

REVIEW ARTICLE

Stunting

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ABSTRACT

Background: Stunting, or failure to thrive, is a chronic nutritional condition resulting from prolonged inadequate nutrient intake. In the short term, stunting can increase morbidity; in the long term, it manifests as delayed bone growth and low body weight. Children with stunting are significantly shorter than their peers. **Objective:** This study aims to identify the multifaceted risk factors contributing to stunting. **Discussion:** Stunting is influenced by a complex interplay of environmental and genetic factors. Key environmental determinants include maternal nutritional status, child feeding patterns, and environmental sanitation. While hereditary factors and hormonal imbalances play a role, malnutrition remains a primary preventable cause of short stature in children. **Conclusion:** Understanding both environmental and genetic factors is crucial for the effective prevention of stunting and the improvement of children's nutritional health.

Keywords: Stunting, Risk Factors, Prevention

INTRODUCTION

Stunting, characterized by a short stature, is defined as a condition where a child's height is significantly below the standard for their age, specifically falling below -2 Standard Deviations (SD) from the median. This condition is a form of chronic malnutrition that develops gradually, often requiring extensive time for a child to recover to their age-appropriate height. The primary causes of stunting include recurrent infections during the first 1,000 days of life and inadequate nutritional intake.

Nutritional issues are health disturbances arising from an imbalance in nutrient fulfillment, whether through deficiency or excess, both of which negatively impact health. Protein is a key factor in the development of stunting among toddlers. Furthermore, factors such as age, birth

length, and the adequacy of macronutrient intake (protein and carbohydrates) as well as micronutrients (calcium, vitamin A, iron, and zinc) significantly influence stunting risks. Maternal knowledge, exclusive breastfeeding, and proper sanitation are also critical factors in stunting prevention.

Children suffering from stunting experience delayed physical growth and suboptimal brain development. This results in impaired mental and learning abilities, often leading to poor academic performance compared to their peers. In the long term, stunting increases the risk of hypertension, diabetes, and even mortality due to infection. The adverse impacts of stunting are twofold: in the short term, it disrupts brain development, intelligence, physical growth, and metabolic functions; in the long term, it leads to decreased cognitive capacity, weakened

immunity, and a higher risk of non-communicable diseases, including obesity, cardiovascular diseases, cancer, stroke, and old-age disability. Infectious diseases such as diarrhea and parasitic infections further exacerbate the condition by interfering with nutrient absorption and growth.

LITERATURE REVIEW

A. Definition

Growth and development are fundamental aspects of pediatric health. Short stature, or stunting, is a growth disorder primarily caused by nutritional deficiencies. Parents play a pivotal role in determining a child's nutritional status; therefore, it is essential for caregivers to understand the implications of short stature. Stunting is assessed by measuring length-for-age or height-for-age using standardized instruments such as stadiometers or infant growth boards.

B. Risk Factors

Stunting in toddlers is not solely a result of maternal malnutrition during pregnancy but is also influenced by various multifaceted factors. Consequently, the most effective interventions to reduce stunting prevalence must be implemented during the First 1,000 Days of Life (HPK). Several primary causes include:

1. Inadequate Protection and Knowledge: Specifically regarding maternal health and nutrition literacy during pregnancy, as well as adherence to healthy dietary recommendations. Data indicates that 60% of infants aged 0 to 6 months do not receive exclusive breastfeeding. Furthermore, two out of three infants aged 0 to 24 months have not received appropriate Complementary Foods (MP-ASI) starting at six months. MP-ASI is vital for introducing new foods, fulfilling nutritional gaps that breast milk alone cannot meet, and

strengthening the infant's immune system.

2. Healthcare and Sanitation Limitations: These include a lack of early health education, suboptimal Antenatal Care (ANC), and Postnatal Care. Access to immunization remains insufficient, and over one-third of pregnant women with children aged 3–6 years have not enrolled their children in Early Childhood Education (PAUD). Household food insecurity and poor environmental hygiene further exacerbate the condition.

A study by Aridiyah revealed that 96.7% of mothers with stunted toddlers had low educational backgrounds. Proper home sanitation significantly influences the prevalence of diarrhea in toddlers. Inadequate sanitation—such as a lack of clean water for handwashing and food preparation—increases the risk of diarrhea linked to pathogens that are not effectively eliminated.

Chronic Energy Deficiency (CED) in women of childbearing age is another critical factor. According to Riskesdas, pregnant women face a CED risk of 24.2%, while non-pregnant women face a risk of 20.8%. Dietary diversity (macro and micronutrients) prior to the onset of stunting is crucial. Unlike acute conditions like diarrhea, stunting is a chronic malnutrition issue resulting from long-term deficiencies.

Other factors, including genetics, fetal nutritional status, infections, and epigenetic influences, also contribute to stunting. Infants born shorter than normal are prone to delayed growth and a higher susceptibility to non-communicable diseases in adulthood. This condition can persist across generations as children may inherit a short stature from their mothers.

C. Pathophysiology

The process of human growth and development is a highly complex phenomenon. Growth is governed by the interplay of genetic and

environmental influences, where specific factors may become dominant at certain stages. While the genetic blueprint determines the potential for adult size and shape at conception, environmental factors can modify this outcome. The extent to which the environment impacts genetic potential depends on the timing, intensity, duration, frequency, as well as the age and gender of the child.

The endocrine system plays a central role, specifically the pituitary gland located at the hypothalamus. The hypothalamus sends regulatory hormones to the pituitary gland via the infundibulum. The anterior and posterior lobes of the pituitary gland secrete essential hormones, including Growth Hormone (GH), Thyroid-Stimulating Hormone (TSH), prolactin, gonadotropins (Luteinizing and follicle-stimulating hormones), and Adrenocorticotropic Hormone (ACTH).

Normal growth results from a complex synergy between the endocrine and nervous systems. Hormones rarely act in isolation. For instance, the liver produces IGF-1 (Insulin-like Growth Factor-1), which works alongside GH to affect skeletal muscle fibers and cartilage cells in long bones. This process supports amino acid absorption for protein synthesis and promotes linear growth in infants and children. Additionally, gonadal hormones such as testosterone and estrogen influence growth rates during adolescence.

D. Classification

Nutritional status assessment in children frequently utilizes anthropometric evaluation. Anthropometry is a method used to measure body dimensions and body mass across various age groups and nutritional levels. The assessment of stunting through anthropometry involves comparing height-for-age or length-for-age according to the child's gender and age standards.

E. Prognosis

The prognosis of stunting is significantly improved if detected early, allowing for prompt and appropriate nutritional intervention. In pediatric cases, complications from secondary infections can be fatal. If therapeutic intervention occurs before the age of two, there is a possibility of "catch-up growth" or improved linear growth. However, certain systemic effects of stunting, such as impaired cognitive function and weakened immune systems, may be irreversible.

In the short term, stunting manifests as severe malnutrition, which heightens the risk of infectious diseases. These infections can lead to decreased appetite, intestinal malabsorption, increased catabolism, and a diminished immune response. Long-term consequences include suboptimal adult stature, increased risk of metabolic disorders and obesity, reduced reproductive health, impaired pre-school learning abilities, low productivity, and below-average work capacity.

F. Management

The Government of Indonesia has implemented the National Movement for the Acceleration of Nutrition Improvement, as mandated by Presidential Regulation (Perpres) No. 42 of 2013. Based on the 2020-2021 stunting management special reports from the Central Bureau of Statistics (BPS), key strategies include:

1. Iron Supplementation: Pregnant women are advised to consume at least 90 Iron-Folic Acid (IFA) tablets throughout their pregnancy.
2. Supplementary Feeding (PMT): Providing supplementary food to pregnant women to meet nutritional requirements starting from the prenatal period.
3. Skilled Birth Attendance: Ensuring deliveries are assisted by experienced physicians or midwives.

4. Early Initiation of Breastfeeding (IMD): Implementing IMD programs for newborns.
5. Exclusive Breastfeeding: Promoting exclusive breastfeeding for the first six months to provide essential micro and macronutrients.
6. Complementary Feeding (MP-ASI): Implementing healthy MP-ASI programs alongside breastfeeding for toddlers (aged 6 to 24 months) with age-appropriate supplementary foods.
7. Environmental Sanitation: Maintaining hygiene and environmental cleanliness.
8. Targeted Nutritional Support: Providing appropriate supplementary nutrition for children.

Required Actions: Integrated efforts from the government, health organizations, and the community are essential to reduce the prevalence of stunting. Nutritional education, food assistance programs, and supportive health policies are crucial to prevent and overcome stunting effectively.

Improving parenting practices—specifically Early Initiation of Breastfeeding, exclusive breastfeeding for 6 months, and continued breastfeeding with complementary foods up to 2 years—is vital in preventing childhood stunting. Additionally, routine pediatric care through vaccinations and monthly growth monitoring at integrated healthcare centers (Posyandu) is essential for the early detection of health issues (Saputri, 2019).

CONCLUSION

Stunting is a condition caused by chronic malnutrition, resulting in a significant deficit in height-for-age compared to standard growth curves. It is a multifactorial issue that extends beyond nutritional deficiencies in pregnant women and toddlers. Effective prevention strategies from an early age include fulfilling maternal nutritional needs during pregnancy, consistent consumption of iron supplements, comprehensive nutritional education, and increased public awareness.

Long-term Impacts: Children affected by stunting tend to experience delayed physical growth, lower intelligence levels, and a heightened risk of chronic diseases in adulthood. These consequences further impact long-term economic productivity and social development.

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