor Oil applied to areas of skin excoriation.

3- Monitor the infant's temperature frequently and observe for possible overheating.

Parental Support:

1- Parents need a clear explanation of jaundice, how phototherapy works and what nursing care infants require while under "lights".

2- Mothers should be encouraged and supported to continue feeding, caring for and interacting with their infants as appropriate.

Side effect of phototherapy:

1- Skin rash
2- Abrasion to the cornea of eyes
3- Dehydration

University of Mosul / College of Nursing

Pediatric Nursing

Year Three /Semester Two

General Nursing Program

2024–2025

Prepared by

Dr. Rayyan Ibrahim Khaleel

Lecturer

Introduction to Child Health Nursing

Perspectives of Pediatric Nursing

Lecture outlines:

Upon completion of the chapter, you will be able to:

1. Discuss different methods of measuring child health.

2. Discuss the philosophy of pediatric nursing care.

3. Identify the major roles and functions of pediatric nursing, including the scope of practice and the professional standards for pediatric nurses.

4. Explain the components of the nursing process as they relate to nursing practice for children and their families.

CHILDHOOD HEALTH PROBLEMS

Children are a gift to this world, and, as such, it is society's responsibility to nurture and care for them. In the past, health was defined simply as the absence of disease; health was measured by monitoring the mortality and morbidity of a group. Over the past century, however, the focus of health has shifted to disease prevention, health promotion, and wellness. The World Health Organization (WHO, 2018) defines health as "a state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity."

Childhood Injuries:

unintentional injury, such as motor vehicle accidents, fires, drowning, bicycle or pedestrian accidents, poisoning, and falls, remains a leading cause of mortality and morbidity in children. These injuries have far-reaching consequences for children, families, and society in general. Risk factors associated with childhood injuries include **young age**, **male gender**, **low socioeconomic status**, **low maternal education level**, **poor housing**, **parental drug or alcohol abuse, or low support within the family**. These deaths can often be prevented

through education about the value of using car seats and seat belts, the dangers of driving under the influence of alcohol and other substances, and the importance of pedestrian and bicycle safety, fire safety, water safety, and home safety.

Infant Mortality Rate:

The infant mortality rate is the number of deaths during the first year of life per 1000 live births. It may be further divided into neonatal mortality (<28 days of life) and post neonatal mortality (28 days to 11 months). In the United States the infant mortality rate was 5.82 per 1000 live births, the neonatal mortality rate was 3.94, and the post neonatal mortality rate was 1.88 in 2014.

The first four causes congenital anomalies, disorders relating to short gestation and unspecified LBW, newborn affected by maternal complications of pregnancy, and sudden infant death syndrome accounted for about half (53%) of all deaths of infants younger than 1 year old.

Childhood Mortality Rate:

Death rates for children older than 1 year of age have always been lower than those for infants. Children ages 5 to 14 years have the lowest rate of death. However, a sharp rise occurs during later adolescence, primarily from injuries, homicide, and suicide. In 2014 accidental injuries accounted for 34.4% of all deaths. The second leading cause of death was suicide, accounting for 12.1% of all deaths. Homicide is the third leading cause of death in the 15-to-19-year age-group. Suicide, a form of self-violence, is the third leading cause of death among children and adolescents 10 to 19 years old.

Childhood Morbidity:

Acute illness is defined as an illness with symptoms severe enough to limit activity or require medical attention. Respiratory illness accounts for approximately 50% of all acute conditions, 11% are caused by infections and

parasitic disease, and 15% are caused by injuries. The chief illness of childhood is the common cold. The types of diseases that children contract during childhood vary according to age. For example, upper respiratory tract infections and diarrhea decrease in frequency with age, whereas other disorders, such as acne and headaches increase. Children who have had a particular type of problem are more likely to have that problem again. Morbidity is not distributed randomly in children. Recent concern has focused on groups of children who have increased morbidity: homeless children, children living in poverty, LBW children, children with chronic illnesses, foreign-born adopted children, and children in day care centers.

THE ART OF PEDIATRIC NURSING

Philosophy Of Care:

Nursing of infants, children, and adolescents is consistent with the American Nurses Association (2010) definition of nursing as the protection, promotion, and optimization of health and abilities, prevention of illness and injury, alleviation of suffering through the diagnosis and treatment of human response, and advocacy in the care of individuals, families, and populations.

Role Of the Pediatric Nurse:

1. **Therapeutic Relationship**

The establishment of a therapeutic relationship is the essential foundation for providing high-quality nursing care. Pediatric nurses need to have meaningful relationships with children and their families and yet remain separate enough to distinguish their own feelings and needs.

2. **Family Advocacy and Caring**

The nurse must work with family members, identify their goals and needs, and plan interventions that best address the defined problems. As an advocate, the nurse assists the child and family in making informed choices and acting in the

child's best interest. Advocacy involves ensuring that families are aware of all available health services, adequately informed of treatments and procedures, involved in the child's care.

3. Disease Prevention and Health Promotion

Every nurse involved in caring for children must understand the importance of disease prevention and health promotion. A nursing care plan must include a thorough assessment of all aspects of child growth and development, including nutrition, immunizations, safety, dental care, socialization, discipline, and education. The best approach to prevention is education and anticipatory guidance.

4. Coordination and Collaboration

The nurse, as a member of the health care team, collaborates and coordinates nursing care with the care activities of other professionals. A nurse working in isolation rarely serves the child's best interests.

The role of the pediatric nursing includes:

1. In primary levels:

Though health education to child and his parents and providing child's basic needs and immunization. It can:

1. Maintain child's health.
2. Help the child achieves his optimal growth and development.
3. Prevent diseases and their complications.

2. In secondary level:

1. Assessing their needs.
2. Nursing diagnosis.
3. Planning for their care.
4. Implementing the plan.
5. Evaluation children's condition.
6. Providing health teaching to children and their parents.

3. In tertiary level:

Assist children to return to their maximal level of functioning following illness and/ or disabilities.

COMMUNICATION

Communication is a complex process that including the perception and judgments of all individuals involved.

Communication may be, **verbal** and **nonverbal**.

Verbal communication: may involve language and its expression: vocalization in the form of laughs, moans, and squalls.

Nonverbal communication: often called "body language" includes gestures, movements, facial expressions, postures, and reactions.

Communication according developmental stage:

Infancy: Because they are unable to use words, primarily use and understand nonverbal communication.

Early Childhood: Children younger than 5 years old are egocentric. Although they have not yet acquired sufficient language skills to express their feelings and wants, toddlers can effectively use their **hands** to communicate ideas without words.

School-Age Years: They want explanations and reasons for everything.

Adolescence: The Art of Listening

Communicate Effectively with Adolescents:

1. Give individual attention.
2. Listen, listen, listen.
3. Be courteous, calm, and open minded.
4. Try not to overreact.
5. Avoid judging or criticizing.
6. Choose important issues when taking a stand.

Communicating with Children:

1. Allow children time to feel comfortable.
2. Avoid sudden or rapid advances, broad smiles, extended eye contact, or other gestures that may be seen as threatening.
3. Talk to the parent if child is initially shy.
4. Communicate through transition objects such as dolls, puppets, and stuffed animals before questioning a young child directly.
5. Give older children the opportunity to talk without the parents present.
6. Position that is at eye level with child.
7. Speak in a quiet, unhurried, and confident voice.
8. Speak clearly, be specific, and use simple words and short sentences.
9. State directions and suggestions positively.
10. Offer a choice only when one exists.
11. Be honest with children.
12. Allow them to express their concerns and fears.
13. Use a variety of communication techniques.

Communication techniques for children:

1. Play
2. Draw, paint, and sculpt.
3. Storytelling, word games.
4. Read books; watch movies, videos.
5. Write.

Play

Play is a universal language of children. The nurse can often pick up on clues about physical, intellectual, and social developmental progress from the form and complexity of child's play behaviors.

Basic for nursing communicating with children:

1. Introduce yourself and explain your role
2. Position should be at level of child
3. Allow to parent stay with child if need
4. Smile and eye contact with child
5. All question direct and explanation if need
6. Good listening and pause
7. Use family terms
8. Speak calm, quit and confident
9. Use positive statement
10. Encourage child to express his feeling.
11. Observe nonverbal cues.
12. Older children need privacy.

Barriers to communication:

1. Language.
2. Values and beliefs.
3. Child age.
4. Economic status for family.
5. Child educational level.
6. Physical barriers (mental disorder, learning disorder).
7. Attitude.
8. Timing.
9. Understanding of message.
10. Trust.

University of Mosul / College of Nursing

Pediatric Nursing

Year Three /Semester Two

General Nursing Program

2024–2025

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Nursing care of the Newborn Baby

Learning Objectives

- Describe the normal characteristics of a term newborn.
- Assess a newborn for normal growth and development.
- Implement nursing care for a normal newborn, such as instructing parents on the care of their newborn.
- Identify expected outcomes for a newborn and family during the first 4 weeks of life to help them manage seamless transitions across different healthcare settings.

Newborns undergo profound physiologic changes at the moment of birth (and, probably, psychological changes as well) as they are released from a warm, snug, dark, liquid-filled environment that has met all of their basic needs into a chilly, unbounded, brightly lit, gravity-based, outside world. Within minutes after being plunged into this strange environment, a newborn has to initiate respirations and adapt a circulatory system to extrauterine oxygenation. Within 24 hours, neurologic, renal, endocrine, gastro intestinal, and metabolic functions must be operating competently for life to be sustained. How well a newborn makes these major adjustments depends on his or her genetic composition, the competency of the recent intrauterine environment, gestational duration, presence of fetal anomalies, the care receives during labor and birth, and the care received during the newborn or neonatal period (the time from birth through the first 28 days of life). One half of all deaths that occur during the first year of life occur in the neonatal period and more than one million babies die every year in the first 24 hours after birth-an indication of how hazardous a time this is for an infant.

It is not unusual to hear the comment "all newborns look alike" from people viewing a nursery full of babies. In actuality, every child is born with individual physical and personality characteristics that make him or her unique right from the start.

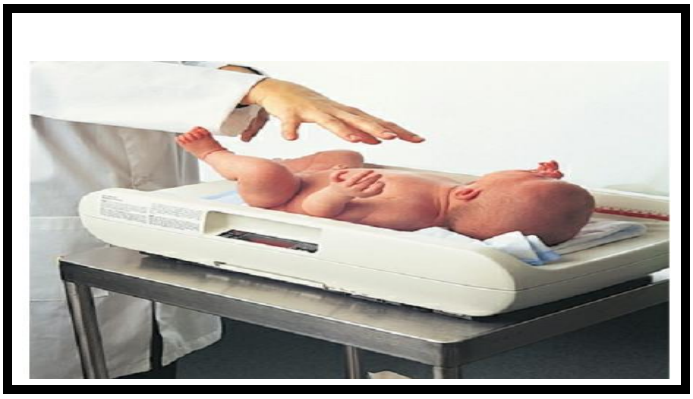
VITAL STATISTICS:

Vital statistics measured for a newborn usually consist of the baby's weight, length, and head and chest circumferences.

WEIGHT:

As long as newborns are breathing well, they are weighed nude and without a blanket soon after birth in the birthing room. Measurements such as body length and head, chest, and abdominal circumferences are also done but can be obtained later because performing these measurements while an infant is still damp exposes the newborn unnecessarily to chilling. A newborn's weight is important because it helps to determine maturity as well as establish a baseline against which all other weights can be compared. The birth weight of newborns varies depending on the racial, nutritional, intrauterine, and genetic factors that were present during conception and pregnancy.

Length:



A newborn's length at birth in relation to weight is a second important determinant used to confirm that a newborn is healthy.

- The average birth length (50th percentile) of a mature female newborn is 49 cm.
- For mature males, the average birth length is 50 cm.
- The lower limit of expected birth length is arbitrarily set at46 cm.

- Although rare, babies with lengths as great as 57.5 cm have been reported.

Head Circumference:

Head circumference is measured with a tape measure drawn across the center of the forehead and then around the most prominent portion of the posterior head (the occiput).

• In a mature newborn, the head circumference is usually 34 to 35 cm.

• A mature newborn with a head circumference greater than 37 cm or less than 33 cm should be carefully assessed for neurologic involvement, although some well newborns have these measurements.

Chest Circumference:

Chest circumference is measured at the level of the nipples. If a large amount of breast tissue or edema of the breasts is present, this measurement will not be accurate until the edema has subsided. The chest circumference in a term newborn is about 2 cm less than head circumference.

VITAL SIGNS:

Temperature:

The temperature of newborns is about 99°F (37.2°C) at birth because they have been confined in their mother's warm and supportive uterus. Temperature will fall almost immediately to below normal because of heat loss, the temperature of birthing rooms (approximately 68° to 72°F [21° to 22°C]), and the infant's immature temperature regulating mechanisms if the baby is not protected from heat loss at birth and in the moments after ward. The majority of heat loss occurs because of four separate mechanisms: convection, radiation, conduction, and evaporation. **Axillary temperatures** are taken because insertion of a thermometer into the rectum can potentially cause perforation of the

mucosa if performed incorrectly. Core body temperature varies according to the periods of reactivity but is usually 36.5° to 37.6° C (97.7°– 99.7° F).

Pulse:

The heart rate of a fetus in utero averages 110 to 160 beats/min. Immediately after birth, as the newborn struggles to initiate respirations, the heart rate may be as rapid as 180 beats/min. Within 1 hour after birth, as the newborn settles down to sleep, the heart rate stabilizes to an average of 120 to 140 beats/min. The heart rate of a newborn often remains slightly irregular because of immaturity of the cardiac regulatory center in the medulla, and transient murmurs may result from the incomplete closure of fetal circulation shunts. You should be able to palpate femoral pulses in a newborn. Radial and temporal pulses are more difficult to palpate accurately. Therefore, a newborn's heart rate is best determined by listening for an apical heartbeat for a full minute rather than assessing a pulse in an extremity or over the carotid artery. Always palpate for femoral pulses and document that they are present because their absence suggests possible coarctation (narrowing) of the aorta, which is a cardiovascular abnormality.

You should be able to palpate brachial and femoral pulses in a newborn, but the radial and temporal pulses are more difficult to palpate with any degree of accuracy. Therefore, a newborn's heart rate is always determined by listening for an apical heartbeat for a full minute, rather than assessing a pulse in an extremity. Always palpate for femoral pulses, however, because their absence suggests possible coarctation (narrowing) of the aorta, a common cardiovascular abnormality.

Respiration:

The respiratory rate of a newborn in the first few minutes of life may be as high as 90 breaths/min. As respiratory activity is established and maintained over the next hour, this rate will settle to an average of 30 to 60 breaths/min. Respiratory depth, rate, and

rhythm are likely to be irregular, and short periods of apnea (without cyanosis), sometimes called *periodic respirations*, are also common and normal during this time. Respiratory rate can be observed most easily by watching the movement of a newborn's abdomen because breathing primarily involves the use of the diaphragm and abdominal muscles. Coughing and sneezing reflexes are present at birth and help clear the airway. Newborns are obligate nose breathers and show signs of distress if their nostrils become obstructed.

The respiratory system does not reach adult levels of maturity until about 7 years of age. The lack of immunoglobulin A (IgA) in the mucosal lining of the upper respiratory tract also contributes to the frequent infections that occur in infancy.

PHYSIOLOGIC FUNCTIONS:

Just as changes occur in vital signs after birth, so do changes in all major body systems.

Cardiovascular System:

Changes in the cardiovascular system are necessary after birth because now, the lungs are responsible for oxygenating blood that was formerly oxygenated by the placenta. As soon as the umbilical cord is clamped, which stimulates a neonate to take in oxygen through the lungs, fetal cardiovascular shunts begin to close. With the first breath, blood pressure decreases in the pulmonary artery (the artery leading from the heart to the lungs). As this pressure decreases, the ductus arteriosus, the fetal shunt between the pulmonary artery and aorta, begins to close. At the same time, increased blood flow to the left side of the heart causes the foramen ovale (the opening between the right and left atria) to close because of the pressure against the lip of the structure (permanent closure does not occur for weeks). With the remaining fetal circulatory structures (umbilical vein, two umbilical arteries, and

ductus venosus) no longer receiving blood from the placenta, the blood within them clots and closes them, and the vessels atrophy over the next few weeks.

Blood Values:

Capillary heel sticks may reveal a falsely high hematocrit or hemoglobin value because of sluggish peripheral circulation. Before obtaining a blood specimen from a heel, warm the foot by wrapping it in a warm cloth to increase circulation and improve the accuracy of this value.

A newborn's blood volume is 80 to 110 ml/kg of body weight or about 300 ml total. Because a newborn has more red blood cells than the average adult, the hemoglobin level averages 17 to 18 g/100 ml of blood (the average for an adult is 11 to 12 g/ml). A newborn's hematocrit is between 45% and 50% (for an adult, 36% to 45%). A newborn's red blood cell count is about 6 million cells/mm^3(for an adult, 3.5 to 5.5 million cells/mm^3).

The Respiratory System:

A first breath is a major undertaking because it requires a tremendous amount of pressure (about 40 to 70 cm H_2O) for a newborn to be able to inflate alveoli for the first time. The reflex to breathe is initiated by a combination of **cold receptors**; a lowered partial pressure of oxygen (PO_2), which falls from 80 mmHg to as low as 15mmHg before a first breath; and an increased partial carbon dioxide pressure (PCO_2), which rises as high as 70 mmHg before a first breath.

Chemical factors: in the blood (low oxygen, high carbon dioxide, and low pH). The primary thermal stimulus: is the sudden chilling of the infant, who leaves a warm environment and enters a relatively cooler atmosphere. Tactile stimulation: tapping or flicking the soles of the feet or gently rubbing the newborn's back, trunk, or extremities. Prolonged tactile stimulation causes hypoxia.

The Gastrointestinal System:

Although the gastrointestinal tract is usually sterile at birth, bacteria may be cultured from the tract in most babies within 5 hours after birth and from all babies at 24 hours of life. Most of these bacteria enter the tract through the newborn's mouth from airborne sources. Others may come from vaginal secretions at birth, from hospital bedding, and from contact at the breast. The accumulation of bacteria is helpful because bacteria in the gastrointestinal tract are necessary for digestion through probiotics and for the synthesis of vitamin K. Although a newborn stomach holds about 60 to 90 ml, a newborn has limited ability to digest everything taken in, especially fat and starch because the pancreatic enzymes, lipase and amylase, remain deficient for the first few months of life. Also, because the cardiac sphincter between the stomach and esophagus is immature, a newborn tends to regurgitate easily. Immature liver function can lead to a tendency toward lowered glucose and protein serum levels. In the duodenum, three enzymes in particular are important for digestion. Trypsin is available in sufficient quantities for protein digestion after birth. Amylase (needed for complex carbohydrate digestion) and lipase (essential for appropriate fat digestion) are both deficient in the infant and do not reach adult levels until about 5 months of age.

Stools:

The first stool of a newborn is usually passed within 24 hours after birth. It consists of **meconium**, a sticky, tar-like, blackish-green, odorless material formed from mucus, vernix, lanugo, hormones, and carbohydrates that accumulated in the bowel during intrauterine life. If a newborn does not pass a meconium stool by 24 to 48 hours after birth, the possibility of some problem such as meconium ileus, imperforate anus, or volvulus should be suspected. About the second or third day of life, newborn stool changes in color and consistency. Termed a **transitional stool**, bowel contents appear both loose and

green; they may resemble diarrhea at to the untrained eye.

• **By the fourth day of life,** breastfed babies pass three or four light yellow stools per day that have a soft consistency. They are not foul smelling because breast milk is high in lactic acid, which reduces the number of putrefactive organisms in the stool.

• A newborn who receives formula usually passes two or three bright yellow stools a day of soft consistency. These have a more noticeable odor, compared with those of breastfed babies.

Occasionally, a newborn has swallowed some maternal blood during birth and either vomits fresh blood immediately after birth or passes a black tarry stool after two or more days. IF stools remain black or tarry, this suggests newborn intestinal bleeding rather than swallowed blood. IF mucus is mixed with stool or the stool is watery and loose, a milk allergy, lactose intolerance, or some other condition interfering with digestion or absorption is suspected.

Renal System:

Total volume of urine per 24 hours is about 200 to 300 ml by the end of the first week. However, the bladder voluntarily empties when stretched by a volume of 15 ml, resulting in as many as 20 voiding's per day. The first voiding should occur within 24 hours. The urine is colorless and odorless and has a specific gravity of about 1.020.

The Immune System:

Newborns have limited immunologic protection at birth because they are not able to produce antibodies until about 2 months (the reason most immunizations are not administered until 2 months of age). Newborns are, however, born with passive antibodies (immunoglobulin G) passed to them from their mother that crossed the placenta. In most instances, these include antibodies against poliomyelitis, measles, diphtheria, pertussis,

chickenpox, rubella, and tetanus. Newborns are routinely administered a hepatitis B vaccine before they leave their birth setting to promote antibody formation against this disease

Nursing Care of The Newborn and Family

Assessment:

Newborns require thorough skilled observation to ensure a satisfactory adjustment to extra uterine life. Physical assessment after delivery can be divided into four phases:

1. The initial assessment, which includes the Apgar scoring system
2. Transitional assessment during the periods of reactivity
3. Assessment of gestational age
4. Systematic physical examination

Initial Assessment: Apgar Scoring: The most frequently used method to assess newborns' immediate adjustment to extra uterine life is the **Apgar** scoring system, which is based on newborn heart rate, respiratory effort, muscle tone, reflex irritability, and color.

INFANT EVALUATION AT BIRTH—APGAR SCORING SYSTEM

SIGN	0	1	2
Heart rate	Absent	Slow, <100 beats/min	>100 beats/min
Respiratory effort	Absent	Irregular, slow, weak cry	Good, strong cry
Muscle tone	Limp	Some flexion of extremities	Well flexed
Reflex irritability	No response	Grimace	Cry, sneeze
Color	Blue, pale	Body pink, extremities blue	Completely pink

Assessment of Gestational Age

The infant's birth weight, length, and head circumference are plotted on standardized graphs that identify normal values for gestational age (for birth weight. Infants whose weight is **appropriate for gestational age (AGA)**

NURSING PROCESS

Every newborn is born slightly acidotic. Any new buildup of acid may lead to severe, life–threatening acidosis.

The Healthy Newborn and Family

Assessment:

Assess the newborn according to the guidelines

Diagnosis (Problem Identification)

After a thorough assessment, several nursing diagnoses for healthy newborns include:

- Readiness for Enhanced Parenting
- Risk for Injury
- Effective Breastfeeding
- Risk for Imbalanced Body Temperature
- Readiness for Enhanced Nutrition
- Ineffective Breathing Pattern
- Risk for Infection
- Risk for Neonatal Jaundice

Planning

Expected patient outcomes include:

- Newborn airway will remain patent.
- Effective breathing pattern will be established.
- Thermoregulation will be maintained.
- Parent–infant attachment behaviors will be observed.

• Breastfeeding or bottle feeding will be established.

• Infant will exhibit no evidence of infection; immune status will be maintained.

• Newborn will remain free of injury.

• Family will demonstrate ability to care for the infant's basic needs.

• Newborn jaundice will be detected and monitored effectively.

Evaluation

The effectiveness of nursing interventions for the newborn and family is determined by continual assessment and evaluation of care based on the following guidelines:

• Monitor axillary temperature regularly; observe for signs of temperature instability such as respiratory distress.

• Eye treatment, vitamin K injection, hepatitis B vaccine, and hearing and newborn screening tests, including bilirubin screening.

• Monitor infant's feeding ability and oral intake.

• Monitor daily weight.

• Observe interactions between infant and family members; interview family regarding their feelings about the newborn.

• Observe parents' ability to provide care for infant; interview parents regarding any concerns about infant's care at home.

• Observe parents' correct use of car safety seat restraint on discharge

NURSING ALERT: To avoid aspiration of amniotic fluid or mucus, clear the pharynx first and then the nasal passages using a bulb syringe: remember, mouth before nose. Vital signs are closely monitored, and any indication of respiratory distress is immediately

Maintain A Stable Body Temperature

reported.

Conserving the newborn's body heat is an essential nursing goal. At birth, a major cause of heat loss is **evaporation**, the loss of heat through moisture. The amniotic fluid that bathes the infant's skin favors evaporation, especially when combined with the cool atmosphere of the delivery room. Heat loss through evaporation is minimized by rapidly drying the skin and hair with a warmed towel and placing the infant in a heated environment or skin-to-skin contact with the mother. In addition,

NURSING ALERT: To The cardinal signs of respiratory distress in a newborn include tachypnea, nasal flaring, grunting, intercostal retractions, and cyanosis.

drying the infant—especially the face and hair—also effectively reduces evaporation because the head, which is a large surface area in a newborn, can be responsible for a great amount of heat loss. Covering the hair with a cap after drying further reduces the possibility of evaporation cooling.

The peripheral capillaries are closer to the surface of the skin, thus making the newborn and young infant more susceptible to heat loss. Over the first year of life, thermoregulation (the body's ability to stabilize body temperature) becomes more effective: The peripheral capillaries constrict in response to a cold environment and dilate in response to heat.

Protect From Infection and Injury:

The most important practice for preventing cross-infection is thorough hand washing of all individuals involved in the infant's care. Other procedures to prevent infection include eye care, umbilical care, bathing, and care of the circumcision. Artificial nails are prohibited, and long fingernails are discouraged for health care providers because the former have been

implicated in the transmission of sepsis. Vitamin K is administered to protect against hemorrhage. In addition, several safety measures are practiced, particularly in terms of proper identification, and screening tests are used to detect various disorders.

Eye Care:

Prophylactic eye treatment against **ophthalmia neonatorum**, infectious conjunctivitis of the newborn, includes the use of (1) silver nitrate (1%) solution, (2) erythromycin (0.5%) ophthalmic ointment or drops, or (3) tetracycline (1%) ophthalmic ointment or drops (preferably in single-dose ampules or tubes). Chlamydia trachomatis is the major cause of ophthalmia neonatorum. Topical antibiotics such as tetracycline and erythromycin, silver nitrate, and a 2.5% povidone–iodine solution have not proved to be effective in the treatment of chlamydial conjunctivitis. A 14-day course of oral erythromycin or an oral sulfonamide may be given for chlamydial conjunctivitis. Administration of oral erythromycin in infants younger than 6 weeks old has been associated with infantile hypertrophic pyloric stenosis; therefore, parents should be informed of the potential risks and signs of the illness.

Vitamin K Administration:

vitamin K (AquaMEPHYTON) is usually administered intramuscularly into the lateral anterior thigh, the preferred site for all injections in a newborn, immediately after birth.

Shortly after birth, vitamin K is administered as a single intramuscular dose of 0.5 to 1 mg to prevent hemorrhagic disease of the newborn, also called **vitamin K deficiency bleeding (VKDB).** Normally, vitamin K is synthesized by the intestinal flora. However, because infants' intestines are relatively sterile at birth and because breast milk contains low levels of vitamin K, the supply is inadequate for at least the first 3 or 4 days. The major function of

vitamin K is to catalyze the synthesis of prothrombin in the liver, which is needed for blood clotting.

Hepatitis B Vaccine Administration:

To decrease the incidence of hepatitis B virus in children and its serious consequences (cirrhosis and liver cancer) in adulthood, the first of three doses of hepatitis B vaccine are recommended soon after birth and before hospital discharge for all newborns. The injection is given in the vastus lateralis muscle because this site is associated with a better immune response than is the dorsogluteal area.

Newborn Screening for Disease:

A number of genetic disorders can be detected in the newborn period. Most states require screening for phenylketonuria (PKU), congenital hypothyroidism, galactosemia, and hemoglobin defects such as sickle cell disease. The nurse's responsibility is to educate parents regarding the importance of screening and to collect appropriate specimens at the recommended time.

Bathing:

Bath time is an opportunity for the nurse to accomplish much more than general hygiene. It is an excellent time for observing the infant's behavior, state of arousal, alertness, and muscular activity. Bathing is usually performed after the vital signs have stabilized, especially the temperature. As part of **standard precautions**, nurses should wear gloves when handling newborns until blood and amniotic fluid are removed by bathing. Studies indicate that healthy full-term newborns with a stable body temperature can be bathed as early as 1 hour of age without experiencing problems, The bath time provides an opportunity for the nurse to involve the parents in the care of their child, to teach correct hygiene procedures, and to learn about their infant's individual characteristics.

Early Newborn Discharge Criteria:

• It was a singleton birth between 38 and 42 weeks of gestation.

• Baby was delivered by uncomplicated vaginal delivery.

• Birth weight is appropriate for gestational age.

• Physical examination was normal.

• Vital signs are normal and stable as measured in an open crib with adequate clothing.

• Infant has urinated and passed at least one stool.

• Infant has completed at least two successful feedings.

• Clinical significance of jaundice, if present, has been determined and appropriate management or follow-up plans put in place.

• Appropriate maternal and infant blood tests have been performed.

• Appropriate neonatal immunizations have been administered.

• Support persons are available to assist mother and her infant after discharge.

• Continuing medical care is planned, including that infant discharged sooner than 48 hours be examined within 48 hours of discharge from the hospital.

*Newborn Home Care After Early Discharge**

Wet diapers - Minimum of one for each day of life (day 2 = 2 wets; day 3 = 3 wets) until fifth or sixth day, at which time 5 or 6 per day to 14 days, then 6 to 10 per day

Breastfeeding - Successful latch-on and feeding every 1.5 to 3 hours daily; audible swallowing

Formula feeding - Successfully taking at least 1 to 2 oz every 3 to 4 hours; voiding as above.

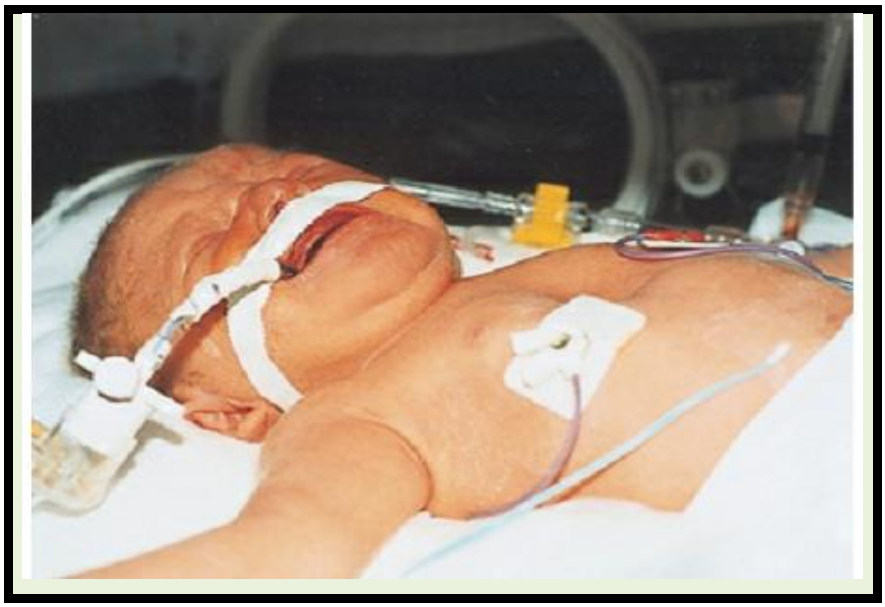
Circumcision - Wash with warm water only; yellow exudate forming, with no bleeding; Plastibell intact for 48 hours

Stools - At least one every 48 to 72 hours (bottle feeding), or two or three per day (breastfeeding)

Color - Pink to ruddy when crying; pink centrally when at rest or asleep.

Activity - Has four or five wakeful periods per day and alerts to environmental sounds and voices

Jaundice - Physiologic jaundice (i.e., jaundice not appearing in the first 24 hours); feeding, voiding, and stooling as noted above or practitioner notification for suspicion of pathologic jaundice (appears within 24 hours of birth; hemolysis and ABO/Rh problem suspected), decreased activity, poor feeding, or dark orange skin color persisting on the fifth day in light-skinned newborn; obtain transcutaneous (or serum) bilirubin before discharge and identify risk with an hour-specific nomogram.



Sternal retractions are a sign of respiratory distress requiring immediate intervention, such as mechanical ventilation or increased oxygen.