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STUNTING MANAGEMENT: A SYSTEMATIC REVIEW

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ABSTRACT
Stunting is a global problem, especially in developing countries. The management of stunting involves the cooperation of various parties and several factors that are carried out to overcome and prevent stunting because of its impact on hindering cognitive and productivity of children in the future. This study was designed to determine the management of handling children with stunting. This research method is a systematic literature review using 4 electronic databases namely PubMed, Google Scholar, Sciencedirect, and ProQuest. Articles containing stunting management strategy were analyzed using the PRISMA method. There were 15 articles met the criteria based on PRISMA analysis, emphasizing 7 strategies in the management of stunted children, namely fulfilling child nutrition, breastfeeding and colustrum, government policies, health promotion, maternal mental health, home visits (mentoring) and environmental sanitation.The main management of stunting is the maternal factor, starting from the fulfillment of nutrition during pregnancy period, breastfeeding to maternal mental health to provide good parenting. Cross-sectoral cooperation from the government and community support is also required to help care for children with stunting.

Keywords: Strategy, Management, Stunting, Prevention, Handling

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INTRODUCTION

Stunting is a condition of failure to thrive in children under the age of five due to chronic malnutrition and recurrent infections, especially during the first 1,000 days of life (HPK), from fetus to 23 months old. Stunting has an impact on inhibiting physical growth and children's vulnerability to disease, as well as hindering cognitive development which affects the level of intelligence and productivity of children in the future. Management of stunting involves various cross-sectors and various factors. Management of stunting is divided into 2, namely prevention efforts to minimize the risk of stunting and handling efforts to overcome children with stunting. Management of stunting has been carried out with various methods but there are still many obstacles faced such as income and economic inequality, trade, urbanization, globalization, food systems, social security, health systems, agricultural development, and women's empowerment (H. R. Jannah et al., 2022; Nugraheni et al., 2020)

Malnutrition is still a major problem in infants and children under five years old globally. Data

from the World Health Organization (WHO) in 2020 shows that 5.7% of children under five in the world are overnourished, 6.7% are undernourished and malnourished, and 22.2% or 149.2 million suffer from stunting (chronic malnutrition). The global prevalence of stunting is classified as high because it is between 20% - <30%. These numbers could increase substantially due to constraints in access to food and essential nutrients during the COVID-19 pandemic. Based on the 2021 Global Hunger Index (GHI), Indonesia ranks 73 rd out of 116 countries with a moderate hunger score (Grebmer et al., 2021). Indicators included in the GHI are the prevalence of wasting and stunting in children under five years old (Kementerian Kesehatan RI, 2022).

Stunting is one of the indicators in the Sustainable Development Goals (SDGs). By 2025, the goal is to reduce the prevalence of stunting and all child malnutrition by 2030. Stunting is a major threat to the quality of people and also a threat to a country's competitiveness, as children with stunting are not only affected by their physical growth (short stature), but also by impaired brain development, which can greatly affect their ability and achievement in school, as well as their productivity and creativity at a productive age. More broadly, stunting can hamper economic growth, increase poverty, and widen inequalities in health development. Management of stunting both prevention and treatment efforts involve many parties and require a long term, various factors of prevention efforts starting with adolescents, pregnant women, the role of the health sector such as the role of cadres, health workers and also the role of the community in empowering the handling of stunting (Indtiyastuti & Kartono, 2022; Sari Dewi et al., 2025).

Efforts to reduce stunting are carried out through prevention efforts in adolescent girls and prospective brides through premarital assistance to prepare for a healthy pregnancy. In addition, pregnant women are also concerned so that they can give birth to healthy babies. Furthermore, it helps mothers after childbirth to provide appropriate breastfeeding and complementary feeding, and supports the monitoring of infants by weighing them at the *posyandu.* The implementation of handling management requires political and policy commitment, government involvement and cross-sectors in accordance with their respective capacities. Management of handling stunting requires a comprehensive and integrated approach implemented using the Holistic, Integrative, Thematic, and Spatial (HITS) approach, (Nugraheni et al., 2023).

METHOD

Study Design.

This study used asystematic literature review method. The collected andselected articles were thenanalyzed and concluded byconsidering research topics whichare useful to read.

Research Subject

In the literature search, keywords were combined with Boolean Operators to get morespecific results and facilitate theselection of relevant articles. Thekeywords are stunting and managing. This literature review uses the following inclusion criteria: 1) the article contained research results on themanagement of stunting 2) a single study applied a quantitative, qualitative, or mixmethod design 3) the researchpopulation involved mothers,caregivers and families with stunted children; 4) the researchwas available in full text articles;5); and 6) the article was writtenin English. While, the exclusion criteria: 1) articles using Literature Review, Systematic Review, or Scoping Review; 2) duplication of publications in twoor more search engines.

Instruments

Researcher used fourdatabases, namely PubMed,Google Scholar, Sciendirect and ProQuest. All databases wereaccessed on 4 January 2024. The following is a list of database links:

Table 1. Database Links

Basis data	Tautan Basis Data
PubMed	https://pubmed.ncbi.nlm.nih.gov/
Science Direct	https://www.sciencedirect.com/
Google Scholar	https://scholar.google.co.id/
ProQuest	https://www.proquest.com/

The keywords used in the search for research articles werecombined with Boolean Operators to get more specific results and tomake it easier to select relevant articles. The keywords used werestunting and managing. Researchers found 103,732 articles which match thesekeywords, each 2781 articles in ProQuest, 81,000 articles in Google Scholar, 10,180 articles inPubMed and 9771 articles inSciencedirect.

Data Analysis

This study used a PRISMA flowchart to identify, screen, andtest for eligibility and inclusion criteria. Articles were screened first to include only those published from 2020 to 2024, available in English as full texts. The article elimination procedurebegan based on irrelevant titles and topics, Literature Review, Systematic Review, or Scoping Review and duplication in two ormore databases.

The literature review used The Joanna Briggs Institute (JBI) 2020 Critical Appraisal Tool, which is a commonly used tool in cross-sectional studies (n=4), qualitative studies (n=1), quasi-experimental studies (n=2), case series (n=2), narrative studies (n=3), RCT studies (n=3). The table displays the results of the critical review presented on the attachment.

RESULT

Prisma Flowchart

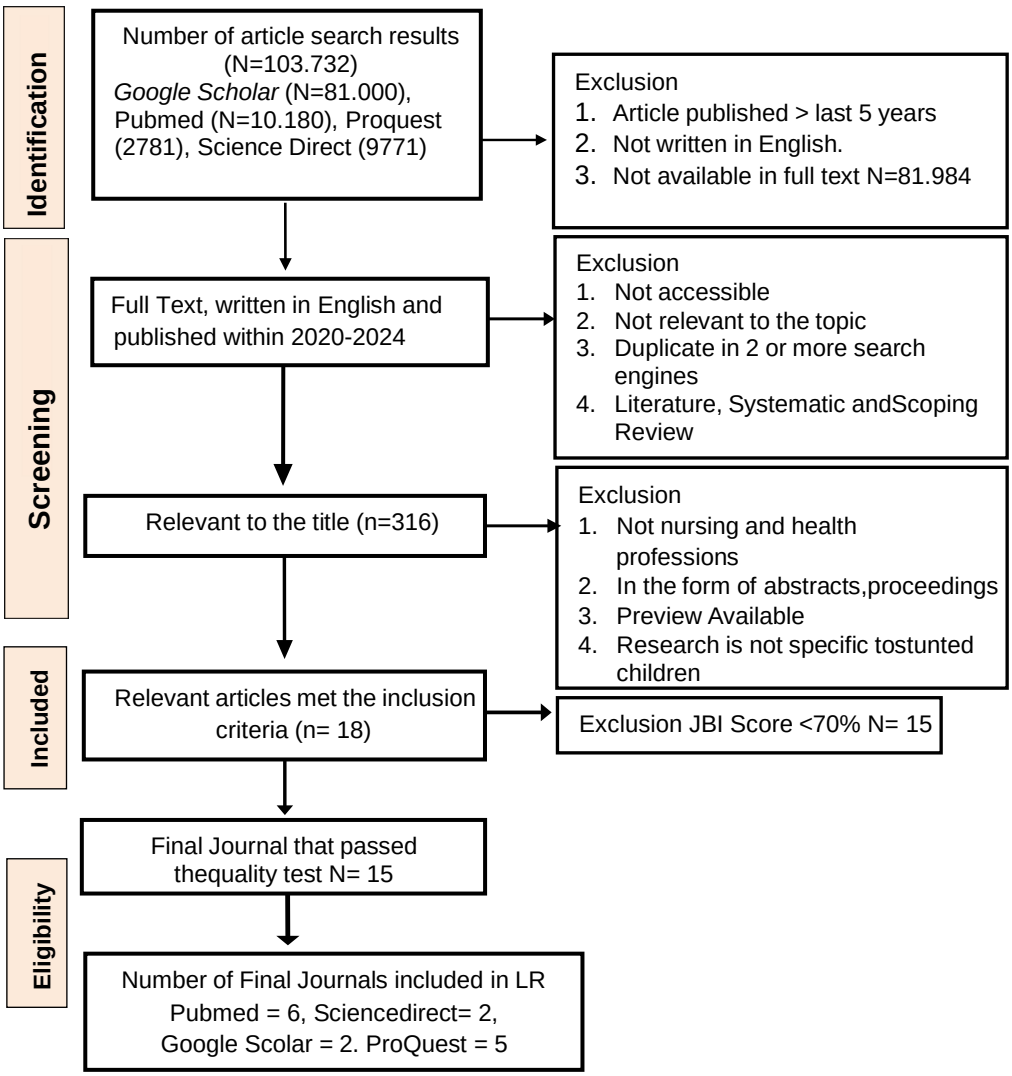

Image 1. Prisma Flowchart

Interpretation PRISMA Search Results

Researcher used four major search platforms in this study:PubMed, Science Direct, ProQuest, and Google Scholar. Atthe identification stage, 103,732 articles were found in alldatabases. Researcher thenconducted further screening for the articles published from 2020 to 2024, available in full texts andin English, at which 21,748 articles were filtered. The researcher conducted further screening using open access criteria, relevant to the topic andeliminated articles using the design of literature review,scoping review and systematic review. In addition, duplicate articles on 4 search engines wereomitted on this stage. This phaseresulted in 316 articles. The search continued, and after reading articles adjusted for the exclusion criteria which were notnursing and health professions topics, and not specific stunting topics, the researchers found 18 articles for further examination. The 18 relevant articles that metthe inclusion criteria were reviewed using JBI and 15 articleswere included in the literature review. This study examined 15 articles from several countries includes Peru, Myanmar, India, Ethiopia, Ghana, Bangladesh, Rohinya,Philippines and Indonesia.

Table 2. Characteristics of the Studies Included in the Analysis of Systematic Review

ID Number	Author and Journal Identity	Tittle Journal	Objectives	Population and Sample	Method	Summary of Resullts
Cross-Sectional Study						
1.	**Author:** Jorge Castro-Bedrinana, Doris Chirinos-Peinado, Gina De La Cruz-Calderon **Journal Identity:** *Public Health in Practice*, *2*(November 2020). https://doi.org/10.1016/j.puhip.2021.100112 journal homepage: www.journals.elsevier.com/public-health-in-practice	Predictive model of stunting in the Central Andean region of Peru based on socioeconomic and agri-food determinants	The aim of this study was to develop a predictive model for stunting in children under 5 years of age in a high Andean rural zone in Peru.	The population and sample in this study consisted of 1050 farming families with children under 5 years old from families in the high Andean rural zone of Peru, specifically in the Junín region, where the prevalence of stunting is 38% according to recommendations for public nutrition studies in communities.	The method used in this study was the analysis of data from a cross sectional study conducted on 380 rural families from 38 Andean communities in 15 districts in the central region of Peru. These families had children under 5 years old with complete information in their anthropometric and measurement surveys. The study was explanatory and predictive in nature, and used multivariate analysis to establish a mathematical prediction model.	The conclusion of this study is that the developed predictive model can effectively identify children under 5 years of age who are at high risk of stunting in the high Andean rural zone of Peru. The study found that variables such as timely colostrum consumption, maternal education level, birth weight, and raising guinea pigs for self-consumption had a significant association with stunting..
2.	**Author:** Than Kyaw Soe, Wongsa Laohasiriwong, Kittipong Sornlorm, Roshan Kumar Mahato **Journal Identity:** PLOS ONE https://doi.org/10.1371/journal.pone.0290600 November 20, 2023	Safely managed sanitation practice and childhood stunting among under five years old children in Myanmar	The aim of this study was to identify the association between well-managed sanitation and the incidence of stunting in children under five years old in Myanmar.	The population and sample in this study were children from 16 townships totaling 1207 selected by simple random sampling spread across three regions and five states in Myanmar, which met the inclusion criteria: children aged 6 months to less than 5 years, willing respondents (Inform Consent) children who have lived in the area for at least one year. Exclusion criteria included: i) children suffering from major health problems such as cancer, HIV, children with congenital disorders, children with physical or mental disabilities, children living with single mothers.	The method used in this study was a Cross sectional analytical study conducted to determine the association between well-managed sanitation practices and stunting in children under five years of age. The height of the selected children, their mothers, and fathers was measured using conventional instruments, and their mothers were interviewed using a prepared questionnaire. The questionnaire was developed by the researcher based on the findings of the existing literature review. Data collection was conducted from September 27 to December 26, 2022.	The conclusion of this study is that well-managed sanitation is an important factor in reducing stunting in children under the age of five in Myanmar. The study found that children who did not have access to well-managed sanitation had a 2.88 times higher risk of being stunted compared to children who had access to well-managed sanitation. Other factors associated with stunting included timing of water collection, wastewater disposal, child gender, vitamin A supplementation, maternal height, and dietary diversity. This study suggests that promoting access to well-managed sanitation facilities, proper wastewater disposal, and health promotion for children's diets are critical steps to reduce stunting in Myanmar.
3.	**Author:** Carlos S. Grijalva-Eternod, Emma Beaumont, Ritu Rana, Nahom Abate, Hatty Barthorp, Marie McGrath, Ayenew	Malnutrition in Infants Aged under 6 Months Attending Community Health Centres:	The objectives of this study were to determine the prevalence of malnutrition in infants under 6	The study sample consisted of infants under 6 months of age (6m infants) who presented at public health centres for any reason over an	The method used in this study was a health centre-based cross-sectional survey, which included all infants under 6 months of age (u6m infants) who attended the selected health centres for any reason during an	Prevalence of Malnutrition: The study found that more than 20% of infants under 6 months of age in Ethiopia showed some form of anthropometric deficit, with one-fifth having severe deficits.

	Negesse, Mubarek Abera, Alemseged Abdissa, Tsinuel Girma, Elizabeth Allen, Marko Kerac, Melkamu Berhane **Journal Identity:** Community Health Centres: A Cross Sectional Survey. *Nutrients* **2021**, *13*, 2489. https://doi.org/10.3390/nu13082489	A Cross Sectional Survey	months of age at community health centres in Ethiopia, assess the prevalence of anthropometric deficits in infants, and evaluate the overlap of various individual indicators.	average period of two weeks at a time. The reasons for their attendance included birth at health centres, immunisation clinics, growth monitoring clinics, and children under 5 years of age clinics (where children present with various acute illnesses) in Deder woreda and Jimma zone in Ethiopia.	average period of two weeks at each centre. The selection of health centres was done considering ease of access and patient load, where ten out of 124 health centres in Jimma zone and all eight health centres in Deder woreda were included in the study. Data were collected using an electronic questionnaire designed using the REDCap (Research Electronic Data Capture) system.	Feeding Practices: Most infants are breastfed, almost half exclusively. However, many infants were introduced to water at 16.7 weeks of age, indicating a deviation from exclusive breastfeeding recommendations. Variation in Nutritional Status: There was a marked difference in nutritional status between infants in Jimma and Deder, with infants in Deder showing poorer nutritional outcomes. Anthropometric Measurements: The study used mid-upper arm circumference (MUAC) and weight-for-age z-scores as the main indicators to assess malnutrition. The study highlighted the high prevalence of low MUAC, especially in the youngest infants.
4.	**Author:** Hayman Win, Sohana Shafique, Sharmin Mizan, Jordyn Wallenborn, Nicole Probst-Hensch, Günther Fink **Journal Identity:** Win *et al. Archives of Public Health (2022) 80:192* https://doi.org/10.1186/s13690-022-00948-6	Association between mother's work status and child stunting in urban slums: a cross-sectional assessment of 346 child-mother dyads in Dhaka, Bangladesh (2020)	The aim of this study is to evaluate the impact of maternal employment status on child stunting, morbidity and dietary intake in urban Bangladesh. This study also aims to highlight the importance of adequate childcare support for working mothers in understanding the effects of maternal employment on child stunting.	The population of this study was children in urban areas of Bangladesh, focusing on 5 slums in 3 municipal corporations in Dhaka Division. The sample consisted of 290 children with non-working mothers and 54 children with working mothers.	The methods used in this study include data collection through structured interviews with mothers or caregivers, anthropometric measurements of children and mothers, and statistical analysis using bivariate and multivariate logistic regression models. In addition, this study also used imputation of missing data using multiple imputation by chained equations (MICE). The study also used clustered standard deviations in all regression models to adjust for sample design and within-group correlations, and to address heteroscedasticity in variance.	The study concluded that maternal employment status has a significant impact on child stunting, morbidity and dietary intake in urban Bangladesh. Children of working mothers have almost double the risk of being stunted compared to children of non-working mothers. The study also highlights the importance of adequate childcare support for working mothers in understanding the effects of maternal employment on child stunting. Recommendations from this study include the integration of appropriate childcare support measures for low-income working mothers in urban areas, especially in slums, as an effective strategy to reduce the prevalence of chronic undernutrition among children in these areas.
Quasi-Experimental Study						
5.	**Author:** Raj Kumar Gope, Prasanta Tripathy, Vandana Prasad, Hemanta Pradhan, Rajesh Kumar Sinha, Ranjan Panda, Jayeeta Chowdhury, Ganapathy Murugan, Shampa Roy, Megha De, Sanjib Kumar Ghosh, Swati Sarbani Roy, Audrey Prost **Journal Identity:**	Effects of participatory learning and action with women's groups, counselling through home visits and crèches on undernutrition among children under three years in eastern India: a quasi-	This study aimed to determine the effectiveness of interventions including crèches, Participatory Learning and Action (PLA) meetings, and home visits in reducing the prevalence of wasting, underweight, and stunting among children under 3	The population in this study was 144,000 people living in three districts selected based on criteria that included population size, percentage of population according to tribe and caste in the district. The sample was all children under 3 years of age and their mothers identified during the household census in the study clusters, who were then selected through	The method used in this study was a quasi-experimental study design. To collect data, researchers conducted a cross-sectional survey. Statistical analysis was conducted using descriptive statistics to explore the sociodemographic characteristics of women and children and using macro z scores in Stata 13.0 to generate z scores for anthropometry. We also estimated the effect of the intervention using the difference in difference method, and the effect size was presented as the adjusted odds ratio.	The conclusion of this study is that community-based interventions, including daycare centers, Participatory Learning and Action (PLA) meetings, and home visits, are effective in reducing the prevalence of wasting, underweight, and stunting in children under three years old in rural districts of eastern India. These interventions were particularly beneficial for children from families in peripheral areas. The study also observed improved infant feeding intake and infection control in the intervention areas. The study highlights the potential effectiveness and benefits of managing daycare centers as part of an intervention program, which can contribute to

	Gope et al. BMC Public Health (2019) 19:962 https://doi.org/10.1186/s12889-019-7274-3	experimental study	years of age in three different areas.	simple random sampling with no exclusion criteria.		child development, maternal mental health, and child development.
6.	**Author:** Lili Rohmawati, Dina Keumala Sari, Makmur Sitepu, Kusnandi Rusmil **Journal Identity:** Med Glas (Zenica) 2021; 18(2):415-420	A randomized, placebo-controlled trial of zinc supplementation during pregnancy for the prevention of stunting: analysis of maternal serum zinc, cord blood osteocalcin and neonatal birth length	The aim of this systematic review and meta-analysis was to investigate the impact of prenatal zinc and vitamin A supplementation on fetal bone growth and birth size, as well as provide information on biochemical markers of bone formation and reference values for osteocalcin and pro-collagen levels in children and adolescents.	The sample population for this study consisted of pregnant women and newborns. The study was conducted at the Obstetrics and Neonatology Unit of the University of North Sumatra Hospital, Malahayati Islamic Hospital, and Royal Maternity Hospital in Medan, Indonesia. Inclusion criteria for pregnant women were good health status, being in the second or third trimester, aged 20-35 years, and having a height of more than 150 cm. Exclusion criteria included multiple pregnancies, congenital abnormalities, prematurity (<37 weeks gestation), or stillbirth. A total of 104 pregnant women were assessed, with 82 being eligible and randomized into two groups, with 41 patients in each group.	The method used in this study was an experimental study with a double pre-test/post-test control group, as well as double randomization with block randomization technique. The study was conducted from March to December 2019 at the Obstetrics and Neonatology Unit of the University of North Sumatra Hospital, Malahayati Islamic Hospital, and Royal Maternity Hospital in Medan, Indonesia. A total of 104 pregnant female patients were evaluated for this study, of which 82 were eligible and randomized, and placed in two groups, each with 41 patients	It was concluded that zinc supplementation during pregnancy has a positive impact on neonatal height, maternal serum zinc levels, and cord blood osteocalcin levels. This study recommends regular screening of maternal serum zinc levels and prophylactic dosing of zinc during pregnancy to prevent zinc deficiency and improve fetal bone growth.
Qualitative Study						
7.	**Author:** Chii-Chii Chew, Xin-Jie Lim, Lee-Lan Low, Kin-Mun Lau, Maziana Kari, Ummi Kalthom Shamsudin, Philip Rajan **Journal Identity:** PLoS ONE 17(March 23, 2022): e0265917. https://doi.org/10.1371/journal.pone.0265917	The challenges in managing the growth of indigenous children in Perak State, Malaysia: A qualitative study	The purpose of this study is to understand the challenges faced by healthcare providers (HCPs) in managing the growth of Orang Asli children in Malaysia.	The study population was Orang Asli children living in Hulu Perak and Kinta districts in Perak State, Malaysia The study sample consisted of health care providers (HCPs) who had different experiences in treating Orang Asli children from different localities for at least 6 months in the districts in Perak State. (pediatricians, family	The method used in this study was qualitative, involving focus group discussions (FGDs) and in-depth interviews (IDIs). FGDs were conducted to collect data from various health care providers (HCPs) involved in the growth management of Orang Asli children. IDIs were used to obtain more in-depth information from key informants such as a pediatrician and a nutritionist who have experience in treating malnutrition in Orang Asli children.	The fulfillment of nutritious food in children is influenced by poverty which affects families in providing food for their children, other challenges found are such as inadequate infrastructure and financial constraints make it difficult for children to access health services. Health services should improve cross-cultural communication and interaction skills among health workers to overcome cultural and social barriers in providing effective health services such as the community's belief in traditional medicine, fear of health workers, and incorrect eating behaviors.

				medicine specialists, general practitioners, staff nurses, nutritionists, and nursing managers).	Data was collected both face-to-face and through virtual mode. Thematic analysis was conducted to process the data collected, using Microsoft 365 Excel for data management and code book development and open coding conducted by the researchers.	
Textual Evidence: Narrative Study						
8.	**Author:** Andjar Prasetyo, Nana Noviana , Weni Rosdiana, M. Arief Anwar, Hartiningsih, Hendrixon, Bekti Putri Harwijayanti, Mochammad Fahlevi **Journal Identity:** *Sustainability* **2023**, *15*, 1821. https://doi.org/10.3390/su15031821	Stunting Convergence Management Framework through System Integration Based on Regional Service Governance	The purpose of this study is to provide information (mapping) that is relevant for the implementation of stunting prevention policies and programs in five provinces in Indonesia. Kalimantan.	This study uses secondary data collected by the Directorate General of Regional Development, Ministry of Home Affairs, Republic of Indonesia, for 2019-2021 in five provinces of Kalimantan (Indonesia): north, south, central, west and east.	The method used in this study is a quantitative descriptive analysis based on secondary data collected by the Directorate General of Regional Development, Ministry of Home Affairs, Republic of Indonesia, for 2019-2021. This research uses a stunting reduction intervention data management system that aims to manage data from the district or city level to the village level, which will be used to support the implementation of other integration measures and the administration of integrated stunting reduction programs and activities. In addition, this research also uses an integrated framework based on five dimensions, namely leadership and staff, stunting analysis, stunting digital data, open government, and stunting information readiness.	Integrated Management Framework: The study emphasized the need for an integrated framework for stunting management, which includes leadership and staff readiness, stunting analysis, digital stunting data, open government, and stunting information readiness. This framework is designed to accelerate stunting reduction efforts in the region. Data Management System: A data management system involving various government agencies is in place, covering aspects such as nutrition, health and sanitation. This system is essential for sustainable data management to support stunting reduction. In conclusion, this study provides insights into the multi-dimensional approach required for effective stunting reduction, including the integration of digital tools, government transparency, and community engagement, as well as the need for continuous improvement in data management and program equity.
9.	**Author:** Hasto Wardoyo**,** Nila Djuwita Moeloek, Ray Wagiu Basrowi, Maria Ekowati, Kristin Samah, Widura Imam Mustopo, Emi Nurdjasmi, Indah Suci Widyahening, Bernie Endyarni Medise, Febriansyah Darus, Tonny Sundjaya, Bunga Pelangi **Journal Identity:** *Healthcare* **2024**, *12*, 44. https://doi.org/10.3390/healthcare12010044	Mental Health Awareness and Promotion during the First 1000 Days of Life: An Expert Consensus	The objective of the study is to explore and discuss mental health issues during the first 1000 days of life in Indonesia, with a focus on perinatal mental health. The study aims to understand the impact of mental health on pregnancy and the importance of mental health awareness and promotion during this critical period. It seeks to gather	The chosen populations for the study were pregnant women, lactating mothers, postpartum women, and women with infants under 2 years old.	The method used in this study was a consensus method via a modified nominal group/expert panel technique. This approach was employed to provide a collective opinion with the expectation that the consensus would serve as a base to conduct more studies in Indonesia on mental health awareness in the first 1000 days of life. The onsite meeting included a presentation and discussion among experts regarding maternal mental health and how to integrate mental health assessment at the integral healthcare post and other primary healthcare facilities. Some experts also provided their remarks via Google Forms, and the	The study resulted in a consensus among experts on the importance of addressing mental health issues during the first 1000 days of life in Indonesia. The experts agreed on several key points: **Mental Health Issues**: There is a need to focus on potential mental health issues that can affect pregnant women, lactating mothers, postpartum women, and women with infants under 2 years old. **Integration of Mental Health**: The concept of integrating mental health into primary healthcare services was discussed, emphasizing the importance of making mental health assessment a routine part of antenatal care. **Assessment Procedures**: The procedure for mental health assessment should be

			expert opinions on various aspects of mental health care, including the integration of mental health services, assessment procedures, and the use of specific assessment instruments. Additionally, the study emphasizes the need for mental health screening and support for pregnant women and new mothers, as well as the integration of these services with antenatal care. The study also references the Regulation of the Ministry of Health number 21/2021 as a framework for mental health assessment and intervention in Indonesia.		expert meeting was recorded and analyzed by the authors	standardized and integrated into the healthcare system, with the use of specific instruments such as the Strength and Difficulties Questionnaire 25 (SDQ-25) and the Self Reporting Questionnaire 20 (SRQ-20) to detect mental health issues. **Social Support and Community Programs**: The role of social support and community-based programs was highlighted as crucial in promoting perinatal mental health awareness. **Screening and Support**: There is a need for systematic mental health screening and support for pregnant women and new mothers to address perinatal mental health issues effectively. **Policy and Implementation**: The study referenced the Regulation of the Ministry of Health number 21/2021 as a framework for mental health assessment and intervention, suggesting that laws and policies should be implemented to promote mental health awareness within the first 1000 days of life. **Expert Recommendations**: The experts provided recommendations for capacity building, mental health training for healthcare providers, and the establishment of a referral mechanism to support women with mental health issues. In summary, the study highlighted the critical need for mental health awareness, screening, and support during the perinatal period in Indonesia, and provided expert consensus on strategies to integrate mental health services into primary healthcare facilities.
10.	**Author:** Jul Indra, Khoirunurrofik KhoirunurrofikI. **Journal Identity:** PLoS ONE 17(January 28, 2022): e0262743. https://doi.org/10.1371/journal. pone.0262743	Understanding the role of village fund and administrative capacity in stunting reduction: Empirical evidence from Indonesia	The objective of the study is to examine the impact of village fund programs on the prevalence of stunting in children in Indonesia, and to assess the role of village apparatuses and policies implemented by village heads in reducing stunting prevalence. The study aims to	The sample of this study includes 473 regencies/cities throughout Indonesia, covering 74,958 villages. The population of the study is the district/city level aggregate data, which is used to analyze the impact of village fund programs on the prevalence of stunting in children across these regions in Indonesia	The method applied in this study involves analyzing district/city level aggregate data to assess the impact of village fund programs on the prevalence of stunting in Indonesia. The study utilizes a rationale based on tools and resources for nutrition capacity assessment as operational support in assessing the influence of village funds on stunting prevalence. This approach was adapted from the United Nations (UN) Network for Scaling Up Nutrition (SUN UN Network) and Nutrition Capacity Assessment of Indonesia (NCAI) in	The study found that increasing per capita village funds is associated with a decrease in the prevalence of stunting among children in Indonesia. However, the educational qualifications of village heads did not show a significant effect on reducing stunting rates. The study also noted regional disparities in the distribution of village funds, with significant reductions in stunting prevalence observed outside the island of Java. Additionally, the number of village officials was found to have a statistically significant impact on reducing stunting prevalence. The research suggests that village fund programs can support national efforts to tackle stunting and underscores the

			understand the effectiveness of these programs and the capacity of local governance in addressing the issue of stunting, which is a significant public health concern in the country.		2018. The study incorporates four fundamental concepts of NCAI, which include policies, plans, and frameworks, as well as the role of human resources (village government apparatus) with adequate skills to implement action theories for budget changes sourced from village funds	importance of enhancing the capacity of village heads and officials to implement health activities, particularly those aimed at the early prevention of stunting.
A Case Series Study						
11.	**Author:** Vibhawari Dani, Kavita Satav, Jayashree Pendharkar, Ashish Satav , Suresh Ughade, Ambadas Adhav, Bharat Thakare **Journal Identity:** *Clinical Epidemiology and Global Health*, *5* (2017), 62–69. https://doi.org/10.1016/j.cegh.2016.11.003 journal homepage: www.elsevier.com/locate/cegh	Community-based management of severe malnutrition: SAM and SUW in the tribal area of Melghat, Maharashtra, India	The aim of this study was to evaluate the effectiveness of localized feeding to address severe acute malnutrition (SAM) and severe underweight (SUW) in children in India.	The study population was all children in the age group of 6 - 60 months from 320 villages in Dharni and Chikhaldara blocks of Melghat. The study sample consisted of 734 Severe Malnourished Children (SMC) in the age group of 6 - 60 months from the population living in 14 selected villages.	The method used in this study was a prospective community-based intervention study with one treatment group. Primary and secondary cares were provided to respondents, 680 children completed over a 3-year period. Interventions included local-therapeutic-food (LTF) with micronutrients (MN), treatment of infections, and behavior change communication (BCC) delivered over 90 days to SMC by village health workers (VHWs)/cadres. Cadres are selected and trained to properly deliver the intervention.	The conclusion of the study was that it proved effective in treating severe acute malnutrition (SAM) and severe underweight (SUW) in children in the Melghat tribal area of Maharashtra, India. Results showed high recovery rates for children with SAM and increased recovery rates for children with SUW. In addition, there was a decrease in the prevalence of SAM and SUW over the three-year intervention period, demonstrating the effectiveness of the intervention. The community-based approach, cost-effectiveness and sustainability of this intervention are applicable and suitable for addressing malnutrition issues in similar settings.
12.	**Author:** S. K. Roy, Khurshid Jahan1, Soofia Khatoon, Nurul Alam, Saria Tasnim1, Shahana Parveen, Ambrina Ferdaus and Khadijatul Cubra **Journal Identity:** Roy *et al. Journal of Health, Population and Nutrition (2022) 41:53* https://doi.org/10.1186/s41043-022-00321-x	Effectiveness of home-based “egg-suji” diet in management of severe acute malnutrition of Rohingya refugee children	The aim of the study was to measure the effectiveness of a home-made diet called "egg-suji" in managing severe acute malnutrition in Rohingya refugee children.	The sample and study population consisted of Rohingya refugee children with severe acute malnutrition (SAM) in Cox's Bazar District, Bangladesh. A total of 645 children were eventually enrolled in the study after one child died and four children moved during the first week of the study.	The methods used in this study included nutritional intervention with the provision of a home-made recipe called "egg-suji" and knowledge-based nutrition counselling to mothers of children with severe acute malnutrition (SAM). Children with SAM were identified through anthropometric measurements, and data were collected using the 24-hour recall method to assess children's food intake. Children's weight was measured using electronic scales, and for children under 2 years, length was measured using a locally made length board. Children with severe acute malnutrition who were clinically well with no signs of infection or other indications for hospitalisation, and	The study concluded that a home-made diet called "egg-suji" is effective in managing severe acute malnutrition in Rohingya refugee children. The intervention, which was conducted for 3 months with additional monitoring for 2 months, resulted in significant improvements in energy intake, frequency of food intake, weight, height, and other nutritional indicators. The study showed that nutrition counselling and provision of food items in refugee camps resulted in full recovery from severe malnutrition in all children involved, and the results were sustained. In addition, the study emphasises the importance of empowering mothers with knowledge of food ingredients and cooking skills to sustain good child feeding practices. These home-made recipes are not only effective but also cost-effective compared to

					who had a good appetite, were considered manageable as outpatients. Children who were on Ready-to-Use Therapeutic Food (RUTF) or refused to co-operate were excluded from the study.	commercial foods such as Ready-to-Use Therapeutic Food (RUTF).
RCT Study						
13.	**Author:** Jeanette BaileyID, Charles OpondoID, Natasha LelijveldID, Bethany Marron, Pamela Onyo, Eunice N. Musyoki, Susan W. Adongo, Mark Manary, Andre´ BriendID, Marko KeracID **Journal Identity:** PLOS MEDICINE PLoS Med 17(July9, 2020): e1003192. https://doi.org/10.1371/journal.pmed.1003192	A simplified, combined protocol versus standard treatment for acute malnutrition in children 6–59 months (ComPAS trial): A cluster-randomized controlled non-inferiority trial in Kenya and South Sudan	To compare a simple combined protocol with a standardized protocol to address acute malnutrition in children aged 6-59 months in health facilities in Nairobi, Kenya, and Aweil East, South Sudan.	The population and sample in this study were children aged 6-59 months with acute malnutrition presenting to the 24 clinics involved in the study in Nairobi, Kenya, and Aweil East, South Sudan. With inclusion criteria of having a mid upper arm circumference (MUAC) less than 12.5 cm and/or edema (+/++, i.e. mild or moderate). Signs of severe illness or danger signs according to the Integrated Management of Childhood Illness (IMCI) algorithm, or did not pass the appetite test (consumption of 30 g RUTF within 20 minutes),	The method used in this study was a randomized controlled trial comparing a simplified combined protocol with a standard protocol in the treatment of acute malnutrition in children. Active case-finding was conducted by community health workers (CHWs). The study was designed to assess the clinical and cost effectiveness of the combined protocol compared to the standard protocol, as well as to evaluate the coverage of the treatment program.	The conclusion of this study is that the simplified combined protocol is an effective and non-inferior alternative to the standard protocol. This combined protocol uses mid upper arm circumference (MUAC) to determine the portion of food given and aims to be more cost-effective. The results showed that the rate of nutritional recovery in the group using the combined protocol with the group using the standard protocol, showed no significant difference and the simplified combined protocol in the management of acute malnutrition, can help expand coverage and improve public health impact, especially in resource-constrained settings.
14.	**Author:** Emanuela Galasso, Ann M Weber, Christine P Stewart, Lisy Ratsifandrihamanana, Lia C H Fernald **Journal Identity:** *The Lancet Global Health*, *7*(2019), e1257–e1268. https://doi.org/10.1016/S2214-109X(19)30317-1	Effects of nutritional supplementation and home visiting on growth and development in young children in Madagascar: a cluster-randomised controlled trial	The aim of this study was to evaluate the impact of various nutrition interventions on child development and nutritional outcomes.	The study population was families with pregnant women in their second or third trimester, families with children aged 0-5 months, and families with children aged 6-11 months residing in the selected areas. This sample was selected using administrative data and involved non-governmental organizations (NGOs) for the provision of program supervision. Of the 261 sites available after stratification and reduction to avoid contamination of the intervention, 125 sites were randomly selected for the study. Each site provided 30 households,	The method used in this study was a cluster-randomized controlled trial design with five intervention groups that included intensive counseling and provision of nutritional supplementation implemented over a 2-year period starting from September-October 2014. Data were collected by an independent survey firm, ProESSECAL, across 125 study sites at three time points: a baseline survey prior to the launch of the intervention (June-August 2014), and two follow-up surveys conducted 1 year after baseline (September-October 2015) and 2 years after baseline (September-November 2016) Data were collected prospectively with five tablet-based questionnaires administered at the three time points.	The main findings of this study are as follows: 1. LNS intervention: There was no main impact of the LNS intervention on overall child growth and development. However, there was an interaction with child age, indicating a potentially greater impact on longevity Z scores and stunting in the youngest children who were fully exposed to LNS. 2. Nutrition Counseling: More intensive nutrition counseling had a significant impact on increasing participants' intake of meat, fish, milk and eggs. 3. Challenges of the MAHAY Program: The MAHAY program faces logistical challenges, low population density, and high food insecurity in rural Madagascar, which limit the program's effectiveness in improving child growth and development. Issues with maternal responsibility and

				which were divided into three cohorts based on child age or maternal pregnancy status at baseline.	Household questionnaires, mother and primary caregiver questionnaires, and child questionnaires were collected from relevant participants. Community health worker and site questionnaires were also administered at each time point to compare key level site characteristics across intervention groups. The primary outcomes measured were child length-for-age and weight-for-length Z scores. Length and weight measurements were repeated at each survey wave using techniques described for the WHO Multicenter Growth Reference Study. Calculation of continuous nutritional status Z scores for age was performed using the computer software, Anthro (version 7.0), and growth standards issued by the WHO.	lack of resources for children's toys and books were also noted. 4. Program Integration and Design: The integration of evidence-based intervention strategies into existing community-based programs is a major strength of this study. However, the study may lack the ability to detect small effects in certain subgroups, and the sharing of LNS among participants was not taken into account. 5. Intervention Outcomes: The study found mixed impacts of the intervention on child development and nutritional status, with some positive impacts on the growth of children who started LNS at 6 months of age. However, supplementation for pregnant or lactating mothers showed no additional benefit. 6. Eating Behavior and Nutritional Deficiencies: Intensive counseling is effective in changing eating behavior, but may not be sufficient to address nutritional deficiencies in the context of high poverty and food insecurity. 7. Future Program Design: This study provides insights for future program design and scale-up in low-income areas with a high prevalence of stunting, and emphasizes the need for comprehensive interventions to address undernutrition. 8. Professionalized Workforce: The article also highlights the need for a professional nutrition workforce in Africa and discusses various tools and indicators to measure early childhood development, household food insecurity, and family care. Overall, this study shows that while certain interventions can have a positive impact on child nutrition and development, addressing the complex challenges of poverty and food insecurity requires multifaceted efforts.
15.	**Author:** Amanda Beatty1 | Evan Borkum2 | William Leith2 | Clair Null2 | Wayan Suriastini3 **Journal Identity:**	A cluster randomized controlled trial of a community-based initiative to reduce stunting	The aim of this study was to evaluate the impact of a multifaceted nutrition project in Indonesia on anthropometric and maternal and	The population studied in this study were children aged 0-35 months and their caregivers. The sample of this study was 95 treatment subdistricts and 95	The method used in this study is a clustered randomised controlled trial (RCT) to evaluate the impact of multifaceted nutrition projects in Indonesia.	The results showed that the multifaceted nutrition project in Indonesia did not have a significant impact on reducing child stunting. However, the project showed positive impacts on several secondary outcomes related to maternal and child nutrition. The research also highlights the challenges of implementing

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Researcher categorized the findings of the research articles on the management of stunting:

Fulfillment of Nutrition

Nutritional fulfillment is animportant factor in handling stunting. This is not only for toddlers but also for pregnant women through the provision of high-protein foods, and supplements for health. In addition, nutritional fulfillment can be sought through the use of livestock such as poultry to support child nutrition and properfood processing starting withcomplementary foods (MP-ASI) (Beatty et al., 2024; Castro-Bedriñana et al., 2021; Dani et al., 2017; Galasso et al., 2019; Grijalva-Eternod et al., 2021; Rohmawati et al., 2021; Roy et al., 2022) Nutritional fulfillmentfor pregnant women aims for optimal development and growthof the fetus, while the fulfillmentof proper nutrition for infants starting from complementaryfeeding is intended to overcome and prevent stunting.

Government Policy

Managing stunting requires integrated management from various parties, especially the government. The government must issue good policies and havegood stunting management starting with a database to monitor the development of children with stunting. Community support (village officials, cadres, PKK) in StuntingResponse is part of an integratedstunting management. Utilizationof village funds or direct assistance to families with stunting, especially to fulfill childnutrition, is an option to take (Bailey et al., 2020; Beatty et al., 2024; Castro-Bedriñana et al., 2021; Chew et al., 2022; Galasso et al., 2019; Grijalva-Eternod et al., 2021; Indra & Khoirunurrofik, 2022; Prasetyo et al., 2023; Wardoyo et al., 2024). Cooperation among various parties is needed toovercome any problems that arisein handling stunting.

Colostrum feeding (IMD) and Exclusive breastfeeding

Breast milk is the best food for infants, especially the colostrum which is provided during early breastfeeding initiation (IMD). It has great benefits for infant immunity. Colostrum provision is then continued by delivering exclusive breastfeeding along the first 6 months (Castro-Bedriñana et al., 2021; Win et al., 2022) The benefits of exclusive breastfeeding for a baby, which will be continued along 2 years isas complete nutrition. The compositions of breast milk are fat, carbohydrates, calories, protein and vitamins. All components are easy to digestand absorb. In addition, breast milk contains antibody which provides protection of infectious diseases and allergic. Besides, breast milk provides stimulation of intelligence and nerves and promotes optimal health andintelligence.

Health Promotion and Counseling

Health promotion or counseling isan effort to handle stunting. Through health promotion, mothers' knowledge will increase,and will then affect how motherscare for the children with stunting. There are many kinds ofhealth information that can beprovided to mothers with stuntedchildren. The kinds of information can be about stuntingitself, how to care for children with stunting, fulfilling child nutrition (MP-ASI), proper household sanitation management, and providingcomplete immunization (Galasso et al., 2019; Gope et al., 2019; Roy et al., 2022). Health promotion can be carried out by health workers andall those involved in handling stunting with various media that are easily accepted by mothers inaccordance with their education.

Maternal Mental Health

Mothers are an important factorin managing stunting. Maternalmental health in the first 1000days of life is needed to minimizeany complications duringpregnancy and childbirth. It is also very important whenmothers provide care afterchildbirth because it will supportchild development and growthoptimally (Wardoyo et al., 2024; Win et al., 2022). Goodmental health of mothers willsupport fetal development duringpregnancy and the quality ofparenting provided to children, aswell as minimizing the prevalenceof and overcoming stunting.

Home Visits and Mentoring

Home visits and assistance tofamilies with stunted children isone of the effective treatments for stunting. The purpose of thesehome visits is to monitor andevaluate children with periodic height measurements, health checks, and health promotion (Gope et al., 2019). The home visits can be carried out by healthworkers or health cadres. Thisassistance can be done not only tofamilies with stunted children butalso to early childhood educationschools and daycare centers to monitor children's developmentand growth.

Good Sanitation

Sanitation is an important factor in handling stunting. Several articles mentioned that good sanitation management willreduce the risk of stunting (Soe et al., 2023), Good sanitation management must be doneespecially in household sanitation, clean water storage, waste disposal, garbage disposal,and pet or husbandrymanagement. Poorly managedsanitation will increase the risk ofinfection in children and will affect their nutritional status. Sothat it will interfere with the growth and development of children and eventually stunting occurs.

DISCUSSION

Stunting is a nutritional problem that occurs in many countries in the world, especiallyin developing countries and poor countries. So that stunting becomes a world problem. Basedon the findings from the article, the management of stunting consists of fulfilling the nutritionof pregnant women and toddlers,government policies, proper household sanitation,breastfeeding and Early Breastfeeding Initiation (IMD) (Colostrum) in infants, health promotion and counseling, home visits and assistance to families with stunting, and maternal mental health.

Nutritional fulfillment for both the mother duringpregnancy and the child starting with proper complementaryfeeding (MP-ASI) and nutritiousfood as a toddler is a must. Nutrition during pregnancy is veryimportant because the formationof organs in the womb will affectgrowth and development when they are born. Pregnant women need blood and calcium supplements. In addition, they need folic acid, protein, iron andvitamins. Nutritional fulfillmentfor toddlers starts withcomplementary foods (MP-ASI)containing protein,carbohydrates and vitamins. Thisshould be done after the baby is 6months old, and done in the rightstages. The First 1000 Days of Life is the golden period in fulfilling nutrition to avoid the problem ofmalnutrition, especially stunting. One of the efforts to prevent stunting can be done by means ofspecific nutrition interventions where actions or activities in theplanning are aimed specifically tothe group of the first 1000 days oflife (HPK) and are short in nature.These activities are generally carried out in the health sector such as immunization,Supplementary Feeding (PMT) forpregnant women and toddlers, monitoring the growth of toddlers in *posyand*u, providing iron-folate supplement tablets for pregnant women, promoting exclusive breastfeeding and MP-ASI (Erawati, 2020). Nutritional problems of stunting can be prevented by various ways, such as providing exclusive breast milk (ASI) to children aged 0-6 months, providing quality complementary foods (MPASI) for children aged 6 months-2 years, and providing sufficient food with adequate quality and maintaining clean and healthy environment in children aged 2-5 years (Jannah et al., 2022).

Handling stunting requires support from the government. Government policies in handling stunting can be in the form of presidential decrees, orministerial regulations which are then developed in the form of derivative policies in local governments to innovate according to their natural and human resources Integratedstunting management is the collaboration of various partieswithin the government structure to overcome various complexfactors in stunting cases. Eachagency has its own responsibilities, namely thehealth sector related to monitoring growth anddevelopment evaluations andcounseling on how to properly treat stunting, social services to overcome economic problems with direct food assistance fortoddlers and fulfill their nutritional needs, besides community self-help, one of which is cadre support, andvillage government for the use ofvillage funds. To achieve success in handling stunting, there needs to be close cooperation between the government, non- governmental organizations, educational institutions, health workers, and the community,because the implementation of

stunting prevention policiesrequires a coordinated approach between institutions and sectors. The Ministry of Health needs to work closely with other ministries such as the Ministry of Education,the Ministry of Women's Empowerment and Child Protection, the Ministry of Public Works and Housing, and other relevant ministries to ensure thatthe various aspects that affect stunting are addressedholistically (Beal et al., 2018).

Another stunting management is related to breastfeeding for infants, starting with Early Breastfeeding Initiation (IMD) at newborn, exclusive breastfeeding along 6 months and breastfeeding along 2 years of toddler age. Breast milk is the best food for babies, especially from the composition and optimal absorption of nutrients. Colostrum is breast milk that comes out after childbirth and is given during IMD.Colostrum contains antibodies that are good for immunity sothat it helps to prevent the risk ofillness or infection in children that will interfere with their growth and development, especially the problem of malnutrition or stunting. Like previous research, exclusive breastfeeding in the first 6 months of infancy is veryinfluential in the growth and development of the toddler until adulthood. Exclusive breastfeeding given will have a positive impact on the health of the baby and prevent several other diseases, one of which is stunting symptoms that result in toddlers failing to grow perfectly.Stunting can lead to reduced levels of intelligence, diseases are more susceptible to enter,can reduce future productivity levels. Consequently, it can hamper economic growth and increase poverty (Rahayu et al., 2023)

Health promotion and counseling are intended to increase the knowledge of mothers with stunted children and how to properly treat stunting. Health promotion iscarried out with various media and materials, while considering the education level of the targetsand the mothers. Health promotion materials, in addition to proper care of stuntedchildren, are how to fulfil properchild nutrition, proper householdsanitation, and utilization of health service facilities. Researchon health promotion methods in handling stunting states that health promotion is a program toimprove the impact of improvements both for individualfamilies and community behaviorwith various health promotion methods carried out (Tiyas & Hasanbasri, 2023)

Home visits and assistance are needed in handling stunting to monitor and evaluate child growth and development, and proper child care. In cases of stunting, home visits can becarried out not only by healthworkers but also by health cadres. In accordance with the article on the role of cadres in handling stunted children, in mentoring and visiting, manythings can be provided, especiallyproviding various healthinformation and utilizing local food for nutritious food sources tosupport children's growth and development (Ardiana et al., 2021). Maternal mental health inthe First 1000 Days of Life is an important factor in stunting management. Maternal psychology during pregnancy needs to be put into consideration to avoid complications during pregnancythat will affect fetal development and growth. After giving birth, mental health is needed by mothers to overcome stressors in childcare, because good and correct parenting will support optimal growth and development of toddlers.

Asupporting research Maribet et al., (2021) states that the psychological problems of pregnant and postpartum womenare due to socio-economic conditions, where maternalpreparation is needed in the First1000 Days of Life, both nutritionalfulfillment and good parenting toreduce the possible occurrence ofstunting. Sanitation is animportant factor in handling stunting. Good home sanitationmanagement, fulfillment of goodclean water, healthy latrines, proper waste disposal, and good livestock maintenance willsupport children's health. Good home sanitation management willprevent various health problems,especially cases of infection thatwill affect growth and development in children so as to avoid cases of stunting. In accordance with previous research that with healthy sanitation in the familyenvironment will also show clean and healthy living behavior so that it will support efforts to support the fulfillment of nutrition for their families,especially toddlers to support optimal growth and developmentand no stunting occurs. In fact, a study shows that poor sanitation increases the risk of stunting (Ainy et al., 2021; Utami & Ainy, 2023).

Maternal factors play an important role in a child's growthand development. It is about howa mother provides good nutritionfor her child, delivers proper parenting with a healthy mental state, and how a mother breastfeeds her baby. A child development is generallycorrelated with mother's occupation, child's age, birthweight, and parental well-being. Meanwhile, a child's nutritional status is closely related to the child's age, birth weight, and infant condition. Therefore, the relationship between parents andchildren must function to supportthe growth and development of the baby.

CONCLUSION

Management of stuntingrequires the support of various factors. Maternal factors start with good mental health in the First 1000 Days of Life for the health of mothers and babies, avoiding complications during pregnancy, and producing the right parenting patterns to support child growth and development. In addition, maternal factors in thefulfillment of proper nutrition since pregnancy are continued when providing complementary food and toddler food with a high composition of protein, vitamins and supplements needed. Mothers with stunted children must have sufficient knowledge incaring for stunted children. Maternal knowledge can beimproved by health promotion provided by health workers or health cadres. Government support is very important by organizing various elements in the government structure to move to support the handling of stunting both from health and non-health. In addition,community self-help from FamilyWelfare Empowerment (PKK) andhealth cadres is very important toprovide assistance in the care of stunted children.

SUGGESTIONS

Future research is suggested to explore the effectiveness of integrated stunting interventions across different regions and cultural settings, including rural and urban comparisons. Studies could also investigate long-term outcomes of maternal mental health support, home visit programs, and community-based nutrition strategies. Moreover, further research should examine the role of digital health tools and data systems in monitoring and improving stunting management more efficiently.

DECLARATION OF INTEREST

The authors affirm that there are no conflicts of interest related to this research.

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AUTHOR CONTRIBUTION

All authors have actively contributed to every phase of the research and have had ample opportunities to engage in discussions about the entire research process with the research team.

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