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Evaluation of Early Childhood Physical-Motor Development in the Perspective of Child Development Achievement Standards

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Abstract

The physical-motor development of young children is a continuous process that occurs significantly in the formation of bones, as well as the growth and development of muscles and nerves, in accordance with their age range. This development directly influences children's motor skills. Therefore, this study aims to examine the stages and developmental tasks of physical-motor development in early childhood based on the standards of child development achievement levels, as well as to explore the role of environmental factors in supporting children's physical growth and motor intelligence. This study employs a qualitative method with a case study approach. Data were collected through in-depth interviews and observations. The findings reveal that children with well-developed physical-motor abilities are those who are able to optimally coordinate their body movements. A supportive environment, effective parenting patterns, and nutritious food are key factors that contribute to physical-motor development in early childhood, especially during the toddler years (under five years of age).

INTRODUCTION

Early childhood (ages 0–6) is considered a golden period in an individual's development. This phase is often referred to as the golden age due to the remarkable growth and development children experience across physical, motor, emotional, cognitive, and psychosocial domains. Child development occurs through a holistic process involving all these aspects (Nurasyiah & Atikah, 2023; Prasetiawan, 2019; Tanfidiyah & Utama, 2019). Therefore, to progress to subsequent developmental stages, a child's physical and motor development plays a crucial direct and indirect role. Physical development significantly influences a child's motor activities, which, in turn, affect their daily behavior and functional abilities. A child's motor intelligence is also shaped by other developmental domains, particularly the connection between physical and intellectual growth.

According to Suyadi, intelligence in children is not solely measured neurologically (optimization of brain function), but also psychologically, through the stages of developmental growth (Dwijayanti & Syafril, 2024; Fadilah, 2019; Karim et al., 2023). Thus, an intelligent child is not only one with rapid brain development, but also one who progresses well across various developmental domains. These include

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religious-moral, physical-motor, language, cognitive, social-emotional, and aristic development. In accordance with the child development achievement standards outlined in Ministry of Education Culture Regulation No. 137 of 2014 recognized as the national standard for early childhood education in Indonesia Montessori emphasizes this phase as a sensitive period. During this time, children are particularly receptive to environmental stimuli and educational experiences. They undergo the maturation of both physical and psychological functions, allowing them to respond to and complete their developmental tasks effectively (Sulyandari, 2019; Widiastuti, 2015). Theoretically, children learn most effectively when their physical needs are met and they feel safe and psychologically secure. Fundamentally, children are individual beings who actively construct their own knowledge (Engkizar et al., 2024).

The integration of various developmental domains especially the interplay between physical and cognitive development highlights the need for structured early education programs that are sensitive to children's developmental milestones (Bornstein, 2015; Sugiyanti, 2021). Recognizing this interdependence, early childhood education must be designed not only to stimulate physical and motor skills but also to provide an enriching environment that fosters cognitive, emotional, and social development. In this context, early learning institutions such as kindergartens play a pivotal role in optimizing children's developmental potential through age-appropriate, holistic approaches.

Selamet Suyanto said that at this stage, brain growth is undergoing rapid development. Based on research on the brain, children's intelligence capacity reaches 50% by the age of 4, 80% by the age of 8, and the remaining 20% by the age of 8 and above. Kindergarten is one form of early childhood education aimed at helping lay the foundations for the development of attitudes, knowledge, skills, and creativity that children need to adapt to their environment and for their further growth and development. The objectives of this study are to describe: 1) the physical motor development of early childhood; 2) the stages and tasks of physical-motor development of early childhood according to standards; 3) the role of the environment in the physical growth and development as well as the motor intelligence of children in the concept of standard levels of child development achievement.

METHODS

This study uses a qualitative approach with a case study design (Engkizar et al., 2023). Data were obtained through observation and interviews, which were used to explore the physical-motor development of young children, including their developmental stages and tasks based on the child development achievement standards, as well as the role of the environment in supporting physical growth and motor intelligence (Baxter & Jack, 2015; Brennen, 2021; Elizabeth, 2016). The research subjects consisted of children aged 4–5 years who had demonstrated physical-motor development achievements in accordance with the indicators in the aforementioned standards.

RESULT AND DISCUSSION

Concepts and Theories of Physical-Motor Development in Early Childhood

Development can be defined as progressive and continuous change in an individual from birth to death (The Progressive and continuous change in the organism from birth to death) (Asfuri, 2020). Another definition of development is "the changes experienced by an individual or organism toward maturity, which occur systematically, progressively, and continuously, both physically and psychologically." 4 Development is a concept that involves quantitative and qualitative changes related to mental/psychological aspects. A child's ability to respond to their parents'

conversations, adult laughter, crawling, walking, holding an object, and so on are all part of the child's developmental process in responding to their surroundings. Physical growth in children is not always the same; some children grow quickly, while others grow more slowly. In addition to changes in weight and height, children also experience physical changes.

In addition, as stated by İsbandiyarova (2024), development in early childhood, namely ages 2-6 years, involves a crisis of initiative versus guilt. Descriptively, children demonstrate motor skills and abilities and become more interested in social interactions with those around them. As physical development matures, children's motor skills become well-coordinated. Each movement aligns with their needs or interests. Children tend to exhibit agile and nimble motor movements. Such as writing, drawing, painting, swimming, playing ball, and athletics. In psychology, the term "motor" refers to activities involving muscles and their movements, or motor refers to any condition that enhances or generates stimulation/stimulation for physical organ activities. Thus, motor skills are body movements or parts performed intentionally and controlled in an organized manner, such as releasing the hands or moving the legs to walk.

According to the cephalocaudal principle, the sequence of physical maturation and growth begins from the head region (*cephalic region*) and proceeds down to the tailbone (*caudal region*). The body undergoes progressive changes from infancy to adulthood. Growth in height and weight occurs most rapidly during the first two years of life. In general, children's physical development follows both the cephalocaudal and proximodistal principles. A newborn's head appears proportionally larger; it makes up about 70% of an adult's head size and about 25% of the baby's total body length (Ilham & Rini, 2024; Prima, 2021; Yulsyofriend et al., 2019).

Over time, physical development occurs in a systematic and non-random manner. According to Kosmas & Zaphiris (2020); Zarei et al (2024), infant development is marked by a transition from uncontrolled movements to intentional and coordinated actions. These purposeful and organized movements form specific patterns, such as pulling the body up to stand, letting go of support, and moving the legs to walk. As children grow and their nervous systems mature, the processes of crawling, walking, and eventually running become stages that shape their overall physical development.

Researchers note that early childhood physical-motor development is a continuous process, encompassing bone formation, muscle growth, and nervous system development, all of which occur in accordance with the child's age range (Fauziddin & Mufarizuddin, 2018; Rahmatullah et al., 2021; Zeng et al., 2017). This process significantly influences a child's ability to move and interact with their environment. Development that proceeds in a sequential manner forms the foundation for essential motor skills used in daily life. According to developmental achievement standards, physical-motor development in children is generally divided into two main categories: gross motor skills and fine motor skills.

First, gross motor development according to is a Aziz et al (2024); Nafisa et al (2024) basic skill that young children aged 4–6 years should have. This competency covers four main aspects, namely: (1) walking, with indicators such as being able to walk up and down stairs using both feet, walk in a straight line, and stand on one foot; (2) running, with indicators such as strength and speed in running; (3) jumping, which includes the ability to jump forward, backward, and sideways; and (4) climbing, such as climbing stairs and trees.

Second, fine motor development according to Randjelović et al (2019); Sutapa et al (2021) includes a child's ability to master fine muscle movements, which involve coordination, dexterity, and agility in using hands and fingers. This ability is

important in supporting children's daily activities, such as drawing, writing, or arranging small objects.

Motor development is strongly influenced by brain function. Through play activities such as jumping, throwing, and running, children's muscle growth is stimulated. In addition, play engages children emotionally, cognitively, and socially, making it a holistic form of development. While brain development plays a key role in shaping motor skills, adequate nutrition also significantly supports both motor development and overall physical growth. Therefore, physical and motor development in children requires careful attention and consistent observation from adults, beginning with exclusive breastfeeding, balanced nutrition, and fulfilling other basic needs. Children who experience healthy physical growth are more likely to develop strong motor skills. The age range of 0–6 years is considered a golden period for development, and physical-motor progress is one of the essential domains during this stage. Play serves as a natural and effective way for children to practice and enhance their motor skills.

Principles of Physical and Motor Development in Early Childhood

According to Richards (2018), individual development is a lifelong process that begins at the moment of conception (prenatal period) and continues until the end of a person's life. This development is dynamic, with changes that can occur slowly or rapidly, and may involve one or multiple aspects of development. Each individual has a unique developmental pattern that is not always the same as others. In the process of individual development, there are several important principles: (1) development occurs throughout life and encompasses all aspects of life; (2) each child has different rates and qualities of development; (3) development is relative and follows certain regular patterns; (4) development occurs in stages; and (5) development progresses from mastering general abilities toward more specialized abilities. As an illustration, by the age of two, children tend to focus on exploring their surroundings, mastering basic physical movements, and developing language skills. By the age of three to six, the focus of children's development shifts to social aspects, such as learning to interact and build relationships with others. This demonstrates that each stage of development has its own unique focus and characteristics, tailored to the child's age and developmental needs (Ferulano, 2021; Gomez et al., 2020).

The Purpose and Function of Physical Development - Motor Skills in Early Childhood

One of the most significant aspects of early childhood development is physical development (Alfonso et al., 2022; Liu & Raine, 2017; Vervoort et al., 2022). From the perspective of physical development, Hurlock explains that, in general, the physical development of young children encompasses four main aspects. First, the nervous system, which is closely related to the development of a child's intelligence and emotions. Second, muscles, which influence the development of physical strength and motor skills. Third, the endocrine glands, which play a role in the emergence of new behavioral patterns, such as during adolescence when feelings of joy or enthusiasm for an activity begin to develop. Fourth, physical structure or body, which includes height, weight, and body proportions. These four aspects are interrelated and play an important role in supporting the overall growth and development of children.

The brain plays a very decisive role in the development of various aspects of an individual, including motor, intellectual, emotional, social, moral, and personality skills. The more mature the development of the brain's nervous system that controls muscles, the more likely it is for a child's motor skills or competencies to develop. The development of motor skills is an important factor in shaping overall personal development. Mazzanti & Karsli-Calamak (2022); Sutapa et al (2021) notes several reasons why motor skills play an important role in the constellation of individual

development. First, through motor skills, children can entertain themselves and derive pleasure. Second, motor skills enable children to transition from a state of "helplessness" to one of "independence." Third, motor skills help children adapt to the school environment. Fourth, normal motor development allows children to play and interact with peers. Finally, the development of motor skills is very important for the formation of children's self-concept and personality.

The physical element in this case is the child's physical readiness to do something, including learning. This physical readiness is related to adequate sleep at night, eating and drinking, resting during the day, and the activities they do. For example, children who get enough sleep at night can usually still concentrate on learning during the day. Conversely, children who wake up too early often feel bored during daytime learning sessions. In this context, learning must take into account rest periods, including providing food and drink for children. Additionally, adults around them should give children opportunities to move and practice without neglecting playtime.

The Role of the Environment in the Physical and Motor Development of Early Childhood

The growth and development of children is essentially a comprehensive whole. In this context, the active involvement of parents is crucial, especially during the early years (under five years old), when children are highly dependent on their immediate environment, particularly their family, especially their parents. Parental involvement is not only about direct efforts in caring for and accompanying children but also includes the important role of creating a supportive home environment as the first social environment children encounter. According to Maulidah et al (2025), generally, children require several basic needs, including: a safe place to live and protection from harm, nutritious food appropriate for their age, warmth such as adequate clothing, physical and mental care including dental health, hygiene, and balanced rest and activities.

All these physical needs, of course, must be the responsibility and concern of adults to fulfill. If these physical needs are well met, it will open opportunities for the healthy development of psychological aspects. In fact, the proper fulfillment of primary physical needs is a prerequisite for the healthy development of a child's psychological aspects (Engkizar et al., 2023). A child's needs should be met in an environment that stimulates all aspects of their development. Children should be treated as active individuals who need to be stimulated to face and overcome challenges. Through interaction and communication between parents and children, various aspects of a child's personality will develop, including an awareness of responsibility (Weyns et al., 2021).

Physical-motor development plays a crucial role in a child's growth. In addition to developing agility and dexterity, it can motivate children to interact with their environment. Furthermore, when utilized effectively, physical-motor development can enhance a child's intelligence. As parents, educators, or adults around the child, it is important to respond and provide time or opportunities for the child to engage in various movements that can help develop their physical-motor skills.

CONCLUSION

Motor skills are one of the domains of intelligence in the standard levels of child development achievement, as outlined in Permendikbud No. 137 of 2014. The growth and development of each child's motor skills occur individually and may vary widely among children. Several factors influence the development of physical-motor abilities in early childhood, including exclusive breastfeeding, proper nutrition, a supportive environment, and the care and responsiveness of adults in their surroundings. Healthy physical growth generally supports the development of motor

abilities. Gross motor skills rely on the development of large muscles, while fine motor skills are based on the coordination of smaller muscle groups. The progression of physical-motor skills typically follows a sequential process, beginning with two foundational growth patterns: *cephalocaudal* (from head to toe) and *proximodistal* (from the center of the body outward). Gross motor development usually emerges before fine motor abilities. In this study, the subject's physical-motor development appeared to be more advanced than that of several peers at the same school level, as indicated by their active participation in various movement-based activities such as dancing. The subject demonstrated agility and well-developed gross motor skills. Furthermore, support and encouragement from both parents and teachers seemed to contribute positively to the subject's steady motor development.

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