



Notes

8

STAGES OF CHILD DEVELOPMENT : -PRENATAL; AND -BIRTH TO THREE YEARS

When a family is getting ready for the addition of a new member in the family, all its members become enthusiastic to welcome the child and assume new roles including those of parents, grandparents and other relations. The expansion of the family, the addition of a new member, the anticipated entry of a child, and the responsibility of care and nurturance of another life is both exciting and daunting.

In this lesson, you will study about the growth and development of children from prenatal period to three years of age.



LEARNING OUTCOMES

After studying this lesson, you will be able to:

- explain the care a mother needs during pregnancy and after child birth;
- describe the stages of development during prenatal period;
- discuss the ways to care for a neonate;
- highlight the milestones of child development during infancy;
- discuss the importance of early stimulation in children's development; and
- describe the milestones of development in different domains during toddlerhood.



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8.1 DEVELOPMENT OF CHILDREN DURING PRENATAL STAGE

The average period of human pregnancy is 37 weeks to 41 weeks. Babies born before 36 weeks of gestation are considered preterm and those born after 41 weeks are known as postterm babies.

Let us study about prenatal development.

8.1.1 Prenatal Development

After union with the sperm, the ovum enters the germinal period, a time of very rapid cell division, which lasts for about two weeks. This is followed by the embryonic period of about six weeks, during which structural development of the embryo takes place. From the beginning of the third month until birth, the time period is known as the foetal period. During this, the organs, muscles and systems begin to develop and function. Many of the processes that the organism will need in order to survive at birth are being developed at this time. The stages of prenatal development are presented pictorially as follows.

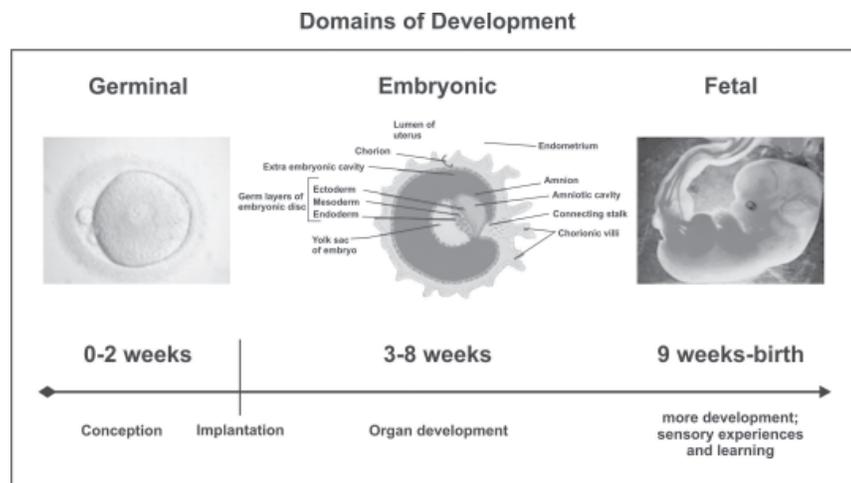


Fig. 8.1 Stages of Prenatal Development

Stage 1: The Germinal Stage

The two-week period after conception is called the germinal stage. Conception occurs when a sperm cell combines with an egg cell to form a zygote. About thirty-six hours after conception, the zygote begins to divide quickly. The resulting ball of cells moves along the mother’s fallopian tube to the uterus. Around seven days after conception, the ball of cells starts to become embedded in the wall of the uterus. This process is called implantation and takes about a week to complete.



One key feature of the germinal stage is the formation of the placenta which is a thick, blood rich tissue lining the wall of the uterus. The placenta has two important functions:

- Passing oxygen and nutrients from the mother's blood into the embryo or foetus i.e. nourishes the developing embryo
- Removing waste materials from the embryo or foetus

Stage 2: The Embryonic Stage

The embryonic stage lasts from the end of the germinal stage to two months after conception. The developing ball of cells is now called an embryo. In this stage, all the major organs form, and the embryo becomes very fragile. At the end of the embryonic period, the embryo is only about an inch long.

Stage 3: The Foetal Stage

The last stage of prenatal development is the foetal stage, which lasts from two months after conception until birth. About one month into this stage, the sex organs of the foetus begin to form. The foetus quickly grows as bones and muscles form, and it begins to move inside the uterus. Organ systems develop further and start to function. During the last three months, the brain increases rapidly in size, an insulating layer of fat forms under the skin, and the respiratory and digestive systems start to work independently.

8.1.2 Factors Affecting Prenatal Growth and Development

Though all infants are expected to follow a 'normal' pattern of prenatal development, some factors might impinge normal growth. A teratogen is any disease, drug or other environment agent that can harm a developing embryo or foetus by causing physical deformation, retarded growth and damage to brain. Some of the teratogens and other factors that affect prenatal growth are discussed below:

- **Drugs:** Medical drugs such as antibiotics and non-prescribed illegal drugs such as marijuana, opiates and cocaine are potentially harmful for the foetus.
- **Alcohol and Smoking:** Intake of alcohol and smoking negatively affects the foetus. These can lead to mental retardation and slow physical growth. Excessive quantity of nicotine and caffeine may also affect the growing foetus.
- **Environmental Hazards:** Environmental hazards caused by modern day living, such as exposure to chemicals, radiations, extreme heat and humidity, can also cause prenatal mutations and deformities.



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**INTEXT QUESTIONS 8.1**

Match Column A with Column B.

Column A	Column B
(a) Zygote	(i) 8weeks
(b) Implantation	(ii) when the zygote attaches to the uterine wall
(c) Embryo	(iii) result of fertilisation
(d) Placenta	(iv) thick, blood-rich tissue that lines the walls of the uterus during pregnancy and nourishes the embryo

8.2 CHARACTERISTICS OF THE NEWBORN

Characteristics of the newborn such as umbilical cord, skin, hair, head, weight, height, sleeping patterns and reflexes are discussed below:

- **Umbilicalcord**

The umbilical cord of a newborn is bluish-white in colour. After birth, the umbilical cord is normally cut, leaving stub about one to two inches long. The umbilical stub dries out, shrivels, darkens and spontaneously falls off within three weeks. This later becomes the belly-button after it heals.

- **Skin**

Newborns are wet, covered in streaks of blood and coated with a white substance known as vernix-caseosa, which is assumed to act as an antibacterial barrier. At birth, a newborn's skin is often grayish to dusky blue in colour. As soon as the newborn begins to breath, usually within a minute or two, the skin's colour reaches its normal tone.

- **Hair**

Some newborns have fine, soft body hair called lanugo. They are particularly noticeable on the back, shoulders, forehead, ears and face of premature infants. Lanugo disappears within a few weeks of birth.

- **Head**

A newborn's head is very large in proportion to the body and the cranium is enormous relative to the face.

- **Weight**

The average birth weight of a full-term new born is approximately 2.5 to 3.5kgs.



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- **Height**

The baby’s length will change much more slowly than the weight. Whatever be the baby’s length at birth, approximately 2 cm (3/4") will be gained each month or just over 5 cm (2") in the first three months.

- **Sleeping Patterns**

Most newborn babies wake up every two to three hours throughout the day. Short stretches of sleep alternate with short period of wakefulness which is mainly for feeding and keeping babies dry and warm.

- **Reflexes**

A reflex is an inborn, automatic or reflexive response to a particular form of stimulation. Reflexes are a neonate’s organised pattern of behaviour. Infants rapidly shut and open their eyes on exposure to direct light, suck at things that touch their lips, grasp when an object is placed in their hands. All of these are some of the reflexes that babies are born with.

The table below highlights major reflexes of newborns:

Reflexes in Newborns	
Rooting	Infants turn the head towards things that touch the cheek
Stepping	Infants move their legs when held upright with feet touching the floor
Swimming	Infants paddle and kick in a sort of swimming motion when lying face down in a body of water
Moro	Activated when support for the neck and head is suddenly removed. Infants thrust their arms outward and appear to grasp onto something
Babinski	Infants fan out their toes in response to a stroke on the outside of her/his foot
Startle	Infants fling out their arms, arch the back and spread the fingers in response to a sudden noise
Eye Blink	Infants rapidly shut and open their eyes on exposure to direct light
Sucking	Infants suck at things that touch their lips
Palmar Grasp	When an object is placed in the infant’s hand and strokes the palm, infants close the fingers and grasp it



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**INTEXT QUESTIONS 8.2**

Match Column A with Column B.

Column A	Column B
(a) Moro reflex	(i) Neonates tendency to turn the head in direction when cheeks are touched
(b) Palmar Grasp	(ii) Infants rapidly shut and open their eyes on exposure to direct light
(c) Rooting	(iii) Babies try to grasp finger put in the palm
(d) Babinski	(iv) Support from neck is removed and baby extends the arms
(e) Eye Blink	(v) Fanning out toes in response to a stroke on foot

8.3 GROWTH AND DEVELOPMENT DURING INFANCY

Infancy has been defined as a period between birth and one year. At birth, infants display a set of inherited reflexes involving sucking, blinking and grasping. They are sensitive to light-dark visual contrasts and movements and show a noticeable preference for gazing at the human face. They also begin to recognize the human voice. During their first year, infants start to develop skills and competencies that become the foundation which they will use for the rest of their lives.

Let us go through the milestones attained by infants in the domains of development from birth to one year.

8.3.1 Milestones of Prenatal to Infancy

Infants grow at an amazing speed during their first year of life. Infants not only grow in the physical aspect like height and weight but also go through major achievements known as developmental milestones.



Fig. 8.2 Milestones in Physical Development



Fig. 8.3 Development of Senses

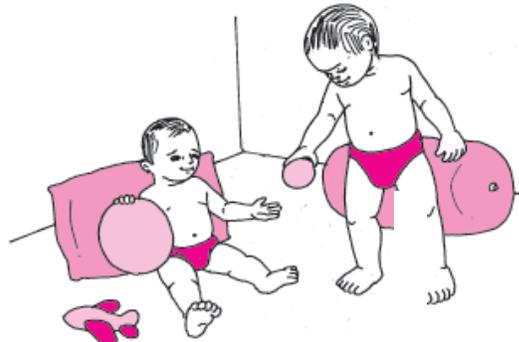


Fig. 8.4 Socio-emotional Development

Based on age ranges, the following section is divided into four parts to address the achievements of infants, in detail.

Birth to Three Months

- **Motor skills:** A newborn’s head is unsteady at the beginning. By the age of three months, an infant tries to lift the head and turn it from one side to the other while lying on the stomach. Stretching and kicking by the baby are likely to get more vigorous. If you offer a toy, you will see the infant might grasp it and hold on tight for a few moments.



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- **Hearing:** Within a few weeks from birth, the infant might respond to sounds by getting quiet or with a smile. Expect the infant to respond to the sound of the mother or other familiar voices.
- **Vision:** The infant will start to focus on the mother's face during feeding. By the age of three months, they might be easily distracted by an interesting sight or sound. Young children also begin to observe complex designs, various colours, sizes and shapes.
- **Communication:** Infants are able to communicate their needs by crying. By the age of two months, the infants smile on purpose, blow bubbles and coo when anyone talks or plays with them. They might even imitate facial expressions of people around them. Infants at this age also try to reach out to known adults when they need attention, security or comfort.

4 Months to 6 Months

Infants become more aware of the surrounding world as they start moving from third month of their lives. They begin exploring the environment around them with more curiosity.

- **Motor skills:** The infant's arms and legs wiggle and kick more purposefully now. You might notice that infants of this age start rocking on their stomach and eventually rollover. They gain muscle strength and have better head control. Most of the infants of this age raise their heads when lying face-down. They might even try to push themselves up or bear weight on their legs. By the age of six months, many infants begin sitting without support. Tip toeing or crawling follows soon after.
- **Eye-hand coordination:** Infants at this age can grasp an object like a rattle. They also try to hold fingers of people around them. Anything within the infant's reach is likely to end up in the mouth. You might notice infants pull objects closer. This requires them to coordinate what they see and hold. Following this, they start transferring objects from one hand to the other.
- **Vision:** Infants at this age begin to distinguish between strange and familiar faces. You might notice that infants concentrate on toys, observe their fingers and toes and stare at their reflection. Most infants of this age turn the head toward bright colours. If a ball is rolled across the floor, the infant will turn the head to follow the action.
- **Communication:** Infants at this age often begin to babble, gurgle and laugh. They respond to and imitate the facial expressions and sounds of others around them. They might babble and then pause, waiting for others to respond. There is increase in memory and attention span. They begin

to pick up the components of speech and the way words form sentences. They even start recognising their names.

7 Months to 10 Months

Increased capacities in almost all domains of development allow infants to do more with their bodies. They start to interact better with the objects and with people around them.

- **Motor skills:** By this age, most infants can roll over in both directions even in their sleep. Some infants can sit on their own, while others need a little support. One might notice that infants begin to rock back and forth, or even crawl across the room. Some infants start making efforts to pull themselves to a standing position.
- **Eye- hand coordination:** Infants start showing more refined fine motor skills. Most infants at this age transfer objects from one hand to another or directly to their mouths. Pulling objects closer with hands gives way to more- refined movements, such as picking up objects with just the thumb and forefinger. This improving dexterity helps the infant to handle a spoon and soft finger foods.
- **Communication:** Infants now communicate through sounds, gestures and facial expressions. One can hear plenty of laughing and squealing from them. Infants might even respond to their own name. They can distinguish emotions by tone of voice. They also try to repeat the sounds they hear.

10 Months to 12 Months

As children reach their first birthday, their actions become goal oriented and they display relative precision in executing their plans.

- **Motor skills:** Most infants at this age can sit without help and pull themselves to a standing position. Infants might use various forward movements to explore new territory. Creeping, crawling and cruising along the furniture will eventually lead to walking. By 12 months, the infants might take their first steps without support.
- **Eye-hand coordination:** Most infants at this age can feed themselves finger foods by grasping items between the thumb and forefinger. They bang blocks or other objects together to enjoy the sound that results and stack objects or nest them inside one another.
- **Cognitive skills:** You have read in the lesson 'Domains of Development' that infants understanding of object permanence improves, they are able to easily find hidden objects. Although they might cry if the mother is



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leaving the room, the infant soon begins to realise that the mother exists even when she is out of sight. They start imitating actions at this age like brushing their hair, pushing buttons on the remote control, or pretending to talk on the phone like adults around them do. Infants are able to look at the correct object, such as a toy, when mentioned.

- **Language:** Most infants at this age respond to simple verbal requests and understand words for familiar people and events. They become skilled at various gestures, such as shaking their head to convey, ‘no’, pointing at something that they want to reach out to, or waving.



ACTIVITY 8.1

Observe a child in the neighbourhood of the age of up to six months and record the milestones of various developmental domains:

Physical and Motor

Cognitive

Language

8.4 GROWTH AND DEVELOPMENT DURING TODDLERHOOD

The stage of life between one and three years of age is called toddlerhood. The growth and development of children at this stage is very rapid. Children want to be a part of whatever adults around them do. As they become more independent, they insist on trying to do many things by themselves. They are probably interested in everything and everyone, especially if it is something new or different.

Children show development in each domain such as physical-motor, language cognitive and social-emotional as discussed below.

8.4.1 Physical-motor Development

Physically, toddlers gain weight, height and their body proportions change rapidly in comparison to infants. Due to this, toddlers attain and practice gross and fine motor skills. The skills and coordination of toddlers increase manifold during this stage. They display their growing control and independence on their bodies in everyday tasks and especially when they play. Some of the milestones of physical-motor development that toddlers attain during this age are:



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Gross Motor Skills

- Walk on their own
- Walk backwards
- Can pick up toys while standing
- Push and pull objects
- Climb on and off furniture
- May begin to run

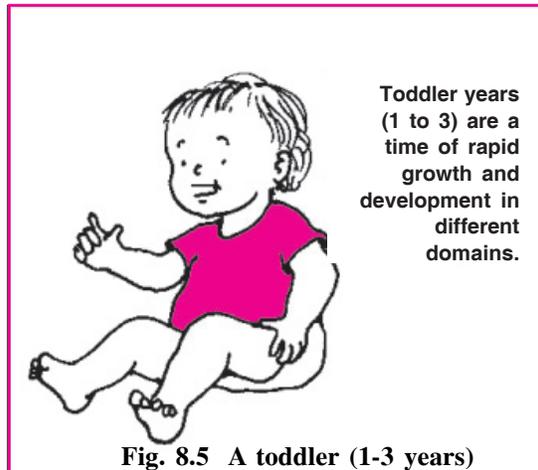


Fig. 8.5 A toddler (1-3 years)

Fine Motor Skills

- Scribble and paint
- May use one hand more than the other
- Grasp, hold and throw a ball
- Turnover and pour out contents from containers
- Feed themselves

8.4.2 Socio-emotional Development

Toddlers show a range of emotions including fear, happiness and joy. They start expressing complex emotions such as jealousy, affection and shame by the age of three years. They also show awareness of what others are feeling and recognize their mental states. They enjoy playing by themselves and /or next to other children. But they have difficulty in sharing toys. Toddlers love to assert themselves by saying, “no”. They want to be independent, yet they are dependent. Sometimes, they do the opposite of what is asked and can become frustrated easily. Play during toddlerhood provides the toddlers an opportunity to develop socially.

Here are some of the milestones of socio-emotional development:

- Recognise themselves in the mirror
- Can identify family members
- Enjoy playing with other people and may cry when play stops
- Become more expressive with face and body
- Imitate some facial expressions
- Develop a sense of attachment and security with the mother or the primary caregiver



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8.4.3 Cognitive Development

Toddlers begin making sense of their environment rather haphazardly but soon they learn to coordinate sensory information more effectively.

As Piaget believes, toddlers show first intellectual behaviour and are capable of independent thinking by this age. They begin deliberately and purposefully experimenting on their environment. They try out new activities through trial-and-error and mentally represent and anticipate events. However, their attention is bound by what is concretely present in their environment. They cannot think in abstract terms. Toddlers at this age are able to think about doing something before actually doing it.

At this age, children mostly engage in parallel play where they play near other children but they do not play together. They are curious, can follow simple directions but have short attention spans. They imitate others in their environment and begin to include a second person in pretend play.

Some of the milestones of cognitive achievements of toddlers are:

- Name familiar people and objects
- Find objects when hidden i.e. object permanence develops
- Capable of deferred imitation
- Understand and respond properly to words and commands
- Distinguish between “you” and “me” and use pronouns “me” and “mine”
- May begin to match similar objects
- Show goal directed behaviour

8.4.5 Language Development, Communication and Emergent Literacy

Language is the most important tool for communication and thus, understanding the development of language among young children becomes essential. The period between one to three years of age is when toddler’s understanding and use of words builds rapidly.

At one year of age, most children can say two or three recognisable words and by the time they are three years old, they start talking using two or three sentences. Between the ages of one and two years, children acquire new words on a regular basis. Initially, they can combine two to three words and then move on to make complete sentences. Between the ages of two and three years, most toddlers learn about 300 words. Toddlers start to understand simple questions and are able to follow simple commands.



You might have heard children of this age saying, “No”, or "I can do it!" or "Let me do it." This shows that the toddler is utilising language as a tool to show independence.

Toddlers listen to everything said to them and often understand more than adults think they do. They are sensitive to the way someone speaks to them. When toddlers learn to communicate well with words, it becomes easier for them to get help when they need.

Let us study some of the milestones of language development.

1 - 2 Years	2 - 3 Years
<ul style="list-style-type: none"> • Use many different consonant sounds • Point to and name specific objects they want • Follow simple commands like, "Roll the ball" and understand simple questions like, "Where's your shoe?" • Use one- or two-word combinations like, "more cookie" or "no juice" • Know a few parts of the body and can point to them when asked • Point to pictures, when named, in books • Use the words 'no', and 'more' • Recognise, name and pickout common objects • Enjoy simple stories,songs and rhymes 	<ul style="list-style-type: none"> • Have a word for almost everything • Use two- or three-word phrases to talk about and ask for things • Speak in a way that is understood by family members and friends • Name objects to ask for them or to direct attention to them • Answer routine questions like, "What is that?", or "What is your name?", or "How old are you?" • Follow directions having no more than two steps, such as, "Find your shoes and get your dress." • Begin to use many different parts of spoken language: eg. Plurals: 'cookies'; Prepositions: 'in the jar'; Modifiers: 'some', 'a lot'; Possessives: 'mine', 'his'; Adjectives : 'pretty'; Adding -ed' to verbs to show past tense • Scribble, colour and draw



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INTEXT QUESTIONS 8.3

State whether the following statements are true or false :

- (a) Toddlers can pick up toys while standing.
- (b) Three year olds do not recognise themselves in a mirror.
- (c) A three year old's speech is not easily understood by the family.
- (d) Toddlers try out new activities and learn through trial and error.



ACTIVITY 8.2

Observe a toddler and comment on the language and physical development.



WHAT YOU HAVE LEARNT

In this lesson, you have learnt that:

- Stages of prenatal development include:
 - Germinal (0-2 weeks)
 - Embryonic (3-8 weeks)
 - Foetal (9 weeks to birth)
- A teratogen is any disease, drug or other environment agent that can harm a developing embryo or foetus by causing physical deformation, retarded growth and damage to brain.
- Newborns are characterized by the umbilical cord, skin, hair, head, weight, height, sleeping patterns and reflexes.
- There are milestones of development of infants in different areas such as motor skills, hearing, vision and communication.
- Providing stimulating inputs to children during their early years of life for their optimum growth and holistic development is called early stimulation.
- Growth and development during toddlerhood is very rapid. There are milestones of development in physical-motor, socio-emotional, language and cognitive domain. Children are expected to achieve age specific milestones in each of the domains of development. Any lag or developmental delay is required to be immediately addressed.



TERMINAL EXERCISE

1. Aarti and her mother are playing with a toy. Her mother hides the toy behind her back. Aarti then begins to look for the toy behind her mother. What is Aarti's approximate age? Give reasons for your answer.
2. Trace the physical development marking milestones attained by infants.
3. What criteria will you use to tell whether a newborn is healthy and is developing normally?
4. Describe how a child is likely to respond to or interact with a rattle at each of the following ages:
 - 2 weeks
 - 3months
 - 6months
 - 10months
 - 15months
 - 21months
5. What are the major environmental factors that can harm a developing embryo and foetus?
6. In your neighbourhood, you observe a 10 months old child who keeps lying on the cot all the time. The child does not make any effort to stand. What advice will you give to the parents of the child?
7. Comment on the language milestones attained by infants.
8. What cognitive milestones are achieved during infancy?



ANSWERS TO INTEXT QUESTIONS

8.1

- (a) iii
- (b) ii
- (c) i
- (d) iv



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8.2

- (a) iv
- (b) iii
- (c) i
- (d) v
- (e) ii

8.3

- (a) True
- (b) False
- (c) False
- (d) True

GLOSSARY

- **Immunoglobulins** are antibodies that pass from the mother to the baby and provide passive immunity to the baby, which protects the baby from a wide variety of bacterial and viral illnesses.

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