ASSIGNMENT 4

1. **Define critical period of growth and development, give an example of why this is important to the development of the fetus**?

**Critical period** I the first six months is the most critical period of development in a child’s life. Although the rapid growth that occurs at prenatal and during infancy slows in childhood and later picks up in adolescence, developmental changes are rapid. Nutrition plays a key role in the process of growth and development. The full potential of heredity will be realized only through good nutrition and health, along with a nurturing and supportive environment. Critical period is also known as the sensitive period, is a time during early postnatal life when the development and maturation of functional properties of the brain, its ‘plasticity’, is strongly dependent on experience or environmental influences. Or it’s a maturational stage in the lifespan of an organism during which the nervous system is especially sensitive to certain environmental stimuli. Functions that are indispensable to an organism's survival, such as vision, are particularly likely to develop during critical periods. For example, the critical period for the development of a human child's [binocular vision](https://en.wikipedia.org/wiki/Binocular_vision) is thought to be between three and eight months, with sensitivity to damage extending up to at least three years of age. Critical period has different mechanisms for example;

**Critical period opening**: which occur in the prenatal brain and continue throughout childhood until adolescence and are very limited during adulthood.

**Critical period closure**: This is modulated by the maturation of inhibitory circuits and mediated by the formation of [per neuronal nets](https://en.wikipedia.org/wiki/Perineuronal_net) around inhibitory neurons.

An example why the Critical period of growth and development is important to the development of the fetus is because it sets the stage for future [psychological](https://www.verywellmind.com/major-branches-of-psychology-4139786) development. For example, it’s during this period that the neural tube develops into the brain and the spinal cord and the neurons continue to form.

1. **What is meant by growth and development and what are the factors affecting normal growth and development of infants and toddlers?**

**Growth** refers to the incremental changes in physical characteristics such as height, weight, size, etc., and Development refers to qualitative changes to growth in an orderly and meaningful fashion which results in maturity. In a human (i.e. the child),the development process can involve developing psychomotor skills such as head support, speaking, learning, expressing the feelings and relating with other people. Human growth for example is divided into the following stages; Infancy which is from birth to weaning, Childhood which is from weaning to the end of brain growth, juvenile which is from the end of childhood to adolescence and adolescence which is from the start of growth spurt at puberty until sexual maturity.

**Below are the factors affecting growth and development of infants and toddlers;**

1. **Heredity**

Heredity is the transmission of physical characteristics from parents to children through their genes. It influences all aspects of physical appearance such as height, weight, body structure, the color of the eye, the texture of the hair, and even intelligence and aptitudes. Diseases and conditions such as heart disease, [diabetes](https://parenting.firstcry.com/articles/parenting-a-diabetic-child/?ref=interlink), [obesity](https://parenting.firstcry.com/articles/obesity-in-children/?ref=interlink), etc., can also be passed through genes, thereby affecting the growth and development of the child adversely.

### 2. Environment

The environment plays a critical role in the development of infants and it represents the sum total of physical and psychological stimulation the child receives. Some of the environmental factors influencing infants and toddler development involve the physical surroundings and geographical conditions of the place the child lives in, as well his social environment and relationships with family and peers. It is easy to understand that a well-nurtured child does better than a deprived one. Starting from birth, infants learn how to make sense of their world through interactions with their parents. This teaches them how to interact with others, including developing relationships, cooperating, and responding to the feelings of others, which are factors that play important roles in helping infants and children develop emotional and social skills. This will, of course, be different for children who are raised in stressful environments.

3. **Gender** the sex of the child is another major factor affecting the physical growth and development of a child. Boys and girls grow in different ways. Boys tend to be taller and physically stronger than girls. However, girls tend to mature faster, while boys mature over a longer period of time. The physical structure of their bodies also has differences which make boys more athletic and suited for activities that require physical rigor. Their temperaments also vary, making them show interest in different things. Boys tend not to love going to school earlier.

### 4. Exercise and Health

Exercise here refers to the normal play time and [sports activities](https://parenting.firstcry.com/articles/best-10-sports-for-kids-to-play/?ref=interlink) which help the body gain an increase in muscular strength and put on bone mass. Proper [exercise](https://parenting.firstcry.com/articles/exercise-for-kids-importance-and-more/?ref=interlink) helps infants and toddlers grow well and reach milestones on time or sooner. They use large muscle groups to sit, stand, walk, run, keep balance, and change positions. Exercise also keeps them healthy and fights off diseases by strengthening the immune system, especially if they play outside. This is because outdoor play exposes them to microbes that help them build resistance and prevent [allergies](https://parenting.firstcry.com/articles/allergies-in-children-causes-symptoms-and-treatment/?ref=interlink) and vice versa.

### 5. Hormones

Hormones belong to the endocrine system and influence the various functions of our bodies. They are produced by different glands that are situated in specific parts of the body to secrete hormones that control body functions. Their timely functioning is critical for normal physical growth and development in toddlers and infants. Imbalances in the functioning of hormone-secreting glands can result in growth defects, obesity, behavioral problems and other diseases.

### 6. Nutrition

Nutrition is a critical factor in growth as everything the body needs to build and repair itself comes from the food we eat. [Malnutrition](https://parenting.firstcry.com/articles/malnutrition-in-children-causes-symptoms-remedies/?ref=interlink) can cause deficiency diseases that adversely affect the growth and development of infants and toddlers. On the other hand, over feeding can lead to obesity and health problems in the long run, such as diabetes and heart disease. A balanced diet that is rich in vitamins, minerals, [proteins](https://parenting.firstcry.com/articles/protein-for-kids/?ref=interlink), carbohydrates and fats is essential for the development of the brain and body.

### 7. Familial Influence

Families have the most profound impact in nurturing infants and toddlers and determining the ways in which they develop psychologically and socially. Whether they are raised by their parents, grandparents or foster care, they need basic love, care and courtesy to develop as healthy functional individuals. The most positive growth is seen when families invest time, energy and love in the development of the child through activities, such as reading to them, playing with them and having deep meaningful conversations. Families that abuse or neglect children would affect their positive development. These children may end up as individuals who have poor social skills and difficulty bonding with other people as adults.

### 8. Geographical Influences or environments.

Where you live also has a great influence on how your children turn out to be. The schools they attend, the neighborhood they live in, the opportunities offered by the community are some of the social factors affecting a child’s development. Living in an enriching community that has houses with enough space to play, play centers, preschools, war free zones all play a role in developing the child’s skills, talents, and behavior. Uninteresting communities like war zones can push some children to not go outside often hence affecting their social development. Even the weather of a place influences infants and toddlers in the form of bodily rhythms, allergies and other health conditions.

### 9. Socio-Economic Status

The socio-economic status of a family determines the quality of the opportunity a child gets. Well-off families can also offer high standards of living for their children, good early education, access to toys and infant books and they afford special aid if the kids need it. Children from poorer families may not have access to [good nutrition](https://parenting.firstcry.com/articles/a-guide-to-nutrition-for-kids/?ref=interlink) to reach their full potential. They may also have working parents who work too many hours and cannot invest enough quality time in their development.

### 10. Learning and Reinforcement

Learning involves much more than schooling. It is also concerned with building the infants up mentally, intellectually, [emotionally, and socially](https://parenting.firstcry.com/articles/social-and-emotional-development-in-children/?ref=interlink) so they operate as healthy functional individuals in the society. This is where the development of the mind takes place and the child can gain some maturity. Reinforcement is a component of learning where an activity or exercise is repeated and refined to solidify the lessons learned. An example is playing a musical instrument; they get better at playing it as they practice playing the instrument. Therefore, any lesson that is taught has to be repeated until the right results are obtained.

Although nature contributes much to the growth and development of children, nurture contributes much more. As mentioned earlier, some of these factors may not be controllable, and you’ll have to make do with what you have. But there are certain things you can definitely ensure for your child. This includes ensuring that your child gets enough rest every day, because his development is heavily dependent on the amount of sleep he gets. Pay close attention to your child’s nutritional and exercise levels, as these too play an important role in promoting your child’s timely and healthy growth and development.

1. **What are the three classifications of under nutrition in preschool children and how is this determined**?

Under nutrition is a condition that results from eating a [diet](https://en.wikipedia.org/wiki/Diet_(nutrition)) in which one or more [nutrients](https://en.wikipedia.org/wiki/Nutrient) are either not enough or are too much such that the diet causes health problems. Below is the classification of under nutrition and how it is determined;

1. Acute under nutrition / Wasting; It usually indicates recent and severe weight loss, because a person has not had enough food to eat and/or they have had an infectious disease, such as diarrhea, which has caused them to lose weight. It is determined by low weight for height.
2. Chronic under nutrition / Stunting; It is the result of chronic or recurrent under nutrition, usually associated with poor socioeconomic conditions, poor maternal health and nutrition, frequent illness, and/or inappropriate infant and young child feeding and care in early life. Stunting holds children back from reaching their physical and cognitive potential. It is determined by low height for age.
3. Under weight; A child who is underweight may be stunted, wasted, or both. It is determined by low weight for age.

b) Infant formula is a substitute for [breast](https://www.medicinenet.com/breast_anatomy/article.htm) milk for feeding infants. It can be Milk-based formulas prepared from cow milk with added vegetable oils, vitamins, minerals, and iron, [Soy](https://www.medicinenet.com/soy_glycine_soya-oral/article.htm)-based formulas made from soy protein with added vegetable oils, and Special formulas for low birth weight infants, Low sodium formulas for infants that need to restrict salt intake, and Predigested protein formulas for infants who cannot tolerate or are allergic to the whole proteins.

Below are the precautions taken while preparing infant formula;

Wash thoroughly hands and food contact surfaces e.g. bench tops with soap and warm water and dry thoroughly with disposable paper towel. Wash and sterilize equipment such as bottles, teats and utensils. Place the bottle under running warm water, taking care to keep the water from getting into the bottle or on the nipple.  Use sterile tongs to remove bottles etc to avoid re-contaminating the equipment. Whenever possible, make a fresh batch of infant formula before each feed. Prepare infant formula exactly according to manufacturer’s instructions. Use water from a safe source to mix your infant formula. Check temperature of infant formula before feeding infants by placing a drop of liquid on the inside of your wrist. It should feel warm. Avoid preparing infant formula if caregivers are suffering illnesses with vomiting or diarrhea, and take extra care with hygiene. If not used immediately, when made up infant formula must be stored in a sterilized bottle or container at the back of the fridge, in the centre where it is coldest. Discard un-used infant formula after 24 hours if refrigerated. Remove the prepared formula just before it is needed.

4**. What precautions should one take when preparing infant formula?**

Inadequate food intake such as a lack of proteins can lead to [Kwashiorkor](https://en.wikipedia.org/wiki/Kwashiorkor), [Marasmus](https://en.wikipedia.org/wiki/Marasmus) and other forms of [Protein–energy malnutrition](https://en.wikipedia.org/wiki/Protein%E2%80%93energy_malnutrition).

Sanitation; Poor sanitary conditions in an environment can contribute to malnutrition and disease in children. For example; drinking unsafe water hence having diseases like diarrhea which leads to dehydration.

Social inequality; In almost all countries, the poorest quintile of children has the highest rate of malnutrition. Sometimes the poorer people find difficulties in purchasing some nutritious food for their children hence leading to malnutrition.

Diseases; [Diarrhea](https://en.wikipedia.org/wiki/Diarrhea) and other infections can cause malnutrition through decreased nutrient absorption, decreased intake of food, increased metabolic requirements, and direct nutrient loss. Parasite infections, in particular [intestinal worm infections](https://en.wikipedia.org/wiki/Helminthiasis) (helminthiasis), can also lead to malnutrition Children with chronic diseases like HIV have a higher risk of malnutrition, since their bodies cannot absorb nutrients as well.

Maternal factors; The nutrition of children 5 years and younger depends strongly on the nutrition level of their mothers during pregnancy and [breastfeeding](https://en.wikipedia.org/wiki/Breastfeeding). Infants born to young mothers who are not fully developed are found to have low birth weights. The level of maternal nutrition during pregnancy can affect newborn baby body size and composition. Iodine-deficiency in mothers usually causes brain damage in their offspring, and some cases cause extreme physical and mental retardation

Gender; A study in Bangladesh in 2008 reported that rates of malnutrition were higher in female children than male children. Girls often have a lower nutritional status in South and Southeastern Asia compared to boys. In other developing regions, the nutritional status of girls is slightly higher.

Diagnosis; Measurements of a child’s growth provide the key information for the presence of malnutrition, but weight and height measurements alone can lead to failure to recognize kwashiorkor and an underestimation of the severity of malnutrition in children.

1. **What are the key causes/determinants of malnutrition in children?**

Malnutrition is caused by a lack of nutrients in your diet, either due to a poor diet or problem absorbing nutrients from food such things can increase a person’s rise of becoming malnourished.

According to world health organization (WHO) 462 million people worldwide are malnourished and stunted development due to poor diet affects 159 million children globally. Malnutrition during childhood can not only long-term health problem but also to educational challenges and limited work opportunities in the future.

**Below are some of the problem that can lead to malnutrition.**

* Lack of appetite

This may be cause by symptoms of an illness, for example, dysphagia when it is difficult to swallow food

* Digestive disorders and stomach conditions

If the body does not absorb nutrients efficiently, even a healthful diet may not prevent malnutrition.

* Inadequate food intake
* Poor health services

In developing countries, 30-50 percent of the population have no access to health service at all that is why their children are suffer from malnutrition because their mothers lack basic information about nutrition.

* Lack of safe water and sanitation

Lack access to adequate water and sanitation can result to spread of infectious diseases including childhood diarrhea, which in turn are major causes of malnutrition.

* Inadequate child and maternal care

Inadequate care for children and women is an underlying cause of malnutrition only recently recognized in all its harmful ramification. Good hygiene in and around the home and in handing food reduces all interaction between parent and child that helps children develop emotionally as well as physically.

* Lack of breastfeeding

Breastfeeding is the foundation of good nutrition for infants and inadequate breastfeeding can jeopardize infants’ health and nutrition, particularly in areas where sanitation and hygiene are poor. Not breastfeeding, especially in the developing world can lead to malnutrition in infants and children.

1. **What are some of the risks associated with introducing complementary foods too early?**

Complementary foods Complementary process means the progressive transfer of the infant from breast milk to the usual family diet. From the stand point of physiological maturation and nutritional need, giving foods other than breast milk before 6 months is usually unnecessary and may entail risks such as making the baby vulnerable to infectious diseases. Complementary food are foods other than breast milk or infant formula (liquids, semisolids, and solids) introduced to an infant to provide nutrients. Below are some of the risks associated with introducing complementary foods too early;

Pose a risk of food being sucked into the airway (aspiration) Introducing solids before 4 months of age [can increase the risk of choking](http://health.mo.gov/living/families/wic/wiclwp/pdf/R_0618_Foods_To_Grow_On.pdf) and cause your infant to drink less than the needed amount of breast milk

Increase a baby's risk of obesity since prior to 4 months old, a baby’s gut has not yet matured enough to have the proper enzymes and bacteria to break down food properly It overrides a baby’s natural cue for hunger and this comes due to spoon feeding at an adult’s pace rather than their pace

Introduction of cereals can interfere with the absorption of breast milk iron, which is normally low in concentration.

Diarrhea because in developing countries population have restricted diets and live in unsanitary environments. Enter pathogenic microorganisms may enter the child’s tract during feeding.

Cause a baby to get too many or not enough calories or nutrients

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