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The Impact of Preterm Birth

Introduction

Preterm births can impact preterm babies, as well as the parents of preterm babies. The question is, what is the impact of preterm births? This course will answer that very question, while providing insight into preterm births in order to build awareness among health care professionals so they may effectively work to optimize patient care.

Section 1: Preterm Babies

Preterm births can impact preterm babies - meaning preterm births can potentially lead to a variety of different complications. This section of the course will review the complications associated with preterm births, as well as provide insight into preterm births. The information found within this section of the course was derived from materials provided by the Centers for Disease Control and Prevention (CDC) unless, otherwise, specified (Centers for Disease Control and Prevention [CDC], 2020).

What is a preterm birth?

- A preterm birth may refer to the birth of a live baby that is born before 37 weeks of pregnancy have been completed. The term preterm baby may refer to any baby born preterm.
- Health care professionals should note that the average length of a full-term pregnancy is between 39 - 40 weeks.

What are the sub-categories of preterm births?

The sub-categories of preterm births include the ones found below.

- **Extremely preterm birth** - an extremely preterm birth may refer to the birth of a live baby that is born at or before 25 weeks of pregnancy.
- **Very preterm birth** - a very preterm birth may refer to the birth of a live baby that is born at less than 32 weeks of pregnancy.
- **Moderate preterm birth** - a moderate preterm birth may refer to the birth of a live baby that is born between 32 and 34 weeks of pregnancy.
- **Late preterm birth** - a late preterm birth may refer to the birth of a live baby that is born between 34 and 36 completed weeks of pregnancy.

Why do preterm births occur?

The exact reason why preterm births occur is unknown. However, specific risk factors may lead to preterm births. Health care professionals should note that preterm births may occur spontaneously.

What are the risk factors for preterm births?

Risk factors for preterm births include the following:

- Age (e.g., becoming pregnant before the age of 20)
- Short cervix (note: the cervix may refer to the lower portion or part of the uterus; a cervix may be considered to be short if it is less than one inch long).
- A previous preterm birth
- Pregnancy with twins, triplets, or other multiples
- An interval of less than six months between pregnancies
- Problems with the uterus, cervix, or placenta
- In vitro fertilization (note: the term in vitro fertilization may refer to the process of fertilizing a woman's egg with a man's sperm outside of the body)
- Smoking cigarettes
- Illicit drug use
- Infections (e.g., infections of the amniotic fluid and lower genital tract)
- High blood pressure
- Diabetes
- Being underweight or overweight before pregnancy
- Stress
- History of miscarriages
- Physical injury or trauma

What are the warning signs of preterm labor?

The warning signs of preterm labor include the following:

- Contractions every 10 minutes or more often (note: the term contraction may refer to the tightening and shortening of the uterine muscles; contractions help push the baby out; contractions may feel like the abdomen is tightening like a fist).
- Changes in vaginal discharge (e.g., a significant increase in the amount of discharge or leaking fluid or bleeding from the vagina)
- Pelvic pressure (e.g., the feeling that the baby is pushing down)
- Low, dull backache
- Cramps that feel like a menstrual period
- Abdominal cramps with or without diarrhea

Can preterm births be prevented?

Preterm births can be prevented. Methods or strategies to prevent preterm births may be found below.

- **Progesterone supplementation** - women with preterm birth risk factors may be able to prevent preterm births with progesterone supplementation. Specific information regarding progesterone may be found below.
    - Progesterone may refer to a hormone involved in the menstrual cycle, pregnancy, and reproduction.
    - Progesterone induces secretory changes in the lining of the uterus and is vital for a successful embryo implantation (note: secretory changes in the lining of the uterus prepare the uterus for a possible pregnancy).
    - Progesterone modulates a woman's immune response to prevent rejection of an embryo.
    - Progesterone suppresses uterine contractions to promote pregnancy.
- **Cervical cerclage** - the term cervical cerclage may refer to a procedure that uses sutures or synthetic tape to reinforce the cervix during pregnancy in women with a

history of a short cervix. Health care professionals should note the following: the sutures or synthetic tape used to reinforce the cervix help support the uterus in order to promote a full term pregnancy; the sutures or synthetic tape is removed during the delivery of a newborn baby.

What are the complications associated with preterm births?

As previously mentioned, preterm births can lead to complications for preterm babies. Specific information regarding the complications associated with preterm births may be found below.

- **Breathing problems** - preterm babies may experience breathing problems. Health care professionals should note that preterm babies may experience breathing problems due to immature respiratory systems. Health care professionals should also note that the types of breathing problems associated with preterm births may threaten the life of a preterm baby. Specific information on the types of breathing problems associated with preterm births may be found below.
    - **Apnea of prematurity** - apnea of prematurity may refer to a disorder characterized by apneic spells. Apneic spells may refer to a pause in breathing for 20 seconds or longer or a shorter pause accompanied by bradycardia (i.e., a slow heart rate), cyanosis, or pallor. Health care professionals should note that apnea of prematurity may be treated with xanthine derivatives and/or nasal continuous positive airway pressure (NCPAP) (note: theophylline is an example of a xanthine derivative; NCPAP may refer to a form of therapy that provides a steady flow of air to the lungs through the nose).
    - **Bronchopulmonary dysplasia** - bronchopulmonary dysplasia may refer to a chronic lung disease that can develop in preterm babies and babies who received treatment with a breathing machine. Signs and symptoms of bronchopulmonary dysplasia may include the following: rapid breathing, labored breathing (e.g., a drawing in of the lower chest while breathing in), wheezing (i.e., a soft whistling sound as the baby breathes out), the need for continued oxygen therapy, and difficulty feeding. Treatment of bronchopulmonary dysplasia may include bronchodilators (e.g., albuterol) to help keep the airways open, and diuretics (e.g., furosemide) to reduce fluid buildup in the lungs. Health care professionals should note that bronchopulmonary dysplasia may lead to infections.

- **Respiratory distress syndrome (RDS)** - RDS may refer to a lung disease that prevents normal breathing. Signs and symptoms of RDS include the following: fast breathing, shallow breathing**,** sharp pulling inward of the muscles between the ribs when breathing, flaring (i.e., widening) of the nostrils with each breath, and grunting (i.e., the baby makes grunting sounds). Treatment of RDS may include: surfactant replacement therapy, breathing support from a ventilator or NCPAP machine, and/or other supportive treatment (e.g., fluids). Health care professionals should note the following information regarding surfactant replacement therapy: surfactant helps keep the lungs open so that a newborn baby can breathe in air; surfactant is typically administered through a breathing tube; typically, once the surfactant is administered, the breathing tube is connected to a ventilator, or the baby may get breathing support from a NCPAP machine.

- **Feeding difficulties** - along with breathing problems, preterm babies may initially experience feeding difficulties or problems with feeding. Health care professionals should note that preterm babies may experience feeding difficulties due to immature digestive systems. Information on the specific types of feeding difficulties associated with preterm births may be found below.

    - **Gastroesophageal reflux disease (GERD)** - GERD may refer to a chronic disease that occurs when acidic stomach contents flow or move back up into the esophagus. Infant-related signs and symptoms of GERD may include the following: spitting up, projectile vomit, inconsolable crying, obvious discomfort, refusing to eat, waking during the night, and problems swallowing. Health care professionals should note the following: GERD may be painful to an infant; it is important for individuals to continue breastfeeding even if an infant exhibits signs and/or symptoms of GERD; severe GERD cases may require health care intervention.

    - **Gastric residuals** - gastric residuals may refer to a condition that occurs when babies do not completely empty their stomachs from a previous feeding; fluid remaining in the stomach. Health care professionals should note the following: babies should be evaluated for gastric residuals; health care professionals can evaluate newborn babies for gastric residuals by assessing the baby for signs and symptoms of nausea, bloating, abdominal discomfort, and abdominal distension (note: abdominal distension may refer to the abnormal enlargement or swelling of the stomach); gastric

residuals should be removed from the stomach, when applicable; the resting position of a newborn baby may influence gastric residuals (e.g., newborn babies in the supine position may be more prone to gastric residuals).

- **Vision problems** - preterm births may lead to vision problems. One of the most common vision problems associated with preterm births is retinopathy of prematurity (ROP). Specific information regarding ROP may be found below. The information found below was derived from materials provided by the CDC and the March of Dimes (CDC, 2020; March of Dimes, 2021).
    - Retinopathy of prematurity (ROP) may refer to a potentially blinding eye disease that is caused by the abnormal development of retinal blood vessels in preterm babies.
    - ROP usually affects both eyes.
    - ROP typically occurs due to abnormal or immature eye blood vessels and/or retinal detachment (note: the retina may refer to a thin layer of tissue that lines the back of the eye on the inside; the functions of the retina include the following: receive focused light, convert the light into neural signals, and send the signals to the brain for visual recognition; retinal detachment may refer to a condition that occurs when the retina pulls away from the layer of blood vessels that provides it with oxygen and nutrients).
    - Signs and symptoms of ROP include: white pupils, abnormal eye movements, crossed eyes, and severe nearsightedness.
    - An eye exam may be used to diagnose ROP.
    - There are five stages of ROP. Stage 1 ROP is the least severe stage of ROP, and is characterized by mildly abnormal blood vessel growth. Stage 2 ROP **is** characterized by moderately abnormal blood vessel growth. Stage 3 ROP **is** characterized by severely abnormal blood vessel growth. Stage 4 ROP is characterized by **a** partially detached retina. Stage 5 ROP is the most severe stage of ROP, and is characterized by a completely detached retina(s).
    - Treatment for ROP depends on the stage of ROP, and may include laser surgery or cryotherapy (note: laser surgery may refer to a type of procedure where a laser is used to burn and scar the sides of the retina; cryotherapy

may refer to a type of procedure where metal probes are used to freeze and scar the sides of the retina).

- **Hearing loss** - along with vision problems, preterm births may lead to hearing loss. Specific information regarding hearing loss may be found below.
    - Hearing loss may refer to a type of sensory deprivation centered around sound; auditory deprivation.
    - Hearing loss can happen when any part of the ear is not optimally functioning.
    - Hearing loss can affect a child's ability to develop speech, language, and social skills.
    - Signs of hearing loss in babies include the following: does not startle at loud noises; does not turn to the source of a sound after six months of age; does not say single words, such as "dada" or "mama" by one year of age; turns head when he or she sees a parent but not if a parent calls out his or her name; sometimes is mistaken for not paying attention or ignoring individuals and/or situations; seems to hear some sounds but not others.
    - Signs of hearing loss in children include the following: speech is delayed; speech is not clear; does not follow directions; sometimes is mistaken for not paying attention or ignoring individuals and/or situations; often says, "What?;" turns the volume on electronic devices up to a high level or setting.
    - Screening and diagnosing hearing loss often includes hearing tests and other screening methods. Health care professionals should note the following: all babies should have a hearing screening no later than one month of age; if a baby does not pass a hearing screening, he or she should get a full hearing test as soon as possible, but no later than three months of age; children should have their hearing tested before they enter school or any time there is a concern about the child's hearing; children who do not pass the hearing screening need to get a full hearing test as soon as possible.
    - Treatment for hearing loss may include one or more of the following treatment options: medications, surgery, cochlear implants, and hearing aids.

- **Cerebral palsy** - preterm births may lead to cerebral palsy. Specific information regarding cerebral palsy may be found below.
    - Cerebral palsy may refer to a group of disorders that affect an individual's ability to move and maintain balance and posture.
    - Cerebral palsy is caused by abnormal brain development or damage to the developing brain that affects an individual's ability to control his or her muscles.
    - The main sign that a child may have cerebral palsy is a delay in reaching motor or movement milestones (e.g., rolling over, sitting, standing, or walking).
    - Signs of cerebral palsy in babies younger than six months of age include the following: the baby's head lags when an individual picks up the baby lying on his or her back; the baby feels stiff at times; the baby feels floppy at times; when held or cradled in the arms, the baby seems to overextend his or her back and neck, acting as if he or she is pushing away from the individual holding the baby; when the baby is picked up, his or her legs get stiff and cross.
    - Signs of cerebral palsy in babies older than six months of age include the following: the baby does not roll over in either direction; the baby cannot bring his or her hands together; the baby has difficulty bringing his or her hands to the mouth; the baby reaches out with only one hand while keeping the other fisted.
    - Signs of cerebral palsy in babies older than ten months of age include the following: the baby crawls in a lopsided manner, pushing off with one hand and leg while dragging the opposite hand and leg; the baby scoots around on his or her buttocks or hops on his or her knees, but does not crawl on all fours.
    - Spastic cerebral palsy is the most common type of cerebral palsy. Spastic cerebral palsy may refer to a type of cerebral palsy characterized be increased muscle tone, which may lead to stiff muscles (note: individuals with spastic cerebral palsy typically have trouble with movement and often move in an seemingly awkward manner). The different types of spastic

cerebral palsy include the following: spastic diplegia/diparesis, spastic hemiplegia/hemiparesis, and spastic quadriplegia/quadriparesis.

- Spastic diplegia/diparesis typically involves muscle stiffness in the legs, with the arms less affected or not affected at all. Individuals with spastic diplegia may have difficulty walking because tight hip and leg muscles cause their legs to pull together, turn inward, and cross at the knees.
- Spastic hemiplegia/hemiparesis typically affects only one side of an individual's body; usually the arm is more affected than the leg.
- Spastic quadriplegia/quadriparesis often affects all four limbs, the trunk, and the face. Individuals with spastic quadriparesis usually cannot walk and often have other developmental disabilities such as intellectual disability; seizures; or problems with vision, hearing, or speech.
- Screening and diagnosing cerebral palsy may include developmental monitoring and developmental screening.
- Developmental monitoring may refer to the act of tracking a child's growth and development over time (note: if signs of cerebral palsy are observed during developmental monitoring, then a developmental screening test should be given as soon as possible).
- Developmental screening may refer to a short test that is given to see if a child has specific developmental delays, such as motor or movement delays (note: The American Academy of Pediatrics recommends that all children should be screened for developmental delays during regular well-child office visits at: 9 months, 18 months, and 24 or 30 months).
- Treatment for cerebral palsy may include one or more of the following treatment options: medications, surgery, braces, and physical, occupational, and/or speech therapy.

- **Developmental disabilities** - preterm births may lead to developmental disabilities. Specific information regarding developmental disabilities may be found below.
    - Developmental disabilities may refer to a group of conditions characterized by impairment in physical, learning, language, or behavior areas. Examples

of developmental disabilities include autism spectrum disorder (ASD) and attention-deficit/hyperactivity disorder (ADHD).

- ASD may refer to a complex developmental disorder that affects how an individual behaves, interacts with others, communicates, and learns.
- ASD typically affects the structure and function of the brain and nervous system (note: ASD lasts the course of an individual's life).
- Autism is referred to as a spectrum disorder because there is wide variation in the type and severity of ASD symptoms. Health care professionals should note that the major symptoms of ASD fall into the following categories: social skill symptoms, communication symptoms, unusual behavior symptoms, and "other" symptoms.
- The social skill symptoms associated with ASD include the following: an individual does not respond to his or her name by 12 months of age; an individual does not point out interesting objects by 14 months of age; an individual appears to be very independent for his or her age; an individual often appears to be in his or her "own world;" an individual often appears to "tune out" other individuals; an individual avoids eye-contact; an individual prefers to play alone; an individual does not share interests with others; an individual only interacts with others to achieve a desired goal or outcome; an individual displays flat or inappropriate facial expressions; an individual does not understand personal space boundaries; an individual avoids or resists physical contact; an individual has trouble understanding other individual's feelings or talking about his or her own feelings.
- The communication symptoms associated with ASD include the following: an individual exhibits delayed speech and language skills; an individual appears to hear sometimes, but not other times; an individual exhibits echolalia (note: the term echolalia may refer to reparative speech patterns; respective word use); an individual often reverses pronouns (e.g., says “you” instead of “I” when engaged in a conversation and/or discussion); an individual uses language in unusual ways; an individual may lack the capacity to put words into sentences; an individual often cannot fully articulate what he or she wants; gives unrelated answers to questions; does not point or respond to pointing; uses few or no gestures (e.g., does not wave hello or goodbye); talks in a flat, robot-like, or sing-song voice; does

not pretend in play (e.g., does not engage with toys); does not understand jokes, sarcasm, and/or teasing.

- The unusual behavior symptoms associated with ASD include the following: an individual may line up his or her toys or other objects in a specific way; an individual spends a lot of time lining things up or putting things in a specific order; an individual may play with his or her toys the same way every time; an individual may appear to like parts of objects (e.g., wheels, book covers, picture frames); very organized; often gets upset by minor changes; has obsessive interests; has to follow certain routines.

- The "other" symptoms associated with ASD include the following: an individual may appear to stare at nothing or wander around; an individual may prefer to walk on his or her toes; an individual appears to be oversensitive to noise; an individual may appear overly uncooperative and/or overly resistant; does not like to climb things, such as stairs; hyperactivity (i.e., very active); impulsivity (e.g., acting without thinking); short attention span; aggression; causes self injury; often displays a lack of self control (i.e., often has "meltdowns" or tantrums); displays unusual sleeping habits; often displays unusual moods or emotional reactions; lack of fear or more fear than expected; unusual reactions to the way things sound, smell, taste, look, or feel; displays unusual eating habits, such as pica (note: pica may refer to an eating disorder characterized by the need to eat objects with little to no nutritional value such as ice, grass, dirt, rocks, hair, and/or paper).

- ASD is typically diagnosed by a physician using criteria outlined in the Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) (note: individuals with a well-established DSM-IV diagnosis of autistic disorder, Asperger's disorder, or pervasive developmental disorder not otherwise specified should be given the diagnosis of autism spectrum disorder; individuals who have marked deficits in social communication, but whose symptoms do not otherwise meet criteria for autism spectrum disorder, should be evaluated for social (pragmatic) communication disorder; severity is based on social communication impairments and restricted repetitive patterns of behavior).

- The physical and mental-health conditions typically associated with ASD include the following: epilepsy, ADHD, anxiety, depression, bipolar disorders, and avoidant/restrictive food intake disorder.
- Treatment for ASD may include one or more of the following treatment options: medications, nutrition, physical activity, physical therapy, psychotherapy, cognitive behavioral therapy, social skills training, joint attention therapy, and support groups.
- ADHD may refer to a type of brain disorder that is marked by an ongoing pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development.
- ADHD-related inattention may refer to an inability to maintain focus. Individuals exhibiting ADHD-related inattention typical appear disorganized, lack persistence, wander off task, and typically have difficulty maintaining sustained focus.
- ADHD-related hyperactivity may refer to a type or form of restlessness. Individuals exhibiting ADHD-related hyperactivity may appear fidgety or constantly move around. Individuals exhibiting ADHD-related hyperactivity may also talk excessively and/or maintain constant activity (e.g., rapidly move from one activity to the next).
- ADHD-related impulsivity may refer to a form of behavior that is characterized by ill-conceived actions. Individuals exhibiting ADHD-related impulsivity typically do not consider the long-term consequences of their actions. Often individuals exhibiting ADHD-related impulsivity engage in risky activities, which are not well thought out and/or planned. Individuals exhibiting ADHD-related impulsivity may also take part in activities that offer instant gratification. Additionally, individuals exhibiting ADHD-related impulsivity may appear socially intrusive or excessively invasive.
- Inattentive-related symptoms of ADHD may include the following: an inability to give close attention to details; an inability to maintain focus; an inability to maintain sustained mental effort for long periods of time; a capacity to consistently overlook details; a capacity to consistently make mistakes (e.g., making careless mistakes on a consistent basis); often appears to be not listening when being spoken to directly; often fails to

follow through on instructions; often fails to complete tasks; often distracted by extraneous stimuli; often forgetful; consistently disorganized.

- Hyperactivity-impulsive symptoms of ADHD may include the following: fidgety (e.g., hand tapping, foot tapping, squirms in his or her seat); often moves around and/or makes movements at seemingly inappropriate times; restless; excessive talking; often interrupts other individuals while they are talking; often exhibits difficulty waiting for his or her turn; often intrudes on others.

- ADHD is typically diagnosed by a physician using criteria outlined in the DSM-5 (note: to receive a diagnosis of ADHD the symptoms should not solely be a manifestation of oppositional behavior, defiance, hostility, or failure to understand tasks or instructions; several inattentive or hyperactive-impulsive symptoms were present prior to age 12 years; several inattentive or hyperactive-impulsive symptoms are present in two or more settings [e.g., at home, school, or work; with friends or relatives; in other activities]; there is clear evidence that the symptoms interfere with, or reduce the quality of, social, academic, or occupational functioning; the symptoms do not occur exclusively during the course of schizophrenia or another psychotic disorder and are not better explained by another mental disorder [e.g., mood disorder, anxiety disorder, dissociative disorder, personality disorder, substance intoxication or withdrawal]).

- Complications typically associated with ADHD include: academic/work-related failure, low self-esteem, and social isolation.

- Conditions typically associated with ADHD can include the following: oppositional defiant disorder, disruptive mood dysregulation disorder, autism spectrum disorder, Tourette's syndrome, sleep disorders, anxiety disorders, and substance abuse.

- Treatment for ADHD may include one or more of the following treatment options: medications, psychotherapy, cognitive behavioral therapy, social skills training, support groups, routine exercise, and developing sleep routines.

Section 1: Summary

Preterm births can impact preterm babies - meaning preterm births can potentially lead to a variety of different complications. The complications associated with preterm births include the following: breathing problems, feeding difficulties, vision problems, hearing loss, cerebral palsy, and developmental disabilities.

Section 1: Key Concepts

- Preterm births can impact preterm babies - meaning preterm births can potentially lead to a variety of different complications.
- The sub-categories of preterm birth include the following: extremely preterm birth, very preterm birth, moderate preterm birth, and late preterm birth.
- Risk factors for preterm births include the following: age; a short cervix; a previous preterm birth; pregnancy with twins, triplets, or other multiples; an interval of less than six months between pregnancies; problems with the uterus, cervix, or placenta; in vitro fertilization; smoking cigarettes; illicit drug use; infections; high blood pressure; diabetes; being underweight or overweight before pregnancy; stress; history of miscarriages; and physical injury or trauma.
- The warning signs of preterm labor include the following: contractions every 10 minutes or more often; changes in vaginal discharge; pelvic pressure; low, dull backache; cramps that feel like a menstrual period; and abdominal cramps with or without diarrhea.
- Preterm births can be prevented.
- The complications associated with preterm births include the following: breathing problems, feeding difficulties, vision problems, hearing loss, cerebral palsy, and developmental disabilities.

Section 1: Key Terms

Preterm birth - the birth of a live baby that is born before 37 weeks of pregnancy have been completed

Preterm baby - any baby born preterm

Extremely preterm birth - the birth of a live baby that is born at or before 25 weeks of pregnancy

Very preterm birth - the birth of a live baby that is born at less than 32 weeks of pregnancy

Moderate preterm birth - the birth of a live baby that is born between 32 and 34 weeks of pregnancy

Late preterm birth - the birth of a live baby that is born between 34 and 36 completed weeks of pregnancy

Cervix - the lower portion or part of the uterus

In vitro fertilization - the process of fertilizing a woman's egg with a man's sperm outside of the body

Contraction - the tightening and shortening of the uterine muscles

Progesterone - a hormone involved in the menstrual cycle, pregnancy, and reproduction

Cervical cerclage - a procedure that uses sutures or synthetic tape to reinforce the cervix during pregnancy in women with a history of a short cervix

Apnea of prematurity - a disorder characterized by apneic spells

Apneic spells - a pause in breathing for 20 seconds or longer or a shorter pause accompanied by bradycardia, cyanosis, or pallor

Nasal continuous positive airway pressure (NCPAP) - a form of therapy that provides a steady flow of air to the lungs through the nose

Bronchopulmonary dysplasia - a chronic lung disease that can develop in preterm babies and babies who received treatment with a breathing machine

Respiratory distress syndrome (RDS) - a lung disease that prevents normal breathing

Gastroesophageal reflux disease (GERD) - a chronic disease that occurs when acidic stomach contents flow or move back up into the esophagus

Gastric residuals - a condition that occurs when babies do not completely empty their stomachs from a previous feeding; fluid remaining in the stomach

Abdominal distension - the abnormal enlargement or swelling of the stomach

Retinopathy of prematurity (ROP) - a potentially blinding eye disease that is caused by the abnormal development of retinal blood vessels in preterm babies

Retina - a thin layer of tissue that lines the back of the eye on the inside

Laser surgery - a type of procedure where a laser is used to burn and scar the sides of the retina

Cryotherapy - a type of procedure where metal probes are used to freeze and scar the sides of the retina

Hearing loss - a type of sensory deprivation centered around sound; auditory deprivation

Cerebral palsy - a group of disorders that affect an individual's ability to move and maintain balance and posture

Spastic cerebral palsy - a type of cerebral palsy characterized be increased muscle tone, which may lead to stiff muscles

Developmental monitoring - the act of tracking a child's growth and development over time

Developmental screening - a short test that is given to see if a child has specific developmental delays, such as motor or movement delays

Developmental disabilities - a group of conditions characterized by impairment in physical, learning, language, or behavior areas

Autism spectrum disorder (ASD) - a complex developmental disorder that affects how an individual behaves, interacts with others, communicates, and learns

Echolalia - reparative speech patterns; respective word use

Pica - an eating disorder characterized by the need to eat objects with little to no nutritional value, such as ice, grass, dirt, rocks, hair, and/or paper

Attention-deficit/hyperactivity disorder (ADHD) - a type of brain disorder that is marked by an ongoing pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development

ADHD-related inattention - an inability to maintain focus

ADHD-related hyperactivity - a type or form of restlessness

ADHD-related impulsivity - a form of behavior that is characterized by ill-conceived actions

Section 1: Personal Reflection Question

How can preterm births impact preterm babies?

Section 2: The Parents of Preterm Babies

Preterm births can impact preterm babies. Unfortunately, preterm births can also impact the parents of preterm babies - meaning preterm births can potentially lead to complications or health-related concerns for the parents of preterm babies. With that in mind, this section of the course will review the impact of preterm births on the parents of preterm babies. The information found within this section of the course was derived from materials provided by the CDC unless, otherwise, specified (CDC, 2020).

Stress

One of the first complications or health-related concerns that may come to mind when considering the impact of preterm births on parents is stress. Specific information regarding stress and the effects of stress may be found below.

- Stress may refer to a factor that causes emotional, physical, or psychological tension.
- Stress may arise from a significant life event such as divorce, moving, school graduation, new employment, and a preterm birth (note: a significant life event may refer to any major shift in an individual's life).
- Stress related to preterm births may result from the birth itself, and/or the complications that may arise from preterm births.
- Signs/symptoms of stress include the following:
    - Disbelief and shock
    - Tension and irritability
    - Fear and anxiety about the future
    - Difficulty making decisions
    - Feeling numb
    - Loss of appetite

    - Nightmares and recurring thoughts about an event
    - Anger
    - Increased use of alcohol and drugs
    - Sadness and other symptoms of depression
    - Loss of interest in normal activities
    - Feeling powerless
    - Crying
    - Sleep problems
    - Headaches
    - Back pains
    - Stomach problems
    - Trouble concentrating
- Stress can play a role in the development of the following: headaches, high blood pressure, heart disease, diabetes, skin conditions, asthma, arthritis, depression, anxiety, and substance abuse.
- Individuals can cope with stress by connecting socially, staying active, and via support groups.

Depression

Another complication or health-related concern that may initially come to mind when considering the impact of preterm births on parents is depression. Specific information regarding depression and depression treatment options may be found below.

- A depressive disorder may refer to a mood disorder characterized by a persistent depressed mood and/or anhedonia, which ultimately causes significant interference in daily life (note: anhedonia may refer to a loss of interest in previously enjoyable activities).
- Clinical depression may be caused by a combination of genetic, biological, environmental, and psychological factors. Specific risk factors for depression may

include: death or loss, abuse, conflict, stress, and/or significant life events (e.g., a preterm birth).

- One of the most common forms or types of depressive disorders is major depressive disorder. Major depressive disorder may refer to a form of depression that occurs most days of the week for a period of two weeks or longer leading to clinically significant distress or impairment in social, occupational, or other important areas of functioning.
- Signs/symptoms of a major depressive disorder may include the following:
    - Depressed mood
    - Anhedonia (note: anhedonia may refer to a loss of interest in previously enjoyable activities)
    - Appetite changes
    - Weight changes
    - Sleep difficulties
    - Psychomotor agitation or retardation
    - Fatigue or loss of energy
    - Diminished ability to think or concentrate
    - Feelings of worthlessness or excessive guilt
    - Suicidality

• Major depressive disorder is typically diagnosed by a physician using criteria outlined in the DSM-5 (note: to receive a diagnosis of depression, symptoms must cause the individual clinically significant distress or impairment in social, occupational, or other important areas of functioning; symptoms must also not be a result of substance abuse or another medical condition).

• Nonpharmacological treatment options for depression include psychotherapy, cognitive behavioral therapy, and support groups.

• Pharmacological treatment options for depression include medications from the following medication classes: selective serotonin reuptake inhibitors (SSRIs),

serotonin and norepinephrine reuptake inhibitors (SNRIs), atypical antidepressants, tricyclic antidepressants, and monoamine oxidase inhibitors (MAOIs).

Postpartum Depression

Mothers of preterm babies may experience postpartum depression. Specific information regarding postpartum depression and postpartum depression treatment options may be found below.

- Postpartum depression may refer to a form or type of depression suffered by a mother following childbirth, typically arising from the combination of the following: hormonal changes, psychological adjustment to motherhood, and fatigue.
- Signs/symptoms of postpartum depression may include the following:
    - Feeling sad, hopeless, empty, or overwhelmed
    - Crying more often than usual or for no apparent reason
    - Worrying or feeling overly anxious
    - Feeling moody, irritable, or restless
    - Oversleeping
    - Having trouble concentrating
    - Having trouble remembering details
    - Having trouble making decisions
    - Experiencing anger or rage
    - Losing interest in activities that are usually enjoyable
    - Suffering from physical aches and pains
    - Muscle pain
    - Frequent headaches
    - Stomach problems
    - Eating too little or too much

    - Withdrawing from or avoiding friends and family
    - Having trouble bonding or forming an emotional attachment with an infant
    - Thinking about self-harming
    - Thinking about harming an infant
- If a new mother experiences the aforementioned symptoms for a period of two weeks or more, she should seek the care of a health care professional.
- Postpartum depression should be diagnosed by a health care professional.
- If left untreated postpartum depression may lead to the following: additional health problems, an inability to care for an infant, and/or self-harm/infant harm.
- Nonpharmacological treatment options for postpartum depression include: psychotherapy, cognitive behavioral therapy, and support groups.
- Pharmacological treatment options for postpartum depression include SSRIs.

Anxiety

In addition to depression, parents of preterm babies may suffer from anxiety. Specific information regarding anxiety and anxiety treatment options may be found below.

- An anxiety disorder may refer to a mental health disorder characterized by prolonged periods of persistent, excessive worry about a number of events or activities, which cause clinically significant distress or impairment in social, occupational, or other important areas of functioning (note: in regards to an anxiety disorder, excessive worry may refer to worrying when there is no specific reason/threat present or in a manner that is disproportionate to the actual risk of an event, activity, and/or situation).
- An anxiety disorder may result from a multitude of different contributors including both genetic and environmental factors. More specific risk factors for anxiety disorders include: trauma, abuse, stress, and significant life events (e.g., a preterm birth).
- One of the most common forms or types of anxiety disorders is generalized anxiety disorder. A generalized anxiety disorder may refer to a mental health disorder characterized by excessive anxiety and worry occurring more days than not for at least six months, about a number of events or activities (such as work or

school performance), which is difficult to control and leads to clinically significant distress or impairment in social, occupational, or other important areas of functioning.

- Signs/symptoms of a generalized anxiety disorder may include the following:
    - Excessive anxiety
    - Excessive worry
    - Restlessness
    - Persistent feelings of being keyed up or on edge
    - Easily fatigued
    - Difficulty concentrating
    - Mind feeling blank at times (i.e., mind going blank)
    - Irritability
    - Muscle tension
    - Sleep difficulties
- Generalized anxiety disorder is typically diagnosed by a physician using criteria outlined in the DSM-5 (note: to receive a diagnosis of anxiety, the anxiety, worry, or physical symptoms must cause clinically significant distress or impairment in social, occupational, or other important areas of functioning; the disturbance is not attributable to the physiological effects of a substance (e.g., a drug of abuse; a medication) or another medical condition (e.g., hyperthyroidism); the disturbance is not better explained by another medical disorder).
- Nonpharmacological treatment options for anxiety include: psychotherapy, cognitive behavioral therapy, and support groups.
- Pharmacological treatment options for anxiety include medications from the following medication classes: SSRIs, SNRIs, and benzodiazepines.

Substance abuse

Depression and anxiety are often associated with substance abuse. Thus, the parents of preterm babies may experience substance abuse as a result of related depression and/or

anxiety (note: the parents of preterm babies may use or abuse substances, such as alcohol, simply due to the stress of a preterm birth). Specific information regarding substance abuse may be found below.

- Substance abuse may refer to the harmful or hazardous use of a psychoactive substance such as alcohol or illicit drugs.
- Health care professionals should make every effort to identify individuals suffering from substance abuse.
- Signs of alcohol and/or illicit drug use may include the following: slurred speech, an active tremor, shakiness, poor coordination, sweating, nausea, vomiting, aggression, agitation, compulsive behavior, craving, red eyes, dry mouth, drowsiness, involuntary eye movements, dilated pupils, nasal congestion, mouth sores, reduced consciousness, lack of pain sensation, intolerance to loud noise, dizziness, confusion, lack of awareness to surroundings, and needle marks.
- Substance abuse may be associated with binge drinking. Binge drinking is defined as five or more drinks on an occasion (within two or three hours) for men, and four or more drinks on an occasion (within two or three hours) for women.
- Substance abuse may be associated with heavy drinking. Heavy drinking is defined as 15 or more drinks a week for men; eight or more drinks a week for women.
- Substance abuse may be associated with opioid use. Opioids may refer to a class of drugs used to reduce pain.
- Substance abuse may be associated with addiction. Addiction may refer to the compulsive or uncontrolled use of one or more substances (e.g., alcohol; illicit drugs).

Suicidal ideation/Suicide

Depression, anxiety, and substance abuse are often associated with suicidal ideation and suicide. Thus, the parents of preterm babies may experience suicidal ideation and/or attempt suicide. Specific information regarding suicidal ideation, suicide, and suicide prevention may be found below. The information found below was derived from materials provided by the CDC and the Joint Commission (CDC, 2018; Joint Commission, 2021).

- Suicidal ideation may refer to thoughts of suicide and/or thoughts of planning suicide. Health care professionals should make every effort to identify the potential for suicide and prevent patient suicide, when applicable.
- Suicide may refer to a death caused by self-directed injurious behavior with any intent to die as a result of the behavior.
- A suicide attempt may refer to a non-fatal, self-directed and potentially injurious behavior with any intent to die as a result of the behavior (note: a suicide attempt may or may not result in injury).
- Suicide can be prevented.
- The suicide of a patient while in a staffed, round-the-clock care setting is a frequently reported type of sentinel event. Health care professionals should note the following: health care professionals can work to reduce the risk for patient suicide by following the related elements of care found below.
    - Health care organizations and health care professionals should conduct an environmental risk assessment that identifies features in the physical environment that could be used to attempt suicide, when applicable.
    - Health care organizations and health care professionals should take necessary action to minimize the risk(s) of features in the physical environment that could be used to attempt suicide (e.g., hooks that can be used for hanging); health care organizations should have procedures in place to mitigate the risk of suicide for patients at high risk for suicide (e.g., one-to-one monitoring; removing objects that pose a risk for self-harm if they can be removed without adversely affecting the patient's medical care; assessing objects brought into a room by visitors; using safe transportation procedures when moving patients).
    - Screen all patients for suicidal ideation who are being evaluated or treated for behavioral health conditions as their primary reason for care using a validated screening tool.
    - Use an evidence-based process to conduct a suicide assessment of patients who have screened positive for suicidal ideation (note: the assessment directly asks about suicidal ideation, plan, intent, suicidal or self-harm behaviors, risk factors, and protective factors).

- Document patients' overall level of risk for suicide and the plan to mitigate the risk for suicide.
- Follow written policies and procedures addressing the care of patients identified as at risk for suicide (note: related policies and procedures should include the following: training and competence assessment of staff who care for patients at risk for suicide; guidelines for reassessment; monitoring patients who are at high risk for suicide).
- Follow written policies and procedures for counseling and follow-up care at discharge for patients identified as at risk for suicide.
- Monitor implementation and effectiveness of policies and procedures for screening, assessment, and management of patients at risk for suicide and take action as needed to improve compliance.

Ineffective Breastfeeding

Finally, breastfeeding may be a health-related concern for parents of preterm babies. Breastfeeding may refer to the act of feeding a baby with milk from a human breast. Effective breastfeeding occurs when an infant receives human breast milk for ingestion (note: the American Academy of Pediatrics recommends exclusive breastfeeding for a period of about six months, followed by continued breastfeeding, while introducing complementary foods, until the child is 12 months old or older). According to information provided by the CDC, breastfeeding is the best source of nutrition for most infants, and breastfeeding can help reduce the risk for certain health conditions for both infants and mothers (e.g., breastfeeding may reduce the incidence of infant-related nonspecific gastrointestinal tract infections; breastfeeding may reduce the incidence of infant-related otitis media; breastfeeding may reduce the incidence of infant-related allergic diseases; breastfeeding may reduce the incidence of infant-related celiac disease; breastfeeding may help prevent obesity; breastfeeding may reduce the incidence of diabetes; breastfeeding may reduce the risk of necrotizing enterocolitis [note: necrotizing enterocolitis may refer to the death of tissue in the intestine]; breastfeeding can help lower mothers' risk of high blood pressure, type 2 diabetes, ovarian cancer, and breast cancer; breastfeeding can help new mothers lose weight; breastfeeding can help a mother's uterus return to its pre-pregnancy size). Health care professionals should note the following: ineffective breastfeeding associated with preterm babies may be related to problems with latching; latching may refer to the process of securing a child to a nipple/breast.

Health care professionals can help parents of preterm babies effectively breastfeed their babies by providing them breastfeeding support. Breastfeeding support may refer to any effort made to assist, guide, and/or facilitate effective breastfeeding. When providing breastfeeding support, health care professionals should focus on essential elements of breastfeeding. Specific information on the essential elements of breastfeeding may be found below.

- **Latching** - once new mothers decide to breastfeed, it is important that they learn about latching and how to hold their child during breastfeeding. Latching may refer to the process of securing a child to a nipple/breast. Mothers can effectively engage in latching by adhering to the suggestions found below.
    - **Suggestion 1** - pull the child close to the nipple/breast in a manner that allows the child's chin and lower jaw to move into the nipple/breast first.
    - **Suggestion 2** - when pulling the child close to the nipple/breast, aim the child's lower lip as far from the base of the nipple as possible to encourage the child to take a large mouthful of the breast.
    - **Suggestion 3** - tickle the child's lips or mouth with the nipple/breast to encourage the child to open his or her mouth.
    - Mothers should look for the following signs to ensure they effectively or successfully latched their child to their nipple/breast: the latch feels comfortable; little to no areola is visible (note: the aforementioned sign can depend on the size of the areola and the size of a child's mouth); the child's mouth appears to be full with breast (i.e., the child's mouth should look like it is around a portion of the breast consisting of the nipple); the child's lips turn outward; the mother hears the child swallow.
- **How to hold a child during breastfeeding** - along with latching, a new mother should learn or obtain insight on how to hold her child during breastfeeding. Health care professionals should note the following: different breastfeeding holds can be associated with varying advantages. The term breastfeeding hold may refer to the position of a child in relation to the individual breastfeeding; the way an individual holds a child during breastfeeding. Information regarding the more common types of breastfeeding holds may be found below.
    - **Cradle hold** - the cradle hold can be advantageous for infants who take to breastfeeding with ease. To engage in the cradle hold, an individual should

hold the child with his or her head on the forearm, with the child's body facing the body of the individual breastfeeding. Health care professionals should note that the cradle hold is considered one of the most comfortable holds for an individual breastfeeding a child. Health care professionals should also note that the cradle hold is typically a standing breastfeeding hold.

- **Clutch hold** - the clutch hold, otherwise referred to as the "football hold," may be advantageous for individuals who have large breasts, flat or inverted nipples, and/or experience a strong let-down reflex. The clutch hold may also be advantageous for infants that prefer to breastfeed in a more upright position. To engage in the clutch hold, individuals should hold the child at the side of their body, with the child laying on his or her back and with his or her head at the level of the nipple. The child's head should be supported by placing the palm of a hand at the base of the child's head. In essence, when engaging in the clutch hold, the individual should hold the child up to the nipple/breast, like he or she would hold a football, hence the alternative name for the clutch hold, "football hold." Health care professionals should note that the clutch hold is typically a standing breastfeeding hold.

- **Cross-cradle hold** - the cross-cradle hold, otherwise referred to as the transitional hold, may be advantageous for preterm infants, infants that have trouble obtaining milk from the breast, and/or infants that require extra head support. To engage in the cross-cradle hold, individuals should hold the child along their body with the head of the child in front of the nipple. The child's head should be supported by placing the palm of a hand at the base of the child's head. Health care professionals should note that when utilizing the cross-cradle hold, individuals should ensure the child is secure across their bodies. Health care professionals should also note that the cross-cradle hold is typically a standing breastfeeding hold.

- **Laid-back hold** - the laid-back hold, otherwise referred to as the straddle hold, may be advantageous for infants who take to breastfeeding with ease or for individuals that favor a breastfeeding hold that allows them to lie down. The laid-back hold may also be advantageous for individuals that prefer a relaxed or gentle/delicate breastfeeding approach. To engage in the cross-cradle hold, individuals should lie back on a pillow with the child's

head just above and between the breasts. When an individual is in the previous position, he or she should gently guide the child to the nipple or simply allow the child to find the nipple on his or her own. Individuals should support the child's head, shoulders, and body as the child approaches the nipple and breastfeeds.

- **Side-lying hold** - the side-lying hold, otherwise referred to as the side-lying position, may be advantageous for individuals that would like to lie down and rest while breastfeeding. To engage in the side-lying hold, individuals should lie on their side with their child close to the nipple. When an individual is in the previous position, he or she should gently guide the child to the nipple or simply allow the child to find the nipple on his or her own. Individuals should support the child as deemed appropriate/comfortable.

- **Signs an infant is receiving enough breast milk** - some of the more widely accepted signs that an infant is receiving enough breast milk may be found below.

    - **The child passes clear/pale yellow urine** - a child passing mostly clear/pale yellow urine can be an apparent sign that a child is receiving enough breast milk. In essence, the clear/pale yellow urine can be an indication that a child is hydrated and well nourished. Health care professionals should note the following: dark/deep yellow or orange urine can be a sign that a child is dehydrated and/or malnourished.

    - **The child is producing consistent bowel movements** - a healthy child receiving enough breast milk should produce approximately one to three bowel movements per 24 hours, beginning after the first 24 hours post birth. Health care professionals should note that the color and texture of the bowel movements should be yellowish and loose, beginning after the first 72 hours post birth.

    - **Consistent sleep patterns** - a child receiving enough breast milk should switch between short sleep periods and wakeful, alert periods. Health care professionals should note that an infant may experience quiet alert periods and crying alert periods.

    - **The child appears content after breastfeeding** - essentially, in this context, a content child is a well fed child.

    - **The breasts feel different after breastfeeding is complete** - if the child received enough breast milk, the individual breastfeeding should notice that the breast(s) feels different and/or softer.

- **Breast pumps** - breast pumps often play an important role in breastfeeding. The term breast pump may refer to any device designed and used for the removal of milk from a woman's breast. Individuals should know how to use and clean a breast pump. Health care professionals may consider reviewing the following counseling points when discussing breast pumps with patients and/or other individuals.

    - Individuals should wash their hands with soap and water for 20 seconds before using and/or handling a breast pump.

    - Individuals should inspect a breast pump before using it. If the breast pump, or related parts, has any mold growing on it, the breast pump should be appropriately discarded.

    - For extra germ removal, individuals should sanitize breast pumps and breast pump parts at least once daily. Sanitizing is especially important if a child is less than three months old, was born prematurely, or has a weakened immune system due to illness or medical treatment .

    - When sanitizing breast pumps and breast pump parts, individuals should clean the breast pumps and breast pump parts first.

    - When sanitizing breast pumps and breast pump parts, individuals may use a microwave on manufacture recommended settings or a dish washer on manufacture recommended settings. Individuals may also simply boil the breast pump parts for a total of five to ten minutes.

    - After sanitization is complete, individuals should allow the breast pump parts to air dry. Once the breast pump parts are clean, individuals should store the breast pump parts in a clean, protected area to prevent contamination during storage.

    - When cleaning the electrical unit for powered breast pumps, individuals should remember the following points of interest: electrical units, which hold the motor and batteries, should be wiped down with a clean paper towel or soft cloth after each use; the electrical unit should never be put into water or other liquids for cleaning; some breast pump manufacturers

make wipes just for cleaning breast pumps, which can make cleaning more convenient; even if these wipes are used, breast pump parts that come into contact with breast milk should be cleaned using liquid dishwashing soap and warm water before pumping.

- Individuals should also be aware of the following points of interest regarding breast pump tubing: when used correctly, breast pump tubing should not touch the pumped milk; individuals should keep a spare set of tubing on hand in case the original set gets soiled or damaged.
- Individuals should review breast pump instruction manuals for specific information regarding their breast pump.

- **Breast milk storage** - breast milk storage may also play an important role in breastfeeding, especially for those individuals providing expressed milk to infants (note: the term expressed milk may refer to human breast milk that has been removed from the breast). Specific information regarding breast milk storage may be found below.
    - Freshly expressed breast milk may be stored at room temperature for up to four hours.
    - Freshly expressed breast milk may be stored in the refrigerator for up to four days.
    - Freshly expressed breast milk may be stored in the freezer for up to 12 months, although frozen breast milk is best six months after freezing.
    - When storing breast milk, individuals should use breast milk storage bags or clean food-grade containers with tight fitting lids made of glass or plastic to store expressed breast milk.
    - Individuals should never store breast milk in disposable bottle liners or plastic bags that are not intended for storing breast milk.
    - Individuals should not store breast milk in the door of the refrigerator or freezer due to the potential for temperature changes when the refrigerator/ freezer door is opened.

- If freshly expressed breast milk will not be used within four hours of removal from the breast, it should be frozen right away to help to protect the quality of the breast milk.
- Individuals should freeze breast milk in small amounts such as two to four ounces or the amount that will be offered to a child at one feeding.
- When freezing breast milk individuals should leave about an inch of space at the top of the container because the breast milk will expand as it freezes.
- When traveling, individuals may store breast milk in an insulated cooler bag with frozen ice packs for up to 24 hours.
- Individuals may thaw frozen breast milk in the refrigerator overnight. Individuals may also place the breast milk container in a container of warm water.
- Individuals should never thaw or heat breast milk in a microwave.
- Individuals should use breast milk within 24 hours of thawing in the refrigerator.
- Once breast milk is brought to room temperature after storing in the refrigerator or freezer, it should be used within two hours.
- Individuals should never refreeze breast milk once it has been thawed.
- Breast milk does not need to be warmed. It can be served to a child at room temperature or cold. However, individuals should note a child's preference to promote feeding.
- If infants prefer warm breast milk, individuals can warm breast milk by placing the container of breast milk into a separate container or a pot of warm water for a few minutes or by running warm, but not hot, tap water over the container for a few minutes.
- Individuals should not heat breast milk directly on the stove or in the microwave.
- Individuals may test the temperature of the breast milk before feeding it to an infant by putting a few drops on the wrist. The breast milk should feel warm, not hot.

    - Before providing the breast milk to a child, individuals should swirl the breast milk to mix the fat, which may have separated.
    - If a child does not finish his or her breast milk, the leftover breast milk may still be used within two hours after the child is finished feeding. However, after two hours, leftover breast milk should be appropriately discarded.
- **Diet** - breastfeeding mothers should also receive information regarding diet. Specific information regarding diet may be found below.
    - A healthy diet for mothers during breastfeeding is important to support the health of both the mother and the infant.
    - Breastfeeding mothers typically require more calories to meet their nutritional needs while breastfeeding; an additional 450 to 500 kilocalories (kcal) of healthy food calories per day is recommended for well-nourished breastfeeding mothers.
    - Typically, women do not need to limit or avoid specific foods while breastfeeding.
    - Breastfeeding mothers should be aware of the following: caffeine passes from the mother to the infant in small amounts through breast milk, but usually does not adversely affect the infant when the mother consumes low to moderate amounts (e.g., about 300 milligrams or less per day, which is about two to three cups of coffee).
    - If mothers are consuming more than two to three cups of coffee per day, they should monitor their infant for the following signs of too much caffeine intake: irritability, poor sleeping patterns, fussiness, and jitteriness.
    - Breastfeeding mothers should be aware of the following: breastfed infants of mothers who do not consume any animal products may have very limited amounts of vitamin B12 in their bodies; low amounts of vitamin B12 can put infants at risk of vitamin B12 deficiency, which can result in neurological damage; it is recommended that mothers who do not consume any animal products consider taking a vitamin B12 supplementation while breastfeeding.
    - Breastfeeding mothers may want to consider taking a daily multivitamin or prenatal supplement every day containing 150 µg of iodine.

- Breastfeeding mothers should be aware of the following: breast milk contains very little iron; therefore, the American Academy of Pediatrics recommends that infants who only receive breast milk (exclusively breastfeed) will need a supplement of iron each day at a dose of one milligram of iron for each kilogram of body weight; the supplement of iron should start at four months of age; at approximately six months of age, an infant's iron needs can be met through the introduction of iron-rich foods, iron-fortified cereals, or iron supplement drops.

- Breastfeeding mothers should be aware of the following: vitamin D is required for infants to support healthy bone development and to prevent rickets, a condition that causes weak or deformed bones; the American Academy of Pediatrics recommends breastfed and partially breastfed infants be supplemented with 400 IU per day of vitamin D beginning in the first few days of life.

- Breastfeeding mothers should be aware of the following: vitamin K is required to form blood clots and to stop bleeding; infants are born with very small amounts of vitamin K stored in their bodies, which can lead to serious bleeding problems like vitamin K deficiency bleeding (VKDB); the American Academy of Pediatrics recommends that all newborns receive a one-time intramuscular shot of vitamin K1 (phytonadione) at a dose of 0.5 to 1.0 milligrams shortly after birth. Health care professionals should note the following: the aforementioned dose of vitamin K1 is typically given during the birth hospitalization.

- **Breast engorgement** - it is natural for a woman's breasts to become larger, heavier, and slightly tender when they begin producing milk. However, some women's breasts can become so large that they experience pain, tenderness, warmth, and/or redness. When breasts reach the point where they cause pain, tenderness, warmth, and/or redness they are said to be engorged. Essentially, breast engorgement is a result of breast milk build up, and should be avoided when possible. Specific information regarding breast engorgement may be found below.

    - Breast engorgement may lead to a low-grade fever.

    - Breast engorgement typically occurs between three to five days after a woman gives birth. However, it should be noted that breast engorgement

may occur at any time during breastfeeding, especially when breast milk is not regularly removed from the breast.

    - Women can prevent breast engorgement by breastfeeding often after giving birth.
    - Women can overcome breast engorgement by removing breast milk by hand or with a breast pump.
    - Women can overcome the pain associated with engorgement by messaging the breasts.

- **Plugged ducts** - plugged ducts, otherwise referred to as plugged milk ducts, can be common in breastfeeding women. When a milk duct is plugged it typically feels like a hard, tender swelling in the breast(s). Women can overcome plugged ducts by following the recommendations found below.
    - Women should breastfeed on the affected side every two hours, which will help loosen the plug and keep breast milk flowing.
    - Women should massage the area, starting behind the sore spot by moving their fingers in a circular motion toward the nipple.
    - Women may use a warm compress on the sore spot.
    - Women should try to relax and get as much sleep as possible. Relaxation and sleep can help release tension, which in turn may help heal the plugged duct.
- **Sore nipples** - sore nipples can often prevent women from breastfeeding infants. Thus, health care professionals should provide women with methods or strategies to overcome or prevent sore nipples. Health care professionals may consider reviewing the following methods/strategies to overcome or prevent sore nipples.
    - Women should ensure they achieve an effective/successful latch when breastfeeding.
    - Women should change positions or breastfeeding holds each time they breastfeed.

    - After breastfeeding, women should express a few drops of milk and gently rub it over the nipples with clean hands; human breast milk has natural healing properties and oils that often soothe tender areas.
    - Women should allow the nipples and breast(s) to air-dry after breastfeeding.
    - Women should avoid harsh soaps and/or ointments.
- **Breast infections** - lastly, while breast feeding, women may experience breast infections. Breast infections may present as soreness or a lump in the breast and may lead to the following symptoms: fever, nausea, vomiting, and yellow discharge from the nipple. Health care professionals may consider reviewing the following counseling points when discussing breast infections.
    - Breast infections may require health care treatment. Women should seek health care if both breasts are affected and/or they observe pus or blood in their breast milk.
    - Women should massage the potentially infected breast, starting behind the sore spot by moving their fingers in a circular motion toward the nipple.
    - Women may use a warm compress on the sore spot.
    - Women should try to relax and get as much sleep as possible to promote healing.

Section 2: Summary

Preterm births can potentially lead to complications or health-related concerns for the parents of preterm babies. The potential complications or health-related concerns for the parents of preterm babies include the following: stress, depression, postpartum depression, anxiety, substance abuse, suicidal ideation and suicide, and ineffective breastfeeding.

Section 2: Key Concepts

- Preterm births can impact the parents of preterm babies - meaning preterm births can potentially lead to complications or health-related concerns for the parents of preterm babies.

- The potential complications or health-related concerns for the parents of preterm babies include the following: stress, depression, postpartum depression, anxiety, substance abuse, suicidal ideation and suicide, and ineffective breastfeeding.

Section 2: Key Terms

Stress - a factor that causes emotional, physical, or psychological tension

Significant life event - any major shift in an individual's life

Depressive disorder - a mood disorder characterized by a persistent depressed mood and/or anhedonia, which ultimately causes significant interference in daily life

Anhedonia - a loss of interest in previously enjoyable activities

Major depressive disorder - a form of depression that occurs most days of the week for a period of two weeks or longer leading to clinically significant distress or impairment in social, occupational, or other important areas of functioning

Postpartum depression - a form or type of depression suffered by a mother following childbirth, typically arising from the combination of the following: hormonal changes, psychological adjustment to motherhood, and fatigue

Anxiety disorder - a mental health disorder characterized by prolonged periods of persistent, excessive worry about a number of events or activities, which cause clinically significant distress or impairment in social, occupational, or other important areas of functioning

Excessive worry - worrying when there is no specific reason/threat present or in a manner that is disproportionate to the actual risk of an event, activity, and/or situation

Generalized anxiety disorder - a mental health disorder characterized by excessive anxiety and worry occurring more days than not for at least six months, about a number of events or activities (e.g., work or school performance), which is difficult to control and leads to clinically significant distress or impairment in social, occupational, or other important areas of functioning

Substance abuse - the harmful or hazardous use of a psychoactive substance such as alcohol or illicit drugs

Binge drinking - five or more drinks on an occasion (within two or three hours) for men, and four or more drinks on an occasion (within two or three hours) for women

Heavy drinking - 15 or more drinks a week for men; eight or more drinks a week for women

Opioids - a class of drugs used to reduce pain

Addition - the compulsive or uncontrolled use of one or more substances

Suicidal ideation - thoughts of suicide and/or thoughts of planning suicide

Suicide - a death caused by self-directed injurious behavior with any intent to die as a result of the behavior

Suicide attempt - a non-fatal, self-directed and potentially injurious behavior with any intent to die as a result of the behavior

Breastfeeding - the act of feeding a baby with milk from a human breast

Necrotizing enterocolitis - the death of tissue in the intestine

Latching - the process of securing a child to a nipple/breast

Breastfeeding support - any effort made to assist, guide, and/or facilitate effective breastfeeding

Breastfeeding hold - the position of a child in relation to the individual breastfeeding; the way an individual holds a child during breastfeeding

Breast pump - any device designed and used for the removal of milk from a woman's breast

Expressed milk - human breast milk that has been removed from the breast

Section 2: Personal Reflection Question

How can preterm births impact the parents of preterm babies?

Case Study: The Impact of Preterm Births

A preterm birth-related case study is presented below to review the concepts found in this course. A case study review will follow the case study. The case study review includes the types of questions health care professionals should ask themselves when considering preterm births and how they relate to the administration of health care. Additionally, reflection questions will be posed, within the case study review, to

encourage further internal debate and consideration regarding the presented case study and preterm births. The information found within the case study and case study review was derived from materials provided by the CDC unless, otherwise, specified (CDC, 2020).

Case Study

A new mother gives birth to a preterm baby. The baby was born right before the 34th week of pregnancy. The condition of the preterm baby is stable. However, as the days progress, the new mother observes that the preterm baby's responses to sounds and noises may "not be normal." Additionally, the new mother experiences breastfeeding obstacles - specifically the new mother is having problems securing her baby to her nipple(s)/breast(s). The new mother also observes that her breasts have become "extremely large and tender."

As time passes the new mother's breastfeeding obstacles continue, and the new mother begins to suffer from episodes of crying, irritability, anger, and headaches. Additionally, the preterm baby's father begins to increase his routine alcohol use to 15 drinks per week. Eventually, the new mother and father reach a point where they have more questions than answers regarding their newborn preterm baby and their own health. The new parents seek counseling from a health care professional.

Case Study Review

What case details may be relevant to the impact of a preterm birth?

The following case details may be relevant to the impact of a preterm birth: the baby was born right before the 34th week of pregnancy; the condition of the preterm baby is stable; as the days progress, the new mother observes that the preterm baby's responses to sounds and noises may "not be normal;" the new mother experiences breastfeeding obstacles - specifically the new mother is having problems securing her baby to her nipple(s)/breast(s); the new mother also observes that her breasts have become "extremely large and tender;" the new mother begins to suffer from episodes of crying, irritability, anger, and headaches; the preterm baby's father begins to increase his routine alcohol use to 15 drinks per week; the new mother and father reach a point where they have more questions than answers regarding their newborn preterm baby and their own health; the new parents seek counseling from a health care professional.

Are there any other case details that may be relevant to the impact of a preterm birth; if so, what are they?

How are each of the aforementioned case details relevant to the impact of a preterm birth?

Each of the previously highlighted case details may be potentially relevant to the impact of a preterm birth. The potential relevance of each case detail may be found below.

The baby was born right before the 34th week of pregnancy - the previous case detail is potentially relevant because it provides context for the preterm birth. The previous detail is also potentially relevant because it indicates the sub-category of preterm birth, which is moderate preterm birth. Health care professionals should note the following: a moderate preterm birth may refer to the birth of a live baby that is born between 32 and 34 weeks of pregnancy.

The condition of the newborn baby is stable - the previous case detail is potentially relevant because it provides further context for the preterm birth. The previous detail is also potentially relevant because it shows that the preterm baby's health and life are not in immediate or apparent danger.

As the days progress, the new mother observes that the preterm baby's responses to sounds and noises may "not be normal" - the previous case detail is potentially relevant because it may represent a sign of hearing loss. Health care professionals should note that preterm births may lead to hearing loss. Health care professionals should also note the following signs of hearing loss in babies: does not startle at loud noises; does not turn to the source of a sound after six months of age; does not say single words, such as “dada” or “mama” by one year of age; turns head when he or she sees a parent but not if a parent calls out his or her name; sometimes is mistaken for not paying attention or ignoring individuals and/or situations; seems to hear some sounds but not others.

The new mother experiences breastfeeding obstacles - specifically the new mother is having problems securing her baby to her nipple(s)/breast(s) - the previous case detail is potentially relevant because it may highlight ineffective breastfeeding. The previous case detail may also be relevant because it may indicate problems with latching. Health care professionals should note the following: latching may refer to the process of securing a child to a nipple/breast.

The new mother also observes that her breasts have become "extremely large and tender" - the aforementioned case detail is relevant because it may indicate that the new mother could be suffering from breast engorgement. Health care professionals should note the following: it is natural for a woman's breasts to become larger, heavier, and slightly tender when they begin producing milk; some women's breasts can become

so large that they experience pain, tenderness, warmth, and/or redness; when breasts reach the point where they cause pain, tenderness, warmth, and/or redness, they are said to be engorged.

The new mother begins to suffer from episodes of crying, irritability, anger, and headaches - the aforementioned case detail is relevant because it may represent signs/ symptoms of stress. Health care professionals should note the following signs/symptoms of stress: disbelief and shock, tension and irritability, fear and anxiety about the future, difficulty making decisions, feeling numb, loss of interest in normal activities, loss of appetite, nightmares, recurring thoughts about an event, anger, increased use of alcohol and drugs, sadness and other symptoms of depression, feeling powerless, crying, sleep problems, headaches, back pains, stomach problems, and trouble concentrating.

The preterm baby's father begins to increase his routine alcohol use to 15 drinks per week - the aforementioned case detail is relevant because it may indicate the presence of substance abuse and heavy drinking. Health care professionals should note the following: heavy drinking is defined as 15 or more drinks a week for men; eight or more drinks a week for women.

The new mother and father reach a point where they have more questions than answers regarding their newborn preterm baby and their own health - the aforementioned case detail is relevant because it provides context for the new parents' potential preterm birth-related complications/health-related concerns (e.g., ineffective breastfeeding, stress, and substance abuse). The aforementioned case detail is also relevant because it provides insight into the possibility for the new parents' preterm birth-related complications/health-related concerns to worsen (i.e., the new parents' questions regarding their newborn baby may lead to increased levels of stress and/or substance abuse).

The new parents seek counseling from a health care professional - the aforementioned case detail is relevant because it indicates the new mother and father are actively engaged in their newborn baby's care, health, and overall well-being, as well as their own health and overall well-being. Health care professionals should note that, often the first step to mitigating the impact of preterm births and treating the complications associated with preterm births is to actively engage in health care (e.g., seeking counseling from a health care professional).

What other ways, if any, are the previous case details relevant to the impact of a preterm birth?

How can health care professionals effectively counsel the parents of the preterm baby?

There are many different methods and strategies that may be used to effectively counsel individuals regarding preterm births. With that said, effective preterm birth counseling typically includes the following elements of care: information regarding preterm births, information regarding the potential complications of preterm births, screening for related complications, and health care referrals. In this particular case, health care professionals should consider providing the parents of the preterm baby with breastfeeding support, information regarding the complications of preterm births for both preterm babies and the parents of preterm babies (e.g., information regarding stress and how to manage stress), as well as specific information regarding preterm baby hearing loss. Health care professionals should note the following: all babies should have a hearing screening no later than one month of age.

What other elements of care, if any, should be included in preterm birth-related counseling?

Conclusion

Preterm births can impact preterm babies - meaning preterm births can potentially lead to a variety of different complications. The potential complications for preterm babies include the following: breathing problems, feeding difficulties, vision problems, hearing loss, cerebral palsy, and developmental disabilities. Unfortunately, preterm births can also impact the parents of preterm babies - meaning preterm births can potentially lead to complications or health-related concerns for the parents of preterm babies. The potential complications or health-related concerns for the parents of preterm babies include the following: stress, depression, postpartum depression, anxiety, substance abuse, suicidal ideation/suicide, and ineffective breastfeeding. Health care professionals should work to effectively identify any preterm birth-related complications associated with preterm babies and the parents of preterm babies.

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