

The Effect of Stunting on Child Growth and Development

Resti Rahmadika Akbar^{1*}, Windy Kartika,² Mutiara Khairunnisa²

¹Bagian Pendidikan Kedokteran, Universitas Baiturrahmah, Padang, Indonesia

²Mahasiswa Fakultas Kedokteran, Universitas Baiturrahmah, Padang, Indonesia

*Email : restirahmadikaakbar@gmail.com

Abstract

Stunting is one of the leading public health problems in lower-middle-income countries, including Indonesia. Stunting is a problem of chronic malnutrition caused by insufficient nutritional intake over a long period due to food that does not meet the dietary needs required. Nutritional issues in young children can have serious consequences; according to the World Health Organization, stunting can cause cognitive or intelligence, motor, and verbal development to develop sub-optimally, increase the risk of obesity and other degenerative diseases, increase health costs, and increase the incidence of morbidity and death. This literature review aims to determine the effect of stunting on children's growth and development and the influencing factors. Search for keywords: Stunting, growth, and development of checking in children, children, cognitive and motor skills. The conclusion from the literature review is that there is a significant relationship between stunting influence on motoric development in children, and the factors that cause stunting do not only come from the child but many external factors that influence such as maternal, economic, environmental, and infectious diseases factors and not only that. Feeding patterns are also one of the factors causing stunting in children.

Keywords— cognitive, motoric, development, growth, stunting

Abstrak

Stunting merupakan salah satu masalah kesehatan masyarakat yang utama di negara-negara berpendapatan menengah kebawah, termasuk Indonesia. Stunting ini merupakan masalah kurang gizi kronis yang disebabkan karena asupan gizi yang kurang dalam waktu yang cukup lama sebagai akibat dari pemberian makanan yang tidak sesuai dengan kebutuhan gizi yang diperlukan. Masalah gizi pada anak kecil dapat menimbulkan akibat serius, menurut World Health Organization, stunting dapat menyebabkan perkembangan kognitif atau kecerdasan, motorik, dan verbal berkembang secara tidak optimal, peningkatan risiko obesitas dan penyakit degeneratif lainnya, peningkatan biaya kesehatan, serta peningkatan kejadian kesakitan dan kematian. *Literature review ini bertujuan untuk mengetahui pengaruh stunting terhadap tumbuh kembang anak dan faktor faktor yang mempengaruhi. Pencarian kata kunci yang digunakan Stunting, Pertumbuhan dan perkembangan stunting pada anak, anak, Kemampuan kognitif dan motoric . Kesimpulan dari literature review adalah terdapat adanya hubungan signifikan bahwa stunting memiliki pengaruh dan perkembangan motorik pada anak dan faktor penyebab stunting tidak hanya berasal dari anak tersebut akan tetapi banyak faktor eksternal yang mempengaruhi seperti faktor ibu, ekonomi, lingkungan, dan penyakit infeksi dan tidak hanya itu pola pemberian makan juga menjadi salah satu faktor penyebab terjadinya stunting pada anak*

Kata kunci — kognitif, motorik, perkembangan, pertumbuhan stunting

I. INTRODUCTION

The process of growth and development of a child takes place from the prenatal period, and the learning process begins after birth. During the growth process, there will be an increase in size, number of cells and intercellular tissue, physical size, and body structure will partially or completely increase. So, this growth can be measured in units of length and weight, which are assessed through anthropometric examination, namely body weight and Height (BB, TB). On the other hand, child development is an increase in more complex body structures and functions such as gross motor skills, fine motor skills, speech and language, socialization, and independence in children. This process can be obtained optimally during the golden period, the so-called Golden Period. This crucial phase lasts for the first 1000 days or from pregnancy until the child is two years old and only occurs once in a child's life. One indicator of the quality of human resources is the optimal growth and development of children, which reflects the nutritional and health status of the population of an area. Stunting is one of the most common growth and development problems.^{1,2}

According to the World Health Organization (WHO), the prevalence of stunting in Indonesia is more than 20% of the Indonesian population and is a severe public health problem. The causes of stunting are multifactorial and related to insufficient nutritional intake or increased nutritional needs. Stunting has irreversible short-term and long-term impacts. Stunting is defined as the failure of linear growth in children, caused by poor nutrition over a long period where a child is too short for his age due to this growth failure. Stunting is a big problem in the world, especially in poor and developing countries, including Indonesia. Stunting and malnutrition are the leading causes of child death across the globe. About

one-third of all deaths that occur each year are caused by malnutrition.^{3,4}

The World Health Organization says that stunting can cause cognitive or intelligence, motor, and verbal development that is not optimal, increase the risk of obesity and other degenerative diseases, improve health costs, and increase the incidence of morbidity and death due to nutritional problems, causing severe consequences. Ultimately, stunting can hinder economic growth, increase poverty, and widen inequality in a country because children have less than optimal levels of intelligence. Students' cognitive development influences their success in school, which includes thinking skills such as remembering, problem-solving, learning, and rationality.⁵

II. LITERATURE REVIEW

A. DEFINITION

Stunting is a condition that causes children to experience growth disorders so that they have a length or Height that is inappropriate for their age. Therefore, children's growth and development are hampered due to chronic nutritional problems such as lack of nutritional intake, especially during the First 1000 Days of Life (HPK). Nutritional deficiencies can occur when the baby is in the womb and the early period after birth but only appear after the child is two years old (Ministry of Health of the Republic of Indonesia, 2020). Nutrition has a vital role in the growth and development of children. During early life, poor nutritional status can have significant and long-term consequences. Malnutrition causes inhibition of children's linear growth, which has an impact on children's development at the same time.^{6,7}

According to the World Health Organization, stunting occurs when the Z-score value for Height for age (TB/U) based on growth standards reaches less than -2 standard

deviations (SD). Stunting is considered a failure of linear growth in children caused by poor nutrition that persists for an extended period.⁸

Stunting can cause a decline in cognitive, productivity, and work performance, and children become vulnerable due to an increased risk of health problems in children. Apart from that, stunting can also cause poverty, increase morbidity and mortality, increase the risk of having low birth weight (LBW) babies, increase the risk of infectious and non-communicable diseases, and reduce economic income. Symptoms of Stunting are visible after the baby is two years old and has below-average or short-height characteristics.⁹

Measuring Stunting Status Using PB/U or TB/U Anthropometry

Body length/age (PB/U) or height/age (TB/U) measurements measure stunting status. Anthropometry measures various body dimensions and body composition of multiple ages and nutritional levels. Body weight, Height, upper arm circumference, and thickness of fat under the skin are some body measurements. Height is an anthropometry that describes the condition of skeletal growth. Average Height usually increases with age. The effect of nutritional deficiencies on Height will not be immediately visible for a relatively long time. The most frequently used anthropometric indices are BB/U, TB/U, and BB/TB. The TB/U index is the leading choice for monitoring nutritional status over a long period (2 years or more). This index is sensitive enough to measure long-term changes in nutritional status. Apart from providing an overview of nutritional status in the past, the TB/U index is also more closely related to socio-economics. Each anthropometric index used to assess the health situation in Indonesia has a reference standard. The reference standard used in Indonesia is the WHO reference standard.

WHO standards classify nutritional status using z-score or z (median value), where one number is TB against the standard deviation according to age and gender.¹⁰

TABLE 1. CATEGORIES AND THRESHOLDS FOR NUTRITIONAL STATUS BASED ON ANTHROPOMETRIC INDEX

Index	Nutritional status category	Threshold (Z-Score)
Weight According to Age (WW/U) Children Aged 0-6 Months	malnutrition	<-3 SD
	underweight	-3 SD until <-2 SD
	well nourished	-2 SD until 2 SD
Body Length According to Age (PB/U) or Height According to Age (TB/U) Child 0-60 Months	Overweight	>2 SD
	Very short	<-3 Sd
	Short	-3 SD until <-2 SD
Body Weight According to Body Length (BB/PB) or Body Weight According to Height (WW/TB) Children Aged 0-60 Months	Normal	-2 SD until 2 SD
	tall	>2 SD
	Very Thin	<-3 SD
Body Mass Index According to age (BMI/U) Children aged 0-60 months	Thin	-3 SD until <-2 SD
	Normal	-2 SD until 2 SD
	Overweight	>2 SD
	obesity	>2 SD
Body Mass Index According to Age (BMI/U) for Children Aged 5-18 Years	very thin	<-3 SD
	thin	-3 SD until <-2 SD
	Normal	-2 SD until 2 SD
	overweight	>1 SD until 2 SD
	obesity	>2 SD

Source: Guidebook for Monitoring Nutritional Status

B. IMPACT

The problem of stunting, especially in the 1000 HPK period, significantly affects the quality of human resources—stunting results in suboptimal growth and development of a child's body organs. Toddlers with stunting contribute to 1.5 million (15%) child deaths in the world.¹¹

TABLE 2. INFLUENCE AND IMPACT ON STUNTING

Effect of Stunting	Description
Stunted Physical Growth	Stunting is associated with shorter Height in children. Children who experience stunting usually have delays in their physical growth.
Delay in motor development	Stunted children may need help developing motor skills like walking, picking up objects, or other physical skills.
Delay in cognitive development	Stunting can also affect cognitive development, including delays in learning, thinking, and language abilities.
Susceptible to disease and infection	Stunted children tend to be more susceptible to infections and other diseases because their immune system is weak.
Long-term impact on health and productivity	The impact of stunting in the long term results in decreased intellectual capacity or intelligence and disruption of the structure and function of nerves and brain cells, which have a permanent or irreversible nature, which will affect the decline in the ability to absorb lessons as an adult.
Short term impact	The impact of stunting in the short term results in children failing to grow, developmental obstacles in cognitive and motor skills, suboptimal physical body size, and metabolic disorders in children.

C. RISK FACTORS

1. CHILD FACTORS

History of LBW

Most babies born weighing < 2500 grams or LBW are unable to follow normal development according to the child's age. Other research suggests that LBW babies pose a risk to the baby's health as an adult. LBW has an impact on hampering physical development and mental development and lowering the child's immune system so that they are easily exposed to infections.¹²

The baby's weight at birth affects the child's subsequent growth. Children with a history of LBW are at risk of experiencing growth and development disorders during childhood, and the mother's condition during pregnancy and childbirth affects the child's health. LBW babies indicate health problems in the mother during pregnancy. LBW babies have a weak immune system and are susceptible to infections, which can cause nutritional issues later in life.¹²

2. MATERNAL FACTORS

a) Mother's Education

Maternal education has a role in supporting children's growth and development. Maternal education can be related to knowledge and understanding of something, including expertise about providing nutrition, hygiene, or health care to children so that maternal education can influence the occurrence of stunting cases in children. Maternal education has a significant impact on children's nutritional status. Mothers with higher education have more knowledge about health and how to use this health information, and mothers will apply this new information about nutrition and health.¹²

b) Mother's occupation

Several studies explain that most women have multiple roles as mothers, wives, children, and working women. This can

affect the way a mother cares for her child. Apart from that, the intensity of meetings between mother and child is also limited. Children with working mothers have a higher risk of stunting than mothers who do not work. This research is supported by which explains that working mothers have little time to meet and care for their children.^{8,9,12}

Some studies shows that there is an influence on the occurrence of stunting on mothers who are educated and mothers who do not work. This means that education and employment are indirect factors in the event of stunting; maternal education has a definite and significant influence on the nutritional status of children. This is in line with research. Working mothers do not have time to care for toddlers, so they have a double workload, which tends to neglect the nutrition and health of their children. Work also determines caring for and meeting the nutritional needs of toddlers. This critical factor must be addressed to prevent or correct malnutrition in children.^{13,14}

c) Mother's Height

Stunting in children is also influenced by the mother's Height. Mothers with short stature are at risk of giving birth to children with stunting because the physical condition of the mother can inherit genetic structures that can lead to short traits so that children born have the opportunity to inherit short genes from the mother. Apart from that, mothers with fast stature experience limited uterine blood flow so that the growth of the uterus, placenta, and fetus is hampered.¹³ Children born to short mothers are 3.7 times more likely to experience stunting, this is because someone with short stature tends to experience anatomical and metabolic system disorders so that effect on fetal health.^{15,16}

3. ENVIRONMENTAL FACTORS

Residential Environment

This research explains that the location of residence impacts children's health. A dirty environment and being in a dirty place is at risk of increasing cases of infection or other diseases in children, thereby disrupting their growth and development. Children who live in environments with poor sanitation, dirty home environments, and unhealthy latrines are more at risk of experiencing stunting because they have the potential to experience infectious diseases such as diarrhea, which will disrupt the absorption of nutrients in the digestive process.^{5,14,17,18}

4. FEEDING PATTERNS

a) Exclusive breastfeeding

Exclusive breastfeeding is breastfeeding after birth until the baby is six months old without giving other food or drink because breast milk contains various kinds of nutrients that help babies grow and develop optimally. Some of the reasons why babies do not receive exclusive breastfeeding are breast swelling/abscess, anxiety, lack of self-confidence, inexperienced mothers, lack of support from the family, lack of knowledge, attitudes, and skills, socio-cultural factors, and health workers, low education prenatal lactation and hospital policies that do not support lactation or exclusive breastfeeding.⁷

To increase a child's immune system and reduce the risk of contamination from food/drinks other than breast milk, WHO recommends exclusive breastfeeding for the first six months and continued breastfeeding until the child is two years old. Breast milk also contains macro and micronutrients, immune components, and free amino acids (Free Amino Acids) needed to support babies' growth and development.^{19,20}

Other research states that exclusive breastfeeding will increase the baby's immune system. Giving colostrum early in a

baby's life can provide immunity to the baby's body, thereby reducing the risk of infection. Children who do not receive exclusive breastfeeding are 6.6 times more at risk of experiencing stunting because a low immune system impacts the body's susceptibility to various kinds of infections.^{4,8,21}

b) Providing Early MP-ASI

Complementary breast milk food (MP-ASI) is given to babies aged more than six months because, at that age, the baby's body needs other nutrients besides breast milk to support optimal growth and development. Giving MP-ASI before six months of age will hurt the child because the baby's digestive organs are not ready to accept food other than breast milk. As a result, the baby's stomach and intestines will suffer injury. Further research explains that giving complementary foods before the age of 6 months causes malnutrition problems in children because the nutritional content of the food provided is inadequate. The micronutrient and protein content cannot meet children's physiological needs.¹⁶

c) Feeding Children

Food is a source of nutrition for the body. The recommended food is healthy and balanced according to the child's needs. Apart from the quality of food, quantity in feeding is also essential in supporting children's growth and development and providing infrequent feeding frequency. Improper feeding methods for children also affect children's nutritional intake. Ways of feeding that are too restrictive will traumatize the child and will not want to eat. Conversely, if the mother is too indulgent in feeding, the child will tend to refuse. So, parents need to understand food needs and how to feed children to prevent the risk of malnutrition.^{2,15,21,22}

5. ECONOMY, ENVIRONMENT, AND INFECTIOUS DISEASES

Stunting is also associated with socio-economic factors and the cleanliness and sanitation of the living environment. The ability to obtain adequate health services and meet pregnant women's and toddlers' nutritional needs is closely related to a person's economic status. However, environmental sanitation and food safety can increase the risk of infectious diseases like diarrhea and worms are contagious diseases caused by poor sanitation and environmental hygiene, which can interfere with the absorption of nutrients in the digestive process. Babies will experience weight loss due to several infectious diseases they share. Stunting can occur in children if this condition continues for a long time and is not accompanied by adequate intake to speed up the healing of infections.^{1,16,19,22}

A house is said to be suitable for sanitation, according to Susenas, if the sanitation facilities used meet health requirements, such as a gooseneck toilet or plengsengan with a lid, and have a place for final disposal of a septic tank or Waste Water Disposal System (SPAL), and is a defecation facility that can be used individually or collectively.^{14,20}

III. CONCLUSION

Based on the results of the literature review that has been carried out, it turns out that the factors that cause stunting do not only come from the child, but many external factors influence them, such as maternal factors, the economy, the environment and infectious diseases, and not only that, feeding patterns are also one of the factors that cause stunting, in children. Nutrition has a vital role in the growth and development of children. Poor nutritional status during early life can have significant and long-term consequences. Malnutrition causes inhibition of children's linear growth, which then

simultaneously has an impact on their development.

Stunting is still a health problem for toddlers that requires the best treatment, so health workers can make promotive and preventive efforts related to the factors that cause stunting so that stunting in children can be prevented as early as possible. To prevent stunting, parents must meet their child's nutritional needs, provide exclusive breastfeeding for six months, carry out early detection through consultation, and regularly measure their child's weight and Height to prevent stunting. To form healthy children and become a high-quality next generation. Apart from that, cooperation from various sectors is needed to create healthy children and become a quality next generation.

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