



Assessment of Risk in the Term Newborn, 2nd Edition

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Transition from Fetal to Extrauterine Life

- Assessment and monitoring of neonatal adaptation are essential for early identification of problems.
- Nursing management during the early newborn period includes identification of risk factors, assessment, monitoring, intervention and postdischarge follow-up.



Evidence-based Practice (EBP) and Developmental Care

- EBP is based on the concept that care is grounded in research findings, rather than experience and tradition.
- Developmental care is individualized treatment based on diagnosis, gestational age and infant needs and capabilities.



Cardiovascular and Pulmonary Adaptation

- The most significant change at birth is that the lungs become the primary organ of oxygenation.
- When the umbilical cord is clamped, immediate circulatory changes occur because the placenta is no longer part of circulation.
- Nurses should evaluate and monitor any murmur or cyanosis in the neonate because they are signs of cardiovascular abnormalities (Lott, 2007).



Apgar Score

- Evaluates five physiologic signs at 1 minute and 5 minutes of life:
 - Heart rate
 - Respiration
 - Muscle tone
 - Reflex irritability
 - Color
- Assigns each sign a score of 0,1 or 2
- Is a convenient shorthand for reporting newborn status and response to resuscitation (AAP & ACOG, 2006)



Asphyxia

- Intrauterine asphyxia is the cessation of placental gas exchange that occurs before or during delivery. It is the most frequent cause of acidosis in the neonate and brain injury in the full-term newborn (Kenner & Lott, 2007).
- Perinatal asphyxia is failure of the newborn to establish adequate alveolar ventilation at birth . It is related to birth trauma, failed initiation of respiration, respiratory distress syndrome and apnea.



Delivery Management

- Ten percent of all newborns require some form of assistance at birth, and 1 percent require extensive resuscitation (Wu & Carlo, 2002).
- Discontinuation of resuscitation may be justified after 10 minutes of continuous and adequate resuscitation efforts if there are no signs of life (AAP & AHA, 2006).



Delivery Management (Continued)

- Suctioning may be done with a bulb syringe or a suction catheter.
- Meconium in the amniotic fluid complicates a small percentage of deliveries.
 - When a baby is born but not vigorous, endotracheal suctioning is required before the infant is dried or stimulated.



Effects of Anesthesia/Analgesia

(Mercer, Erickson-Owens, Graves & Haley, 2007)

- Most anesthesia and analgesia medications cross the placenta and enter fetal circulation in a dose-dependent fashion.
- Infants of mothers who receive narcotic analgesia or epidural anesthesia perform less well on tests of muscle tone, alertness and motor skills; however, these effects are transient.



Assessment of Gestational Age

- An accurate assessment incorporates size and maturity.
- Assessment methods include:
 - Mother's menstrual history
 - Prenatal ultrasonography
 - Evaluation of obstetric parameters
 - Postnatal maturational examinations
 - Dubowitz Assessment of Gestational Age
 - Lubchenco Scale
 - New Ballard Score



Infant Classification and Growth Assessment

- After assessing gestational age, the nurse plots the infant's length, weight and occipital-frontal head circumference (OFC) on intrauterine growth charts.
- Growth curves show measures of intrauterine growth in percentiles for each week of gestation.



Infant Classification and Growth Assessment (Continued)

Term	Percentile
Large for gestational age (LGA)	Above the 90 th percentile
Appropriate for gestational age (AGA)	Between the tenth and 90 th percentiles
Small for gestational age (SGA)	Below the tenth percentile



Physical Assessment

- Examination should occur within the first 24 hours of life after transition is complete (Verklan & Walden, 2004).
- Abnormal physical findings include:
 - Asymmetrical or weak movements
 - Floppy or rigid posture
 - High-pitched cry
 - Inability to complete a full range of motion
 - Prolonged tremors



Weight and Length (Kenner & Lott, 2007)

- An AGA term infant weighs 2,500 g to 4,000 g.
 - It is acceptable for infants to lose up to 10 percent of their birthweight in the first week of life.
 - Infants should return to their birthweight within the first 2 weeks of life.
- The term infant's length averages 45 cm to 55 cm.



Vital Signs (Kenner & Lott, 2007)

- The healthy infant has a respiratory rate between 40 and 60 breaths per minute.
- Heart rate should range from 120 to 160 beats per minute.
- Blood pressure ranges are related to gestational and chronologic ages.



Skin

Initial skin assessment includes:

- General color
- Consistency (smooth, peeling)
- Opacity
- Thickness
- Hair distribution
- Staining
- Epidermal consistency
- Obvious markings, moles or rashes

Head

- The average head circumference in a term infant is 35 cm; the customary range is 31 cm to 38 cm (Kenner & Lott, 2007).
- The infant has as many as six palpable fontanelles at birth; the two most important are the anterior and posterior fontanelles.

Face and Neck

- The nurse assesses:
 - The face for shape, symmetry, bruising and dysmorphic features
 - Gag, sucking and rooting reflexes
 - Facial movements for symmetry during crying
 - The neck for length, masses, webbing, mobility and the relationship of neck to body
- The nurse also performs detailed assessments of the ears, eyes, nose and mouth.

Thorax and Cardiovascular System

The nurse assesses:

- The infant's chest for size, symmetry, musculature, bony structure, number and location of nipples and ease of respiration
- The infant's heart for rate, rhythm, murmurs and character of sounds
- Femoral pulses in comparison with pulses in the upper extremities



Abdomen

- The nurse assesses the abdomen for contour, size, symmetry and umbilical cord location.
- The nurse palpates the abdomen to locate vital organs and any masses.
- The infant should urinate by 24 hours of age and have a bowel movement by 48 hours.

Kidneys

The nurse examines the kidneys for shape, texture and size (Altimier, Quatman & Howard, 2007):

- Kidneys are smooth and firm to touch when palpated.
- The length of the kidney in the term infant is 4.5 cm to 5.0 cm from the upper to the lower pole.

Anogenital Area and Genitalia

- The nurse evaluates the anus for patency and tone.
- In the male, the nurse checks the glans, urethral opening, prepuce and shaft of the penis; the scrotum is examined for size, rugation and the presence of testes.
- In the female, the nurse examines the labia, clitoris, urethral opening and external vaginal vault.



Skeletal System

- The nurse observes and palpates the curvature of the spine and performs passive flexion, extension and lateral bending.
- The nurse assesses extremities for symmetry, degree of flexion and presence of defects and fractures.

Sleep and Activity Patterns

The first 6 to 8 hours after birth are called the transitional period. During this period, the newborn experiences physiologic variations in three phases:

1. Reactivity immediately after birth
2. Relative inactivity
3. A second episode of reactivity



Infant State Assessment

- Evaluation of newborn behavior incorporates assessment of state, reactions to stimulation and the newborn's ability to move from one state to another.
- A state-organized infant can transition between states and has the physiological and behavioral ability to reach or withdraw from any state.



Newborn Screening and Genetic Testing

- The March of Dimes (2006) recommends newborn screening for 29 conditions.
- Policies regarding parental informed consent for newborn screening differ by state.
- Sample collection for screening occurs between 48 and 72 hours after birth.



Thermoregulation

- Thermoregulation is the balance between heat production and heat loss.
- It is vital to the newborn and is entirely managed by nurses.
- It is closely linked to the infant's survival and health status (Kenner & Lott, 2007).



Heat Loss Mechanisms

- **Conduction:** transfer of heat when two solid objects are in surface-to-surface contact
- **Convection:** transfer of heat between areas that are in contact with each other but that are not solid
- **Evaporation:** heat loss caused by evaporation of water from the skin
- **Radiation:** transfer of heat from a warmer object to a cooler object without contact



Heat Dissipation

- Infants respond to overheating by vasodilation in the skin, which increases heat loss from the blood.
- In the first week of life, immaturity of the skin causes the largest amount of heat loss through evaporation.
- The newborn's head represents 21 percent of the total body surface area and accounts for a significant proportion of total heat loss (Blackburn, 2007).



Heat Production

The human body responds to cold in three ways:

1. Voluntary muscular activity (vasoconstriction and increased movement)
2. Shivering (inefficient in the term newborn)
3. Chemical or nonshivering thermogenesis (brown-fat metabolism for several hours after birth)



Temperature

- At birth, the neonate's temperature may decrease at a rate of 0.2 C to 1.0 C per minute, mainly through convective and evaporative heat loss.
- Norms (AAP & ACOG, 2007):
 - Rectal or auxiliary temperature of 36.5 C to 37.5 C
 - Skin temperature of 36 C to 36.5 C

Thermoneutral Environment

- A thermoneutral environment is a range of environmental temperatures in which an infant's metabolic rate is at a minimum and body temperature is maintained (Chandra & Baumgart, 2005b).
- At birth in a 25 C room, the infant requires 200 Kcal/kg/min to match the heat loss (Knobel, Wimmer & Holbert, 2005).



Temperature Assessment

- For neonates and infants, axillary temperatures closely correlate with rectal temperatures and are safer for the infant.
- Axillary temperature, on average, is 0.4 C less than rectal temperature (Kenner, 2003).



Hyperthermia

- Infant hyperthermia is caused by an overheated environment or fever.
 - In febrile infants, core temperature increases before skin temperature.
 - In an overheated environment, skin temperature increases first.
- Accurate documentation of skin, core and air temperatures can aid in the diagnosis.

Hypothermia

- One of the earliest signs of hypothermia is vasoconstriction.
- When a cold-stressed infant is rewarmed, skin temperature should not be warmer than core temperature by more than 1 C.
- The nurse slows the rewarming process if the infant becomes apneic or if blood pressure decreases.

Respiratory Distress

- Respiratory distress is a common neonatal complication that decreases oxygenation and carbon dioxide exchange.
- The three most common respiratory conditions that cause respiratory distress in the term newborn are:
 1. Pneumonia
 2. Transient tachypnea of the newborn (TTN)
 3. Meconium aspiration syndrome (MAS)



Hypoglycemia

- Caused by an inadequate supply of glucose, alterations in endocrine regulation or increased glucose regulation
- Can be transient or persistent and asymptomatic or symptomatic
- Usually defined as <35 mg/dL (Kenner & Lott, 2007); is not a single number—instead, is a trend of falling blood-glucose values



Hyperglycemia

- Usually is defined as a blood glucose level >125 mg/dL (whole blood) or 145 mg/dL to 150 mg/dL (plasma)
- Occurs most often in preterm newborns
- Is typically asymptomatic and detected on routine laboratory screening

Perinatal and Neonatal Infections

- The newborn's increased susceptibility to infection and decreased ability to respond to it make risk assessment and early intervention vital to reducing morbidity and mortality.
- Assessment of risk begins with a review of the maternal history and intrapartum record for evidence of maternal infection.



Predisposing Risk Factors for Newborn Infection

Maternal

- | | |
|---|---|
| <ul style="list-style-type: none">• Malnutrition• Lack of prenatal care• Substance abuse• TORCH infections• Peripartum maternal fever• Clinical amnionitis• UTI at time of delivery | <ul style="list-style-type: none">• Vaginal colonization with GBS• Perineal colonization with E. Coli• Prolonged rupture of membranes (>24 hours)• Sexually transmitted infection (STI) |
|---|---|

Neonatal

- | | |
|--|--|
| <ul style="list-style-type: none">• Prematurity• Perinatal asphyxia• Concurrent neonatal Disease | <ul style="list-style-type: none">• IUGR• Galactosemia• Congenital asplenia• Male sex |
|--|--|



GBS

- GBS is a gram-positive, anaerobic bacterium that colonizes in the vagina or rectum of 10 percent to 30 percent of pregnant women (CDC, 2002).
- It is the most common cause of neonatal sepsis and meningitis in the United States (CDC, 2002).
- Treatment is with benzylpenicillin or ampicillin (Dear, 2005).

E. coli

- *E. coli* is a gram-negative rod that makes up most typical human fecal flora.
- It is the second most common cause of neonatal sepsis and meningitis in the United States (Dear, 2005).
- Treatment is with aminoglycoside alone or with cefotaxime if meningitis is suspected (Dear, 2005) .

Tuberculosis (TB)

- The incidence of TB in the United States has resurged since the late 1980s in association with the HIV epidemic (CDC, 2006c, 2006d).
- Transmission is by inhalation or ingestion of infected droplets, ingestion of infested breastmilk or contamination of traumatized skin or mucous membranes.

Tuberculosis (TB) (Continued)

- The Mantoux Purified Protein Derivative (PPD) skin test usually is positive once the infant develops antibodies to the bacilli.
- Infants are at minimal risk and require no anti-TB treatment if they are born to mothers who have completed treatment for TB and have no evidence of disease.



Sexually Transmitted Infections (STIs)

The CDC (2006b) suggests gathering information from clients about STIs using the five P's:

1. Partners
2. Prevention of pregnancy
3. Protection from STIs
4. Practices
5. Past history of STIs



Congenital Syphilis

- Syphilis can be transmitted across the placenta and through direct contact with active genital lesions during delivery.
- Evaluation for congenital syphilis includes physical examination and serologic testing.
- Nurses should examine cerebrospinal fluid in all infants born to mothers with syphilis during pregnancy and in those with suspected or proven congenital syphilis (Dear, 2005) .



Congenital Syphilis (Continued)

- Treatment at any stage is with parenteral penicillin G or benzylpenicillin (CDC, 2006c).
- Breastfeeding is not contraindicated for infants whose mothers have been treated.



Gonorrhea

- Intrapartum contamination usually occurs during contact with maternal secretions in the birth canal.
- It also can occur in utero after rupture of the membranes.

Gonorrhea (Continued)

- The most common clinical manifestation in neonates is ophthalmia neonatorum or conjunctivitis (CDC, 2006c).
- Correct administration of eye prophylaxis prevents gonococcal infection in most infants.
- There are no contraindications to breastfeeding with maternal gonococcal infection.



Hepatitis B (HBV)

- HBV is the hepatitis virus most often seen in perinatal and neonatal infection.
- Perinatal transmission is 76 percent in mothers with acute HBV in the third trimester and 10 percent in the first two trimesters (Dear, 2005).
- Ninety percent of infants born to women with HBV surface antigen and HBV envelop antigen are at risk for HBV during the first year of life (Kenner & Lott, 2007).



Hepatitis B (HBV) (Continued)

- Neonatal infection usually occurs at birth when the infant comes in direct contact with contaminated maternal blood and vaginal fluid.
- ACIP (2005) recommendations:
 - Infants born to HBV+ women
 - Dose 1 of HBIG vaccine at birth
 - Subsequent doses at 1 and 6 months (Pickering, 2006)
 - Infants born to non-HBV+ women
 - Dose 1 at birth or before discharge
 - Dose 2 at 1 or 2 months of age
 - Dose 3 at 6 to 18 months of age



HIV

- HIV is transmitted to the fetus in utero transplacentally, intrapartally through contact with maternal blood and in breastmilk.
- Infants usually develop signs and symptoms between 4 and 6 months of age with an incubation of 6 weeks to 10 years (CDC, 2006b, 2006c).

HIV (Continued)

- With proper screening and antiretroviral prophylaxis during labor and after birth, the risk for vertical transmission rate decreases (AAP & ACOG, 2007; Simpson, 2006).
- Research into pharmacological prevention in the neonate is promising, with clinical trials examining combinations of antiretroviral agents.

Chlamydia

- Chlamydia is the most widespread STI in the United States (Kenner & Lott, 2007).
- *Chlamydia trachomatis* is the bacterial agent most commonly found in perinatal infection (CDC, 2006c; Kenner & Lott, 2007).
- Transmission occurs at birth when the infant comes in contact with contaminated vaginal fluids in the birth canal.



Chlamydia (Continued)

- Acquisition occurs in approximately 50 percent of infants born vaginally to infected mothers and in some infants delivered by cesarean with intact membranes (Kenner & Lott, 2007).
- Breastfeeding is permitted unless antibiotics are used to treat maternal infection are contraindicated (Kenner & Lott, 2007).



Herpes Simplex (HSV)

- HSV-2 is the most common cause of disease in the newborn (Kenner & Lott, 2007).
- Transmission usually occurs intrapartally with ascending infection after rupture of membranes or through contact with an infected birth canal during vaginal delivery.

Herpes Simplex (HSV) (Continued)

- The risk of contracting the disease is 30 percent to 50 percent if the mother is experiencing a primary infection compared to <5 percent with a recurrent outbreak (Kenner & Lott, 2007).
- Treatment includes antiviral pharmacologic intervention with acyclovir and vidarabine.



TORCH Infections

- Toxoplasmosis
- Other infections (hepatitis B, syphilis, herpes zoster)
- Rubella (German measles)
- CMV
- Herpes



Vitamin K Deficiency

- One in 200 to 1 in 400 newborns not treated prophylactically with vitamin K at birth develop hemorrhagic disease of the newborn (HDN) (Blackburn, 2007).
- Every neonate should receive a single intramuscular dose of 0.5 mg to 1.0 mg of prophylactic vitamin K1 oxide at birth for prevention of early vitamin K deficiency bleeding (VKDB); parenteral vitamin K is required for late VKDB (AAP Committee on Fetus and Newborn, 2006).



Neonatal Polycythemia

- Neonatal polycythemia is a venous Hct of >65 percent or 22 g/dL (Blackburn, 2007).
- Increased blood viscosity is the underlying mechanism for clinically significant polycythemia.
- A screening Hct before 6 hours of age helps detect polycythemia and allows for appropriate management.



Jaundice

- More than half of all full-term newborns in the United States each year become clinically jaundiced (Hansen, 2006).
- There are three types of jaundice:
 1. Physiologic
 2. Pathologic
 3. Hyperbilirubinemia

Jaundice in Breastfeeding Infants

- Two patterns of jaundice can occur in breastfeeding infants:
 1. Late-onset breastmilk jaundice
 2. Early-onset breastfeeding jaundice
- Support is mounting for increasing the frequency of breastfeeding as a measure to help reduce total serum bilirubin level (Bhutani et al., 2006; Hansen, 2006).



Jaundice Screening and Diagnosis

- Newborn jaundice can be detected by blanching the skin (AAP, 2004).
- Nurses should assess the sclerae and skin over the forehead and trunk for jaundice every 4 to 8 hours and ensure that appropriate serum bilirubin monitoring is done (Bhutani et al., 2006).



Jaundice Management

- Phototherapy, the most common treatment for hyperbilirubinemia, reduces bilirubin through photoisomerization and photo-oxidation.
- Parents must know when to call for help or bring the infant in for follow-up care.



Car Seats

- All states mandate the use of car seats for babies (March of Dimes, 2008).
- A newborn must leave the hospital in a car seat.
- To prevent bradycardia, apnea and oxygen desaturation, parents should limit travel with their infant until he is able to hold his head up.



Sudden Infant Death Syndrome (SIDS)

- SIDS is the sudden death of an infant under 1 year of age which remains unexplained through case investigation, including performance of a complete autopsy, examination of the death scene and review of the clinical history.
- In 2003, the SIDS rate for all races was 52.9 per 100,000 live births (Mathews, MacDorman & Menacker, 2002).



SIDS Prevention

(AAP Task Force on Infant Sleep Position and SIDS, 2005)

- Use *Back to Sleep*.
- Use a firm sleep surface.
- Keep loose bedding and soft objects out of the infant's sleeping environment.
- Do not smoke during pregnancy.
- Maintain a separate, but proximate sleeping environment.



SIDS Prevention

(AAP Task Force on Infant Sleep Position and SIDS, 2005) (Continued)

- Consider offering a pacifier at nap time and bedtime.
- Avoid overheating
- Avoid commercial devices marketed to reduce the risk of SIDS.
- Avoid development of positional plagiocephaly by utilizing “tummy time.”



Skin Care and Bathing

- Neonates require skin care practices that optimize the skin's function as a barrier organ.
- Skin pH becomes acidic after birth, forming an acid mantle that defends against microorganisms.
- Parents should use nonalkaline soaps when bathing their infant.



Signs of Abuse (Walls, 2006)

- Malnutrition
- Bruising
- Repeated fractures or fractures in various stages of healing
- Intracranial hemorrhages
- Retinal hemorrhages
- Whiplash-like injuries, also called shaken baby syndrome (SBS)



The Nurse's Role in Abuse Prevention

(Walls, 2006)

- Identifying at-risk parents:
 - History of abuse in family
 - Alcohol or drug use
 - Overmedication with over-the-counter drugs
 - Abuse during pregnancy
 - An unwanted pregnancy/infant)
- Educating parents about abuse
- Referring parents for counseling and services
- Following up with parents or other family members

