

The Relationship between Dietary Diversity and the Risk of Stunting in Young Children in Indonesia

Nurbaiti*¹, Shinta Iis Safitri², Yuni Sari³

^{1,2,3}Department of Midwifery, Politeknik Kesehatan Aceh, Kementerian Kesehatan, Aceh, 23231, Indonesia

ABSTRACT:

Introduction: Stunting, a form of chronic malnutrition, remains a significant public health issue in Indonesia, with high prevalence rates among young children. Dietary diversity has been identified as a crucial factor influencing the nutritional status and risk of stunting in this population. This study aimed to investigate the relationship between dietary diversity and the risk of stunting in young children in Indonesia.

Materials & Methods: Literature searches were conducted on electronic databases such as PubMed, Embase, and the Cochrane Library. Articles that meet the inclusion criteria will be analyzed narratively.

Results: The findings demonstrate a significant inverse relationship between dietary diversity and the risk of stunting. Children with higher dietary diversity were found to have a lower likelihood of being stunted compared to those with lower dietary diversity. The results also suggest that dietary diversity can serve as a proxy indicator for nutrient adequacy in this context.

Conclusions: Promoting increased dietary diversity among young children and their mothers emerges as a key strategy to address the high prevalence of stunting in Indonesia. Interventions focusing on improving access to and consumption of a diverse range of nutritious foods, such as nutrition education, food production diversification, and food distribution programs, are recommended to contribute to the reduction of stunting in the country.

KEYWORDS: Dietary Diversity, Stunting, Young Children, Indonesia

INTRODUCTION

According to data from UNICEF, WHO, and the World Bank, in 2020 there were 149 million children under five (21.9%) who experienced stunting globally, with the highest prevalence in Africa (33.1%) and Asia (21.8%). Some countries with the highest stunting rates are South Africa (27.4%), India (34.7%), and Indonesia (27.7%). The main factors causing stunting are inadequate nutrient intake, recurrent infections, and lack of access to quality health services, so various interventions have been implemented to reduce stunting rates, such as increasing access to nutritious foods, good sanitation, clean water, and maternal and child health services(1–4). According to the 2018 Riskesdas data, the prevalence of stunting in Indonesia reached 27.7%, with the highest prevalence in East Nusa Tenggara Province (42.6%), Papua (38.5%), and West Sulawesi (36.4%), while the lowest prevalence was in DKI Jakarta Province (17.7%), Bali (19.1%), and Riau Islands (21.6%). Meanwhile, in Aceh Province, the prevalence of stunting was recorded to be higher than the national figure, which was 29.5%, with the highest districts being Aceh Tenggara (40.1%), Gayo Lues (37.2%), and South Aceh (36.6%), and the lowest being the City of Lhokseumawe (23.3%), the City of Sabang (24.0%), and the City of Banda Aceh (24.1%). Factors contributing to the high stunting in Indonesia and Aceh include poverty, food security, access to clean water and sanitation, and the quality of maternal and child health services. The incidence of stunting reflects the existence of chronic nutritional problems influenced by the condition of the mother/prospective mother, the fetal period, and the infant or toddler period, including diseases suffered during the toddler period and other problems that indirectly affect health(5–9).

Several studies in various regions have also shown the still high prevalence of stunting. The study by Novita (2018) in Klaten Regency found a prevalence of 21.07%. In 2018, the study by Mira showed a stunting prevalence of 37.5% at the Bojongmanik Health Center in Lebak Regency. From these studies, several factors related to the incidence of stunting were found, including dietary diversity and feeding patterns in toddlers(6,10). Stunting is a problem of malnutrition caused by inadequate nutrient intake over a long period due to the provision of food that does not meet nutritional needs(11–13). The causes of stunting consist of direct and indirect causes. Direct causes are nutritional and health problems, while indirect causes are food availability, parenting, access to clean water and sanitation, and health services. One of the indirect causes of stunting is dietary diversity. The more diverse and

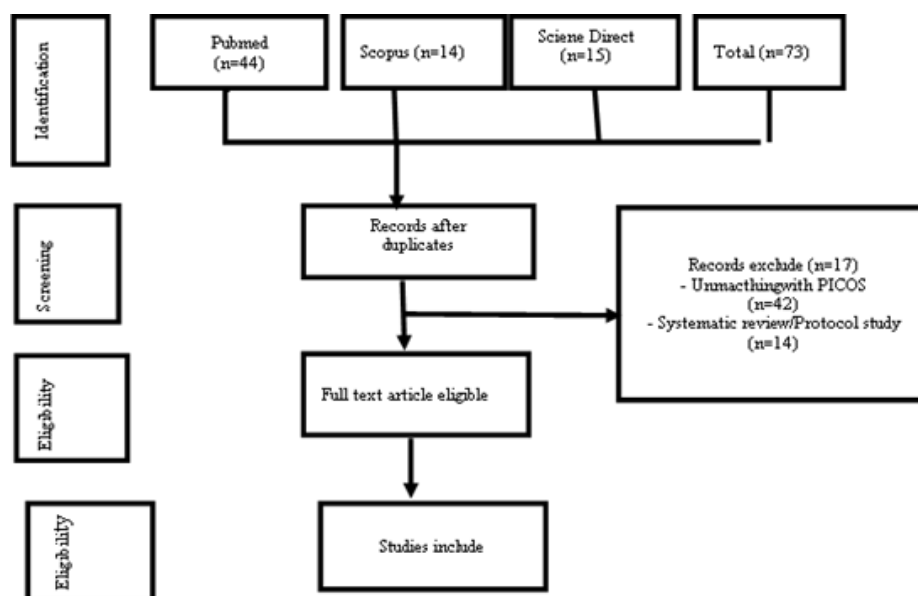
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balanced the composition of the food consumed, the better the nutritional quality. Therefore, the purpose of this study is to conduct a literature review on the relationship between dietary diversity as measured by the Individual Dietary Diversity Score (IDDS) and the risk of stunting in children under five in Indonesia.

METHODS

The research method used in this study is a Systematic Literature Review. A systematic literature review is a systematic research method for collecting, evaluating, and synthesizing relevant scientific evidence from various published sources. This method consists of two main points, namely eligibility criteria and search strategy (Bedaso et al., 2022). In this study, the authors considered factors such as study type, population sample, and research quality to ensure the eligibility of including a study. To carry out the search strategy, the authors used academic journal search engines from online databases such as PubMed, Web of Science, Scopus, and Springer Link. The search was conducted using relevant keywords such as "dietary diversity, Individual Dietary Diversity Score (IDDS), stunting in children under five, Indonesia, malnutrition, nutrition, child health, and feeding practices," as well as other related keyword variations. This search was limited to studies published within the last 10 years to obtain the most current understanding of the researched topic. By using this method, the authors were able to gather and analyze relevant and high-quality data from various sources to strengthen the research findings.

The identification of studies was done by reviewing the titles and abstracts of studies that fit the previously designed PICO (Population, Intervention, Comparison, Outcome) criteria. Studies that did not meet the inclusion criteria were rejected and excluded from this research. Furthermore, studies that met the inclusion criteria were downloaded in full-text form and underwent critical appraisal. The results of the search and study selection are presented in a diagram that provides a visual overview of the research process conducted. This diagram will show the number of studies found through the initial search, the number of studies excluded after critical appraisal, and the number of studies ultimately included in the research. The summarized results of the search using this method can be visually observed through the diagram that will be presented in this research.



RESULTS AND DISCUSSION

Stunting, or the condition where a child's height is low for their age, is one of the chronic nutritional problems that remain a major challenge for public health in Indonesia. The prevalence of stunting in Indonesia is still quite high, reaching 30.8% in 2018. Stunting can have a negative impact on a child's physical and cognitive development, so it is crucial to identify the factors that influence it, one of which is dietary diversity.

Author, Year	Title	Objective	Methodology	Findings
Paramashanti et al., 2017(14)	Individual Dietary Diversity is Associated with Stunted Children Aged 6-23 Months in Nanggulan, Indonesia	To examine the association between individual dietary diversity and stunting in children	Cross-sectional study, 180 children aged 6-23 months, dietary diversity assessed using	Individual dietary diversity was significantly associated with stunting in children aged 6-23 months. Children with low dietary diversity had higher risk of stunting.

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		aged 6-23 months	Individual Dietary Diversity Score (IDDS)	
Rathnayake et al., 2016(15)	Use of Dietary Diversity Score as a Proxy Indicator of Nutrient Adequacy of Rural Elderly People in Sri Lanka	To assess the use of dietary diversity score as a proxy indicator of nutrient adequacy in rural elderly people	Cross-sectional study, 216 elderly people, dietary diversity assessed using Dietary Diversity Score (DDS)	Dietary diversity score was a valid proxy indicator of nutrient adequacy in rural elderly people in Sri Lanka.
Rah et al., 2010(15)	Low Dietary Diversity is a Predictor of Child Stunting in Rural Bangladesh	To examine the relationship between dietary diversity and child stunting	Cross-sectional study, 1,718 children under 5 years, dietary diversity assessed using Household Dietary Diversity Score (HDDS)	Low dietary diversity was a significant predictor of child stunting in rural Bangladesh.
Saaka, 2014(16)	Relationship between Maternal Nutrient Intake and Low Birth Weight in Northern Ghana	To assess the relationship between maternal nutrient intake and low birth weight	Cross-sectional study, 517 pregnant women, dietary intake assessed using 24-hour recall	Maternal nutrient intake, including dietary diversity, was associated with low birth weight in northern Ghana.
Dewey & Adu-Afarwuah, 2008(17)	Systematic Review of the Efficacy and Effectiveness of Complementary Feeding Interventions in Developing Countries	To review the evidence on the efficacy and effectiveness of complementary feeding interventions in developing countries	Systematic review of 17 studies	Dietary diversity interventions can improve child nutritional status, including reducing stunting.
Arimond & Ruel, 2004(18)	Dietary Diversity is Associated with Child Nutritional Status: Evidence from 11 Demographic and Health Surveys	To examine the relationship between dietary diversity and child nutritional status	Cross-sectional analysis of 11 Demographic and Health Surveys	Dietary diversity was positively associated with child height-for-age Z-scores, a measure of stunting.
Moursi et al., 2008(19)	Dietary Diversity is a Good Predictor of the Micronutrient Density of the Diet of 6- to 23-Month-Old Children in Madagascar	To assess the ability of dietary diversity to predict the micronutrient density of the diet of young children	Cross-sectional study, 218 children 6-23 months, dietary diversity assessed using Dietary Diversity Score (DDS)	Dietary diversity was a good predictor of the micronutrient density of the diet in young children in Madagascar.
Sié et al., 2018(20)	Dietary Diversity and Nutrient Intake among Children in Rural Burkina Faso	To assess dietary diversity and nutrient intake among children in rural Burkina Faso	Cross-sectional study, 576 children 6-59 months, dietary diversity assessed using Minimum Dietary Diversity (MDD)	Dietary diversity was low among children in rural Burkina Faso, which was associated with inadequate nutrient intake.

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Sununtnasuk & Fiedler, 2017(21)	Can Household-Based Food Consumption Surveys be Used to Make Inferences about Nutrient Intakes and Inadequacies? A Bangladesh Case Study	To assess the validity of using household-based food consumption surveys to estimate nutrient intakes and inadequacies	Secondary analysis of household consumption survey data from Bangladesh	Household-based food consumption surveys can be used to make valid inferences about nutrient intakes and inadequacies, including the association with dietary diversity.
Nguyen et al., 2013(22)	Maternal and Child Dietary Diversity are Associated in Bangladesh, Vietnam, and Ethiopia	To assess the association between maternal and child dietary diversity	Cross-sectional study, 5,463 mother-child pairs from Bangladesh, Vietnam, and Ethiopia, dietary diversity assessed using Minimum Dietary Diversity (MDD)	Maternal and child dietary diversity were positively associated in all three countries, suggesting the importance of improving maternal nutrition for child nutrition.
mugsi et al., 2015(23)	Dietary Diversity Predicts Nutritional Status of Children in Ghana	To examine the association between dietary diversity and nutritional status of children under 5 years	Cross-sectional study, 1,457 children under 5, dietary diversity assessed using Minimum Dietary Diversity (MDD)	Higher dietary diversity was associated with lower odds of stunting, wasting, and underweight in children.
Steyn et al., 2006(24)	Food Variety and Dietary Diversity as Indicators of the Dietary Adequacy and Health Status of Young Children	To assess the relationship between food variety, dietary diversity, and nutritional status of young children	Cross-sectional study, 1,770 children under 6 years, dietary diversity assessed using Dietary Diversity Score (DDS)	Dietary diversity was a good indicator of dietary adequacy and health status in young children.
Bezner Kerr et al., 2018(25)	Breastfeeding and Dietary Diversity Predict the Nutritional Status of Young Children in Rural Malawi	To examine the relationship between breastfeeding, dietary diversity, and nutritional status of children under 2 years	Longitudinal study, 810 children under 2 years, dietary diversity assessed using Minimum Dietary Diversity (MDD)	Breastfeeding and higher dietary diversity were associated with better nutritional status, including reduced stunting, in young children.

Several cross-sectional studies have found a significant relationship between dietary diversity and the nutritional status of children. Paramashanti et al. (2017) showed that children aged 6-23 months with low dietary diversity had a higher risk of stunting in Indonesia(14). Rah et al. (2010) also found that low dietary diversity was a significant predictor of stunting in children in rural Bangladesh(15). Additionally, Saaka (2014) identified that maternal nutrient intake, including dietary diversity, was associated with low birth weight in northern Ghana. Longitudinal studies also support these findings(16). Bezner Kerr et al. (2018) found that breastfeeding and higher dietary diversity were associated with better nutritional status, including a reduction in stunting, in children under 2 years in Malaw(17)i. Some studies have shown that dietary diversity can be used as a proxy indicator of nutrient adequacy. Rathnayake et al. (2016) found that the dietary diversity score was a valid proxy indicator of nutrient adequacy in the elderly in rural Sri Lanka. Moursi et al. (2008) also demonstrated that dietary diversity was a good predictor of micronutrient density in the diet of children aged 6-23 months in Madagascar. Sununtnasuk & Fiedler (2017) confirmed that household-based food consumption surveys can be used to draw valid conclusions about nutrient intake and deficiencies, including their relationship with dietary diversity(21). Some studies have also examined the relationship between maternal and child dietary diversity. Nguyen et al. (2013) found that maternal and child dietary diversity were interrelated in Bangladesh, Vietnam, and Ethiopia, suggesting the importance

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of improving maternal nutrition to support child nutrition. The evidence summarized indicates that dietary diversity is an important factor associated with the nutritional status of children in developing countries. Interventions that improve children's dietary diversity can contribute to the improvement of nutritional status, including the reduction of stunting. Additionally, dietary diversity can also be used as a valid proxy indicator to assess nutrient adequacy. Understanding the relationship between maternal and child dietary diversity is also important for designing effective interventions to improve children's nutritional status.

CONCLUSION

Dietary diversity has been shown to have a significant relationship with children's nutritional status, including the risk of stunting, in Indonesia. Children with higher dietary diversity tend to have a lower risk of stunting. Additionally, dietary diversity can also be used as a proxy indicator of nutrient adequacy. Based on these findings, increasing dietary diversity in young children and mothers should be a key focus in efforts to reduce the prevalence of stunting in Indonesia. Interventions that improve access to and consumption of a diverse range of nutritious foods, such as nutrition education, food production diversification, and food distribution programs, are expected to contribute effectively to reducing stunting rates. Continuous monitoring and evaluation of related programs are also necessary to ensure their success. With a comprehensive approach that prioritizes improving dietary diversity, it is expected to be a key strategy in efforts to reduce stunting in Indonesia.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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