

Stunting among Preschool Children: A Review of The Effects of Cognitive and Literacy Development

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Abstract

Stunting is one of the effects of malnutrition that occurs among children. It becomes a severe issue when it has a huge impact, especially in the cognitive development process of preschool children. Thus, this paper will discuss the general problem among preschool children and how it affects their cognition development and influences literacy skills. The discussion also includes a comparison of the theory of constructivism by Lev Vygotsky and Jean Piaget regarding the needs of children to enhance their cognitive development.

Keywords: Stunting, Preschool Children, Cognitive Development, Literacy Skills.

Introduction

The malnutrition crisis is a global issue and the cause of almost half of child deaths. The long-term effects of malnutrition in children are getting intense and affecting economic productivity, increasing the risk of non-communicable diseases, and diminishing educational achievement. With a string of economic instability, and conflicts, including COVID-19 plaguing the world, this issue is rising, especially among children. As we can see, there are several forms of malnutrition. Most of the children suffered from thin (underweight) weight below the recommended level for a particular age; too thin (wasting) weight below the recommended level for a particular height; and short (stunting) height below the recommended level for a particular age (Petermann-rocha et al., 2022). All of these causes affect children's developing physical and mental that cause various forms of malnutrition. Among the effects caused by this problem, stunting children is increasing and deserves attention. Petermann et al (2022) found that by 2020, approximately 149.2 million children will be stunting (Petermann-rocha et al., 2022). By 2025, the number of stunted children is estimated at 131 million (27 million exceeding the expected 40% reduction in the target number of stunting children) (Ali, 2021; Woreda et al., 2021). Children's disability problems that do not proceed until they are adults can have long-term adverse effects on cognitive development, academic achievement, and economic productivity later in life.

Stunting in children refers to a child who is too young or short for his age. These children can suffer from poor physical and cognitive development (Kinyoki et al., 2020). Stunting is assessed by comparing the height for the age of the child with a nutrition reference population and healthy children i.e., a Z score equal to or lower than 2 (Ali, 2021). It is also defined as either an excess or imbalance in a person's energy or nutrient intake associated with impaired physical and psychological growth and development (Ali, 2021). In addition, recurrent infections and inadequate psychosocial stimuli can also increase the risk of stunted. The first 1000 days of life are the most critical, as a child's growth and development through this stage can control a child's performance during later life (Ali, 2021). Inadequate nutrition during this phase can not only cause stunted but will also affect the developmental process of the child. Linear growth failure in children is associated with a variety of pathological disorders and an increased risk of morbidity and death. Stunted children not only experience poor physical growth but may also have impaired neural development and poor cognitive, educational, and economic functions (Ali, 2021; Kok, 2020).

Children may not be able to develop their full cognitive potential, which in turn interferes with their literacy skills. As a result, they will have learning difficulties in school which will affect income, and acceptance in the community as they grow up (Ali, 2021; UNICEF et al., 2020; WHO et al. al., 2019). Stunted children under 2 to 6 years will affect a low cognitive development level of education and lead to significant economic problems for individuals, families, and communities. Cognitive function is a crucial component of children's quality of life. It is a general term for information processing regarding a wide range of abilities and intelligence along with perception, attention, memory, problem-solving, and decision-making (Bailey et al., 2021). The most dynamic and optimal time of cognitive development produced by the human brain is during the age of 5–6 years or when they are in preschool (Brown, 2010; Welsh et al., 2012). Therefore, stunted preschool children require more attention to ensure that their cognitive development is not disrupted. Literacy is the gateway to the knowledge and skills necessary for children to build their character. In addition, literacy development skills are also an important factor in the process of children's lives. It involves a lot of social interaction because the development of literacy skills is also closely related to language proficiency other than reading and writing.

Stunting among Children

Stunting is among the effect of malnutrition that are closely related to nutritional practices in children involving deficits in cognitive development and achievement in learning (Ekholuenetale et al., 2020) along with literacy skills that affects achievement in learning. Among the globe, 87 million stunted children are estimated to live in Asia, 59 million in Africa, and 6 million in Latin America and the Caribbean (World Health Organization, 2018). Five sub-regions have child stunting rates over 30%, West Africa (31.4%), Central Africa (32.5%), East Africa (36.7%), South Asia (34.1%), and Oceania (38.3%) excluded Australia and New Zealand (World Health Organization, 2018).



Figure 1: Percentage of the world stunting children (WHO et al., 2019).

In April 2021, The Joint Malnutrition Estimates (JME) revealed that robust efforts to reach the World Health Assembly (WHA) set for 2025 and the Sustainable Development Goals (SDGs) set for 2030 are still inadequate in tackling the problem of childhood malnutrition globally (WHO, 2021). The findings of a recent analysis by the World Health Organization show that only a quarter of all countries are on track to halve the number of children affected by stunting by 2030 (WHO, 2021).

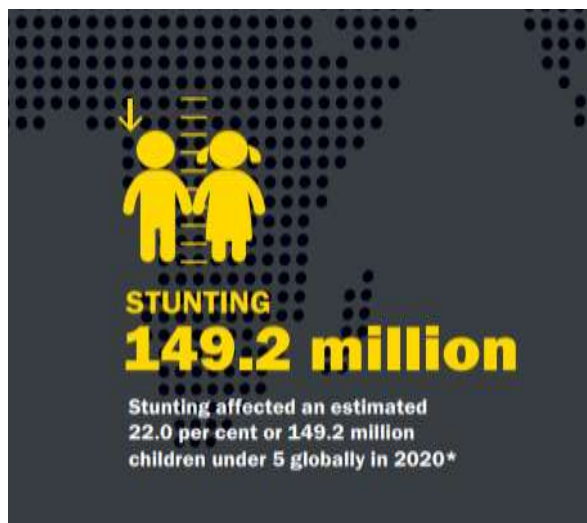


Figure 2: Percentage and number of stunted children under five years old worldwide by 2020 (WHO, 2021).

WHO also called on all parties to enforce more intensive efforts immediately to achieve the global target of reducing the number of children stunted to 104 million by 2025 and 87 million by 2030 (WHO, 2021). In general, stunted is caused by an unbalanced intake of nutrients and insufficient growth. Persistency of inadequate daily intake of nutrients that do not meet the recommended requirements will result in stunting problems, especially in children. Imbalanced food intake can impair cognition and impair and limit a child's cognitive abilities (Bommer et al., 2020). The developing child's brain needs all the essential nutrients to form and maintain its structure, especially in children. Children who do not get adequate nutrition are at high risk for developmental problems and cognitive as well as literacy skills. The first thousand days of life are the most critical period of brain development. The process need and adequate nutrition are essential for optimal growth.

Cognitive development is a sensitive period in which children are most vulnerable to behavioral and cognitive deficits (Roberts et al., 2022). Cognitive development is correlated with literacy skills especially the use of language mostly in reading and writing. Hammill and Mcnut (1981) confirmed that many studies associated cognitive or intellectual abilities and reading skills.

Some studies prove children experience the most dynamic and optimal changes during the age of 5–6 years or when they are in preschool (Brown, 2010; Welsh et al.; 2012). Proper nutritional practices and adequate nutrient intake are essential to improve brain function and enhance learning (Ekholuenetale et al., 2020). Children with inadequate nutrition and psychosocial stimuli are more likely to underperform in school and represent poor levels of cognition, literacy and education, which are associated with low-income incomes later in life. Stunting can also result in recurrent infection in the first thousand days of a child's life. This effect can be seen very significantly in the cognitive, literacy and physical development of children. Some studies show that children with low birth weight are more likely to achieve low school achievement (Abdul & Wan, 2020; Mitra et al., 2014). Children with lower iron levels and blood hemoglobin have significantly lower cognitive performance (Abdul & Wan, 2020; Mitra et al., 2014). This condition will contribute to the tendency to lag in learning normally for those with chronic health problems such as diabetes and asthma (Murray et al., 2021).

Cognitive Development among Preschool Children

Cognitive development forms a complex and multi-faceted set of mental abilities. In children, this process tracks the development of various areas such as reasoning, memory, problem-solving, learning, and knowledge representation. The optimal level of cognitive development depends on classical achievements in thinking, language, and comprehension as seen in children, notably from diverse environments (Nasiopoulou et al., 2021). Cognitive development is also prescribed as a process that involves thinking, behavior, memory, problem-solving, communication abilities, and other mental processes that are so unique to humans that they shape human competence (Archana J.V., 2021). Cognitive development becomes the main focus in preschool because cognitive ability influences all learning activities. Most studies have shown that children's disability problems affect their cognitive development (Id et al., 2020; Roberts et al., 2022; Kok, 2020). Children experience the most dynamic developmental changes while in preschool and acquire essential skills that contribute to school readiness (Roberts et al., 2022). Cognitive development achievement in preschool often predicts achievement later in life (Roberts et al., 2022). Mastery of basic cognitive skills is essential to understanding a concept in all the pillars of the National Preschool Standard Curriculum (KSPK). Cognitive skills allow an individual to think, give opinions, understand, and remember things that happen in their environment. In addition, it also involves mental activities such as memory, categorizing, planning, reasoning, problem-solving, creating, and imagining. The cognitive development of a child emphasizes the construction of a child's thinking and the survival of an individual. Cognitive development is aligned with the knowledge and ability of children to use that knowledge to understand the world around them. Cognitive development focuses on the way children learn and process information, which is the process of developing children's thinking or building knowledge. Cognitive development becomes the main focus in preschool because cognitive ability influences all learning activities. Good improvement can emphasize and foster a positive

attitude towards basic cognitive skills to understand a concept in all the pillars of the National Preschool Standard Curriculum (KSPK).

Literacy Skills among Preschool Children

In general, early literacy skills refer to the knowledge, skills, and performance of preschool children in reading and writing skills before they can read and write according to standards and principles of early literacy skills development. The term early literacy also refers to the behaviors, concepts, and skills of early childhood that are pre-existing and can be developed into literacy that includes future reading, writing, and literary knowledge. Early literacy also means the basic reading and writing skills of children that exist from an early age and continue to develop until children are taught those skills on a standard basis. Preschool children aged 2 to 5 years are at the stage of early communication, language and literacy development which is divided into three phases of development. They are preliteracy, emergence of literacy and early literacy which is the basis to the success of literacy in the future. Literacy play a key role in enabling the kind of early learning in preschool years. Literacy development are linked with academic achievement, reduced grade retention and enhance productivity in adult life. The concept of literacy is not only proficiency in reading and writing, also social skills to build children's language proficiency. Understanding the term of literacy skills can also referring to variety of skills.

Cognitive and Literacy Development According to Theories of Constructivism

Vygotsky Cognitive Development

Theories of cognitive development play an extensive role in helping teachers to interpret the ideas children think and play a role in children's cognitive development. An educator needs to know these developmental theories to guide children's learning to reach an optimal level. There are two main theories regarding the cognitive development of children. There is a Theory of Cognitive Development by Lev Vygotsky. Children's cognitive development emphasizes the formation and construction of children's thinking. It focuses on the changes in a child's thinking development to the next level. Lev Vygotsky's Theory of Cognitive Development (1934-1986) argues that an individual's cognitive development occurs in a sociocultural environment that influences an individual's behavior and thinking. Lev Vygotsky points out that a child's association with other individuals encourages developing thinking. Association and interaction often occur between children with individuals who are more knowledgeable or mature than them. According to Lev Vygotsky, children cannot build their knowledge without the guidance of more competent individuals. Children's knowledge is nurtured through social interactions with individuals in their environment such as parents, siblings, immediate family, or peers. These individuals act to guide, communicate, give instructions and give feedback to the children. Children will then use the information gained during play or when faced with a similar situation. Vygotsky also stated that individual cognitive development occurs in two stages. They are the social level and the specific level. Children's cognitive development is influenced by the social and cultural interactions surrounding them. When children interact with others, the values, and norms embedded in the culture directly transmit to the child and influence their cognitive development. Therefore, to understand this development is to understand the cultural context in which children grow up. Vygotsky considered language is a crucial part of his theory because it has a major role in cognitive development.

In addition, Vygotsky also introduced the Zone of Proximal Development (as shown in figure 1), which is the gap between what a student can do without or with help. Vygotsky often cites the definition of Proximal Developmental Zone (ZPD) as the gap between actual developmental levels determined based on problem-solving ability without assistance and development potential levels determined through problem-solving under adult guidance or collaboration with more capable peers. He believes the role of education is to provide children with experiences according to their ZPD that can encourage and advance their learning. The concept of ZPD has been evolved, modified, and converted to the new thought since the original idea by Vygotsky. The concept of scaffolding is closely related to ZPD. Scaffolding is a process in which a teacher or peer assists their peers who's in the ZPD as needed. When paying attention to the similarities in Piaget and Vygotsky's theories, it is clear that the fact that both see children as active learners engaged in cognitive conflict in which exposure to the surrounding environment allows for changes in their understanding. Vygotsky believe that this development decreases with age. It is concluded that Vygotsky is the developmental psychologists who had presented theories of child cognitive development. Vygotsky emphasizes the social factors and interactions that influence development. Another relevant feature is that Vygotsky pays much attention to cultural properties such as language and culture as a whole that discover the impact on an individual's cognitive development. Lev Vygotsky made many contributions to the field of education through the developmental theory of children's cognitive development.

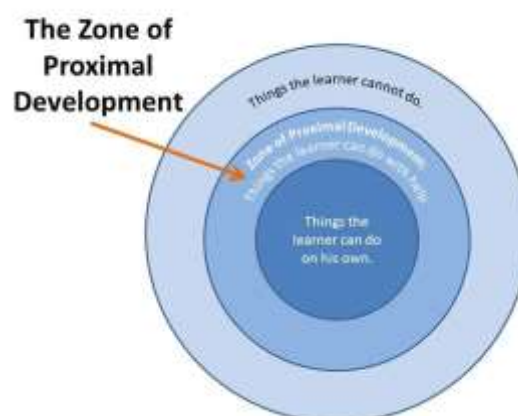


Figure 1: ZPD (Zone of Proximal Development)

Vygotsky Literacy Development

Vygotsky places more and different emphasis on the role of language in cognitive. He believed thought and language are initially separate systems from the beginning of life, merging at around three years of age, producing verbal thought (inner speech). Vygotsky, cognitive development results from an internalization of language. Vygotsky (1971) also contends that idea produces the speech and the produced speech are regulated and adjusted by the culture.

He believed there is a connection between cognitive development and the literacy skills through socio-culture as shown in figure 2.

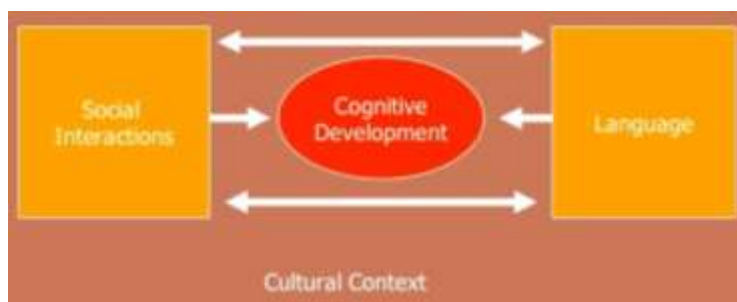


Figure 2: Socio-culture connection between cognitive development and the literacy skills

This notion is remarkable in that how observable behavior is a pillar of Vygotskian perspective toward literacy. Literacy includes speaking, reading, and writing or any activities that use language or the ability to read, write, speak and listen in a way that lets us communicate effectively and make sense of the world. Vygotsky does not refute the influence of innate cognitive factors (memory, brain and mind) in language development. Theories of skilled literacy are concerned within the processes during reading and writing. Theories of literacy development describe how literacy changes as children gain the language and cognitive skills that underpin those processes (Mahmoodi-shahrehabaki, 2019). Vygotsky created a groundbreaking theory and proved that language was the basis of learning (Mahmoodi-shahrehabaki, 2019). His points included the argument that language supports other activities such as reading and writing. In addition, he claimed that logic, reasoning, and reflective thinking were all possible as a result of language.

Conclusion

Stunting children has an enormous impact on children's cognitive and literacy development. Proper and healthy eating habits should be nurtured at an early age as an effort to prevent children from developing stunted adulthood. Stunting not only disrupts the process of children's cognitive and literacy development but also causes various diseases and affects the physical and emotional condition of the children. The importance of cognitive and literacy skills can be measured when they can have a significant impact on a child's future. It also affects the life and future and is often associated with the process of the intellectual development of children. Cognitive and literacy skills involve the progress of improving a child's thinking, knowledge, and intellectuality and the ability to generate common sense in various problem-solving activities, understanding, analyzing, and forming new knowledge and understanding of the experiences he went through.

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