TRENDS IN PHYSICAL AND MOTOR DEVELOPMENT IN INFANCY IN A TYPICAL NIGERIAN MIDDLE CLASS SETTING

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ABSTRACT

To understand an infant’s world, this paper traced infants’ physical development and then examined the methods used to assess the well-being of infants following birth, various paths of infant motor development and particularly milestones in motor development in infancy. Children experience a lot of changes and these changes in turn influence their cognitive, psychosocial and emotional development. All these go a long way to making out the golden educational implications for learning which will be of help to teachers and school authorities. In concluding, it was observed that the proper handling of infants at this stage will serve as a prerequisite for what will happen in the first few years of the child in school.

Keywords: Trend, Physical and motor development, Infancy, Milestone

INTRODUCTION

Development is the pattern of biological, cognitive, and socio-emotional changes that begin at conception and continue through the life span. Most development involve growth. Development and growth have been interchangeably used by most developmental psychologists because both processes are interrelated and interdependent. Uzodima (2018) opines that it is difficult to differentiate the contribution of either of them in the development of the personality of an individual. However, some psychologists have defined growth as the increase in bodily dimensions, height and weight, generally confined to quantitative changes.

Stages of Development

According to Oladele (2015), it is difficult to divide the life of man into water-tight compartments or stages definable by age periods because individuals vary in their development and maturation traits as a result of many factors including race, heredity, nutrition, environment and social conditions.
Physical Development in Infancy

Infancy is a time of rapid physical and nervous system development and accomplishments that ensure an infant’s survival and ability to cope with its world. The typical newborn weighs about 7½ pounds and is about 20 inches in length. In one year after its birth, an infant’s length increases by one-half and its weight almost triples. Infancy sees exciting changes in psychomotor development.

Developmental Milestones of Infancy

In his careful analysis of physical growth and development, Metu (2019) described growth as being like the weaving of a cloth whose design never repeats itself. The underlying threads, each coming from the real at its own rhythm, interact with one another continuously, in a manner always highly regulated and controlled. To help visualize the rapid growth that occurs during infancy, consider table 1. As the baby is growing, physical competence becomes observable, parents begin to treat their child differently and recognise greater individual maturity. Different parenting practices now spring into action and these varied practices reflect the culture into which a child is born in Nigeria and the level of education of the parents. The manner in which Balinese mothers carry their children affects children’s motor development; infants in a typical Nigerian setting show superior motor abilities due to their considerable physical freedom as the expectations from their mothers help them to sit and walk relatively early (Okeke, 2019). In other words, different families in different cultures go about parenting in different ways.

Table 1: Development Milestones of Infancy in a Typical Nigerian Middle Class Setting

<table>
<thead>
<tr>
<th>Age (mos)</th>
<th>Heights (in)</th>
<th>Weight (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>24</td>
<td>13-15</td>
</tr>
<tr>
<td>6</td>
<td>26</td>
<td>16-18</td>
</tr>
<tr>
<td>9</td>
<td>28</td>
<td>19-24</td>
</tr>
<tr>
<td>12</td>
<td>30</td>
<td>25-28</td>
</tr>
<tr>
<td>18</td>
<td>32</td>
<td>29-30</td>
</tr>
</tbody>
</table>

Source: Field Survey 2019

Growing children experience changes in shape and baby composition, in the distribution of tissues, and in their developing motor skills, these changes then influence cognitive, psychosocial, and emotional development. For example, the infant’s head at birth is about a quarter of the baby’s total length, but in the adult, it is about one-seventh of body length. Different tissues (muscles, nerves) also grow at different rates, and total growth represents a complex series of changes. Under-lying this rapidly unfolding and complex process is of course, proper nutrition.
Nutrition

Developed countries have nearly eliminated malnutrition, although the familiar suspects of poverty, illness and neglect can still cause considerable nutritional damage. In developing countries, the issue focuses on concerns about the relative benefits of breast versus formula feeding. Although breast versus formula has always caused controversy, it is interesting to note that breast-feeding in Nigeria is now on the increase (Obi, 2019). Given the recent attention to the benefits of breast-feeding and the national goal of having 75 percent of mothers breast-feed their children up to a year and a year and half, Nigeria is no doubt on the right track. Breast-feeding is now the modern trend, especially among typical Nigerian middle class setting.

The composition of breast milk varies during the first weeks following birth. For the first 3 or 4 days, its known as colostrum, a thin, yellowish fluid that is high in protein. Transitional milk then appears until about the end of the second week. Finally, mature milk is available (Ogundele, 2019).

Breast-feeding has two advantages that cannot be duplicated by formula feeding. First is the protection against disease offered by a mother’s milk. Breast-fed babies seem to have lesser degree of illnesses than formula-fed babies, an important consideration in developing countries. Second, breast-fed babies are less at risk for allergic reactions than are formula-fed babies (Okeke, 2019).

On the other hand, one of the advantages of formula feeding is that others including the father, can feed the baby. In Nigeria, infants are usually well-nourished either through breast or formula feeding. Considerations such as returning to work, may influence a woman’s decision to either breast or formula feed (Ogundele, 2019).

Newborn infants have a special need for protein, given the rapid tissue building occurring during these days. Their high metabolic rates also consume large amounts of their energy; thus, they require substantial amounts of proteins, fats, carbohydrates, usually ready for semi-solid food at about 4 to5 months. Table 2 presents a recommended schedule for the introduction of semi-solid food.

Table 2: Introducing Solid Foods

<table>
<thead>
<tr>
<th>Age</th>
<th>Breast</th>
<th>Types of food</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4 months</td>
<td>Breast milk</td>
<td>Breast milk</td>
</tr>
<tr>
<td>4-6 months</td>
<td>Iron fortified cereals made with rice, barley or soya</td>
<td></td>
</tr>
<tr>
<td>6-7 months</td>
<td>Strained fruits and vegetables, fruit juices, teething foods</td>
<td></td>
</tr>
<tr>
<td>8-9 months</td>
<td>Pureed meats, potatoes, rice or pasta</td>
<td></td>
</tr>
<tr>
<td>10-12 months</td>
<td>Finger foods, toast strips, yogurt, and an increased variety of food</td>
<td></td>
</tr>
</tbody>
</table>

Source: Field Survey, 2019
In the course of one year, or a year and a half, infants progress from breast milk plus semi-solid food to a variety of table foods and formulas.

**Brain Development**

The adult human brain weighs about 3 to 4 pounds and contains about 100-200 billion neurons (Gopnik, Meltzoff & Kuhl in Metu, 2019). Nervous system development begins during the embryonic period when neurons reproduce at the rate of about 250,000 per minute. During infancy, connections among the neurons begin to increase notably (as much as 100 to 1,000 connections for each of the billion neurons). This amazing complexity provides the biological basis for cognitive development (Howard, 2000). Estimates are that the baby’s brain at birth is about a quarter of its adult size. At 6 months, it is about 50 percent of its adult weight, 60 percent at 1 year, 75 percent at 2 years, 90 percent at 6 years, and 95 percent at 10 years.

The human brain (unlike that of other primates) continues to grow rapidly after birth, especially during the first two years (Howard, 2000). The myelin sheath which helps the passage of nerve impulses, is not complete until about 6 years of age, and the brain is not considered to be physically mature until puberty. Thus, about 75 percent of the human brain develops outside of the womb in direct relationship with its environment.

For example, at birth, the baby’s experience adds a new dimension to the brain’s wiring process. The range of a baby’s pleasant and unpleasant experiences begin to shape an infant’s emotional life; as such, the more the degree to which parents talk to their babies, the more complex will be their wiring for language. When babies have the opportunity to interact with appropriate toys and objects, the more refined their circuitry for motor control becomes. In other words, the brain keeps rewiring itself even after it turns on (Gopnik, Meltzoff & Kuhl in Okeke, 2019).

Each of the brain’s four lobes (frontal, partial, temporal and occipital) exercise specialized functions. For example, the frontal lobe contains the motor area for control of all the skeletal muscles (which shows rapid growth for survival purposes); the partial lobe seems to be the controlling centre for the body’s sense areas; the temporal lobe manages auditory functions, the occipital lobe analysis visual information. Brain structures for thinking are diffused throughout the cortical area which makes considerable sense when you think about answering a question. You listen to the question (auditory area); you respond by speaking (motor area); you search your memory.

At birth, of course, the infant must assume those life-sustaining functions that the mother provided for nine months, which leads to an analysis of the important role that native reflexes play.
Neonatal Reflexes

A reflex is an automatic response to certain stimuli. Popular examples of reflexes include the eye blink and the knee jerk. All of the activities needed to sustain life’s function are present at birth (breathing, sucking, swallowing, elimination). These reflexes all serve definite purposes. The gag reflex enables infants to spit up mucus; the eye blink protects the eyes from excessive light; an anti-smothering reflex facilitates breathing.

In an attempt to rank an infant’s reflex in order of importance, Ogundele (2019) noted that the most crucial reflexes are those associated with breathing. Breathing patterns are not fully established at birth, and sometimes infants briefly stop breathing. These periods are called apnea, and though there is some concern that apnea may be associated with sudden infant death, these periods are common in all infants. Usually they last for about 2 to 5 seconds; episodes that extend from about 10 to 20 seconds may suggest the possibility of a problem. Sneezing and coughing are both reflexes that help to clear air passages.

Next in importance are those reflexes associated with feeding. Infants suck and swallow during the prenatal period and continue at birth. They also demonstrate the rooting reflex in which they will turn toward a nipple or a finger placed on the cheek and attempt to get it into their mouth.

Newborn Abilities

In the days immediately following birth until about two weeks to one month, the infant is called a neonate. During this period, babies immediately begin to use their abilities to adapt to their environment. Among the most significant of these abilities are the following:

- Infants display clear signs of imitative behaviour at 7 to 10 days (for instance, if one sticks out the tongue at a baby who is about 10 days old, the baby will stick its tongue back at the person). Here neonates are telling us that they have the ability to imitate almost immediately after birth, an ability that children alert parents to immediately after birth, and an ability that should alert parents to immediately demonstrate desirable behaviour for their children to learn and imitate. Infants imitation of such tongue movements as just described is well-established in babies as young as a few hours to about six weeks of age.

- Infants can see at birth and if one captures their attention with an appropriate object (such as a small, red rubber ball) held at about 10 inches from the face, they will track it as one moves the ball from side to side. Infants react to color at between 2 and 4 months and depth perception appears at about 4 to 5 months (Brazelton & Nugent in Uzodima, 2018).
Infants not only can hear at birth, but they also can perceive the direction of the sound. In a famous, yet simple, experiment, a clicker was sounded (similar to those children play with) from different sides of a delivery room only 10 minutes after an infant’s birth. The infant not only reacted to the noise, but attempted to turn in the direction of the sound, indicating that children immediately tune into their environment (Ndudi, 2019).

Motor Development

Parents are fascinated by their child’s motor development: Is he/she sitting up on time? Shouldn’t he/she be crawling by now? I wonder if he/she will ever walk. Why can’t he/she hold his/her head steady? Motor development occurs in both head-to-feet direction (called cephalocaudal), as well as a proximodistal direction (from the center of the body to the extremities). For many years, research into infant locomotion has been at a standstill mainly because of the belief that neuromuscular maturation was the primary agent of motor development. Recently, however, modern investigators, using high-speed film, computerized video recordings, and infrared emitting diodes, have provided new insights into changes in coordination, balance, and strength in infants’ locomotion.

Studies have shown that continuity of walking movements in the first year may be masked by underlying changes in the infants’ muscle distribution, body fat, and the differential effect of gravity. For example, newborns with chubby legs stepped less than slender-legged infants. But when the slender-legged infants were weighted with an amount usually gained over the first months of life, they stopped stepping (Ndudi, 2019).

Here are several important characteristics of motor control:

Head Control

The most obvious initial head movements are from side to side, although the 1-month-old infant occasionally lifts its head when in a prone position. Four-month-old infants can hold their heads steady while sitting and will lift their head and shoulders to a 90-degree angle when on their abdomens. By the age of 6 months, most infants can balance their heads quite well.

Locomotion: Crawling and Creeping

Crawling and creeping are two distinct development phases. In crawling, the infant’s abdomen touches the floor and the weight of the head and shoulders rests on the elbows. Locomotion is mainly by arm action. The legs usually drag, although some infants push with their legs. However, most of them can crawl after 7 months.

Creeping is more advanced than crawling since movement is on hands and knees and the trunk does not touch the ground. After 9 months, most children can creep. Most descriptions of crawling and creeping are quite uniform. The progression is from propulsion on the abdomen
to quick, accurate movements on hands and knees, but the sequence is endlessly varied as infants adopt a bewildering diversity of positions and movements that can only loosely be grouped together.

**Locomotion: Standing and Walking**

After about 7 months, infants when held will support most of their weight on their legs. Coordination of arm and leg movements enables babies to pull themselves up and grope toward control of leg movements. The first steps are a propulsive lunging forward. Gradually, a smooth, speedy, and versatile gait emerges. The world now belongs to the infant.

Once babies begin to walk, their attention darts from one thing to another, thus quickening their perceptual development. Tremendous energy and mobility coupled with a growing curiosity, push infants to search for the boundaries of their world. It is an exciting time for young people, but a watchful time for parents, since they must draw the line between encouraging curiosity and initiative and protecting the child from personal injury. The task is not easy. It is, however, a problem for all aspects of development.

<table>
<thead>
<tr>
<th>Age</th>
<th>Head control</th>
<th>Grasping</th>
<th>Sitting</th>
<th>Creeping crawling</th>
<th>Standing walking</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3 months</td>
<td>Can lift head and chest while prone</td>
<td>Grasps objects, briefly holds objects, carries objects to mouth</td>
<td>Sits awkwardly with support</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-8 months</td>
<td>Holds head steady while sitting balances</td>
<td>Develops skillful use of the thumb</td>
<td>Transition from sitting with slight support to brief periods without support</td>
<td>Crawling movements appear at about 7 months (trunk touches floor)</td>
<td></td>
</tr>
<tr>
<td>8-12 months</td>
<td>Has established</td>
<td>Coordinates hand activities, handedness begins to appear</td>
<td>Good truck control, sits alone steadily</td>
<td>Creeping (trunk raised from floor) begins at 9-10 months and continues until steady walking</td>
<td>Can stand and take steps holdings on to something; by 12 months will pull self up</td>
</tr>
<tr>
<td>12-14 months</td>
<td></td>
<td>Handedness pronounced, holds crayon marks lines</td>
<td>Can sit from standing position</td>
<td></td>
<td>Stands alone, begins to walk alone</td>
</tr>
<tr>
<td>18 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Begins to run</td>
</tr>
</tbody>
</table>

*Source: Field Survey, 2019*
Educational Implications

Given the rigor in infancy development, if properly developed, a follow up is supposed to be carried out as the child goes into school.

1. Growing children need regular exercises. The home and school should give opportunities for these. Such exercises as chasing, jumping, running, swinging, climbing, skipping with rope and cycling promote good physical development and coordination. However, since children are in a stage of development, they are susceptible to sudden fatigue which they may not want to acknowledge. Teachers should be on the lookout for fatigue cases in order to change to less tasking activities and should punctuate their action with breaks or periods of rest.

2. Until about the age of 8 years, the eyeballs of most children are shallow or flat instead of round; this may result in their inability to clearly focus on small, near point objects, and a tendency toward eye fatigue or irritation. Therefore, until their eyes are matured, reading materials should be printed in large letters and writing paper should have large spaces.

3. Teachers should provide a relatively free and flexible situation for children who are just beginning to learn to write. Crayons and soft chalk or thick pencils should be used at the early stage of writing and drawing to aid the development of hand and finger muscles.

4. Children should be given large objects such as balls, brightly coloured foam, rubber toys, etc, for games.

5. Script writing (single letters) consisting of single strokes should be taught. It usually gives good result with large muscles.

6. Cursive writing (joined letters) can be introduced at a later stage when children have gained adequate control of the small muscles of the wrist and fingers.

CONCLUSION

The authors’ view of an infant today is that of an individual of enormous potential; one whose activity and competence are much greater than originally suspected. It is as if a newborn enters the world with all its systems ready to function and eager for growth. What happens during the first two years therefore, has important implications for the child’s future development.

REFERENCES