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Policy advocacy for stunting prevention in Indonesia

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Abstract

This research aims to explore the role of advocacy in influencing the formation, implementation, and evaluation of stunting prevention policies in Indonesia. The research employed a qualitative descriptive approach. Secondary data were obtained from official government documents, non-governmental organization reports, academic studies, and relevant mass media. Data analysis was conducted through content analysis techniques with stages of in-depth reading, thematic coding, and information categorization. The validity of the results was strengthened through data triangulation, while reliability was maintained through consistency in the analysis and interpretation process. The research findings show that stunting is still a serious chronic nutrition problem, characterized by limited access to nutrition and health services, low nutrition literacy in the community, and weak coordination between institutions. Structured and collaborative policy advocacy, including through the use of artificial intelligence (AI), is considered to be able to help identify risks early, design targeted interventions, and encourage more effective budget allocation. The conclusion of this study confirms that advocacy has an important contribution in encouraging more responsive and sustainable stunting prevention policies. Practically, the results of this study encourage the need for increased government and community commitment through greater investment, cross-sector collaboration, and the use of digital technology to support policies that can improve the quality of life of Indonesian children.

Keywords: Artificial intelligent, Policy advocacy, Stunting.

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1. Introduction

Nutritional issues represent a highly complex and urgent concern in Indonesia. Particularly because Indonesia is among the countries facing a comprehensive range of nutritional problems. Several studies indicate that nutritional problems in Indonesia tend to persist and even worsen, unlike some other ASEAN countries such as Malaysia, Singapore, and Thailand.

One of the persisting nutritional issues in Indonesia is stunting [1]. Stunting, or impaired growth in children, is a serious public health problem in Indonesia. With a relatively high prevalence, stunting imposes wide-ranging and long-lasting impacts on the well-being and development of children. Stunting is a condition of chronic malnutrition caused by prolonged inadequate nutrient intake, often due to inappropriate feeding practices. Stunting begins in utero and becomes evident by the age of two. Cases of stunting or failure to thrive among Indonesian toddlers remain high and have not shown significant improvement. The World Health Organization (WHO) ranks Indonesia as the third-highest country in Asia in terms of stunting cases.

According to the 2018 Basic Health Research data, the prevalence of stunting in Indonesia reached 30.8 percent. While the WHO target states that the stunting rate should not exceed 20 percent [1]. Based on data from the Indonesia Nutrition Status Survey (SSGI) released by the Ministry of Health, in 2022, the prevalence of stunting in Indonesia decreased by 2.8 percentage points compared to 2021, from 24.4% to 21.6%. However, this Figure 1 still exceeds the WHO target. The following are the numbers of stunting cases in Indonesia since 2007:



Figure 1.
The Percentage of Stunting in Indonesia by SSGI.
Source: Ministry of Health, Republic of Indonesia [2].

Referring to the graph, the efforts by the Indonesian government to address stunting have yielded positive results, as indicated by the declining trend. The Indonesian Ministry of Health announced the results of the Indonesia Nutrition Status Survey (SSGI), showing a decrease between the data from 2021 and 2022. The prevalence of stunting in 2021 was 24.4 percent, which then decreased to 21.6 percent in 2022. Looking back to 2013, the prevalence of stunting in Indonesia was still 37.2 percent. The decline began in 2016, with subsequent decreases in 2018, 2019, 2021, and 2022, when it managed to reach 21.6 percent. In the past decade, this has been the lowest decrease in stunting rates. Meanwhile, the prevalence of stunting in 2023, using 2022 data, remained at 21.6 percent. The target for stunting prevalence is set to reach 14 percent by 2024. The annual target is to reduce the stunting rate by 3.8 percent.

Although there has been a decrease, globally, based on UNICEF and WHO data, Indonesia's prevalence of stunting still ranks 27th out of 154 countries with stunting data, placing Indonesia 5th among Asian countries. This figure remains notably high. Despite the Indonesian Ministry of Health issuing policies, the results obtained have not met expectations. This fact raises a question about whether the stunting prevention policies that have been implemented truly address the core issues.

Stunting is not merely a matter of physical growth impairment; it also results in increased susceptibility to illness in children. Furthermore, it disrupts brain development and intelligence, posing a significant threat to the quality of human resources in Indonesia. Presidential Regulation Number 72 of 2021 on Accelerating Stunting Reduction explains that stunting is a disruption in a child's growth and development caused by chronic malnutrition and repeated infections, as evidenced by deviations in height or length below the standards set by the Ministry of Health.

The issue of stunting has short-term and long-term impacts on human resource quality [3]. In the short term, stunting cases lead to failure in child or toddler growth, hindrances in cognitive and motor development, low height, and other health problems. In the long term, it results in decreased intellectual capacity or adult intelligence, leading to low productivity. Problems related to nerves and brain cells slow down the learning process and give rise to diseases such as diabetes, heart disease, stroke, and hypertension [3] obesity risks [4]. Additionally, the long-term consequences of stunting include increased morbidity and mortality, poor child development and learning capacity, susceptibility to infections and non-communicable diseases in adulthood, and decreased productivity and economic capabilities [5].

Economically, stunting issues hinder economic growth and labor market productivity. They result in approximately an 11% loss in GDP and a reduction of up to 20% in adult worker income. This exacerbates inequality and reduces 10% of lifelong earnings, worsening intergenerational poverty. In the future, it will impede development and the opportunity to become a developed nation [6].

Preventing stunting in Indonesia is crucial because it can impact the physical and psychological growth and development of children. The high prevalence of stunting in Indonesia, particularly in certain regions, highlights the need for effective interventions to prevent this issue [7, 8]. One of the major causes of stunting is insufficient nutritional intake, both during pregnancy and in toddlers [9]. Several studies suggest that proper nutritional interventions, such as providing micronutrient supplements, vitamins, and proteins, can help reduce the risk of stunting and malnutrition [7, 8, 10]. Additionally, improving a balanced supplementary diet through nutritional counseling can also contribute to reducing stunting cases. Therefore, efforts to prevent stunting through appropriate nutritional interventions are crucial for improving the health and quality of life of children in Indonesia [9].

Although the Indonesian Ministry of Health has issued policies, the results obtained have not met expectations. This fact raises a question about whether the stunting prevention policies truly address the core issue. In connection with this, it becomes important to reevaluate stunting prevention and mitigation policies in Indonesia. There are three reasons why stunting prevention and mitigation in Indonesia has become a serious issue that needs immediate resolution. First, from a policy perspective, the prevalence of stunting exceeding the threshold ($< 20\%$) indicates that stunting prevention and mitigation policies have not been implemented as they should. Issues may arise in the policy formulation process, where policies taken may not adequately address the actual problems, or problems may occur during policy implementation. Therefore, a comprehensive evaluation is needed to identify root causes and find solutions to these issues [1].

Second, from the community participation perspective, active community involvement is crucial in supporting government policies. Community participation is essential because the community truly understands its conditions and situations, and they should be at the forefront in addressing stunting issues. Third, one of the visions of the President of the Republic of Indonesia is to focus on human resource development by providing health guarantees for pregnant women, infants, toddlers, and school children, including improving the quality of education and vocational training [11].

Furthermore, the lack of competent human resources and professional staff with expertise in accelerating stunting prevention programs is one of the shortcomings in stunting prevention policies in Indonesia. The number of specialists dedicated to stunting prevention is still insufficient compared to the scope of the issue, resulting in temporary and discontinuous interventions and limited outreach by counselors. Additionally, the budget allocated for stunting prevention activities is very limited and inadequate compared to the high prevalence of stunting among toddlers [12].

To address these issues, effective prevention measures are necessary, including through policy advocacy. Policy advocacy is a strategic effort to advocate for policy changes and practices aimed at raising awareness, support, and action towards stunting prevention. An important step in policy advocacy for stunting prevention is a profound understanding of the factors causing and the impacts of stunting, as well as relevant policies that need to be implemented. Social, economic, cultural, and environmental factors influencing stunting need to be comprehensively analyzed to formulate effective and sustainable policies [13].

This study aims to explore the landscape of stunting prevention policy in Indonesia and analyze potential advocacy strategies to strengthen the implementation of these policies. The research seeks to delve into the role of advocacy in influencing the formation, implementation, and evaluation of stunting prevention policies in Indonesia. By understanding the dynamics of advocacy and the factors influencing the policy process, this research aims to provide deep insights into how advocacy can be an effective tool in supporting stunting prevention efforts, as well as to identify strategies to enhance the effectiveness of policy advocacy in the Indonesian context.

Through this research, it is hoped that a deeper understanding of the challenges and opportunities in policy advocacy for stunting prevention in Indonesia will be obtained. The findings of this research are expected to make a significant contribution to strengthening stunting prevention efforts through effective and sustainable advocacy strategies. Thus, significant improvements in the nutritional status and well-being of children in Indonesia are expected to be achieved.

2. Literature Review

2.1. Definition and Concept of Stunting

Stunting is a condition of growth failure in children under the age of five due to chronic malnutrition and repeated infections, especially during the first 1000 days of life. It is also a condition of growth failure in toddlers caused by long-term malnutrition and inadequate parental care, resulting in children being shorter than their peers of the same age and experiencing cognitive delays [14]. According to Stewart et al. [5], stunting is a condition where a child's height is below -2 standard deviations from the median height-for-age according to the World Health Organization (WHO) growth standards, indicating poor linear growth during critical periods.

From a nutritional perspective, stunting is often explained as the result of a complex interaction between food and non-food factors that affect nutrient absorption, metabolism, and children's body growth. This condition is not only influenced by insufficient food intake but also by factors such as access to clean water and good sanitation, feeding practices and dietary patterns within families, and genetic factors that affect individual responses to nutrition [13].

Stunting is also defined as a condition characterized by chronically inhibited growth due to long-term malnutrition [15]. According to UNICEF [16], stunting is considered an irreversible growth disorder caused by inadequate nutrient intake and repeated infections. It indicates a disturbance in linear growth resulting from chronic malnutrition and recurrent infections. Children experiencing stunting, especially at a young age, may encounter growth disturbances in other organs, including the brain [17].

In the dimension of human development, stunting is viewed as a crucial indicator for measuring the quality of life and human potential of a population. Children experiencing stunting tend to have a higher risk of chronic diseases, cognitive

limitations, and other developmental issues that can affect their productivity and well-being in adulthood. Therefore, stunting is considered a serious challenge in efforts toward sustainable human development [18].

Stunting is a global health issue characterized by children's height being below two standard deviations from the median growth criteria of WHO [19]. Stunting occurs when children experience chronic malnutrition and is often caused by non-health issues such as economic, political, social, cultural, poverty, lack of women's empowerment, and environmental degradation [20]. This condition can result in children not reaching their optimal growth potential, leading to a poor quality of life and affecting a country's human capital.

The most commonly used method for assessing the nutritional status of children is through anthropometric assessment. Anthropometric indices used to determine stunting in children include height-for-age or length-for-age, referred to as the HAZ or LAZ index [2]. Height is an anthropometric parameter used to describe bone growth, measured from the highest point of the head or vertex to the lowest point of the heel bone or calcaneus. Height-for-age is a measurement of the ideal growth for a specific age and can be used as an indicator to determine nutritional status [2]. This index depicts the longitudinal growth or height of a child based on their age. The HAZ or LAZ index identifies children who are short (stunted) or severely short (severely stunted), which is caused by prolonged inadequate nutrient intake or frequent illness [2].

Table 1.

Body Length or Height-for-Age Index (HAZ or LAZ) Children aged 0 - 60 months.

Nutrition Status Category	The Threshold (Z-Score)
Extremely Short (Severely Stunted)	<-3 SD
Short (Stunted)	-3 SD sd <-2 SD
Normal	-2 SD sd +3 SD
High	> +3 SD

Source: Ministry of Health, Republic of Indonesia [2].

2.2. Causes of Stunting

The factors causing stunting in developing countries, such as Indonesia, are highly complex and involve various interconnected aspects. Firstly, inadequate access to proper nutrition is a major cause of stunting. Many children in rural or urban poor areas still suffer from malnutrition due to limited access to nutritious food and clean water. Lack of knowledge about proper nutrition also poses a problem, leading to imbalanced dietary patterns and insufficient consumption of nutrient-rich foods crucial for children's growth and development [21].

Moreover, poor sanitation is also a significant factor contributing to stunting in developing countries. Digestive tract infections caused by contaminated water and poor sanitation can disrupt nutrient absorption in children's bodies, ultimately hindering their growth [22]. Inadequate access to quality healthcare services and appropriate health education also contribute to the increasing rates of stunting in developing countries. Furthermore, socio-economic factors also play a crucial role in determining the prevalence of stunting in developing countries. Families with low incomes often cannot afford to purchase nutritious food or provide adequate healthcare for their children. Additionally, the lack of access to quality education and decent jobs for parents can also influence the nutritional status of children [23].

In the context of Indonesia, geographical and cultural factors also contribute to the high prevalence of stunting. For example, in remote or rural areas, access to healthcare and nutrition services is often limited. Unbalanced dietary habits, such as a tendency to consume high-carbohydrate foods with low protein and vitamin content, also exacerbate the stunting situation in Indonesia [14].

Stunting is caused by multidimensional factors and is not solely attributed to poor nutrition experienced by pregnant women and toddlers. Therefore, the most crucial interventions to reduce stunting prevalence need to be implemented during the first 1000 days of a child's life. Some factors contributing to stunting include:

1. Poor caregiving practices, including mothers' lack of knowledge about health and nutrition before and during pregnancy, as well as postpartum.
2. Limited healthcare services, including antenatal care (health services for pregnant women), postnatal care, and quality early childhood education.
3. Limited household/family access to nutritious foods.
4. Lack of access to clean water and sanitation.

Additionally, other factors contributing to stunting include maternal health and nutrition conditions before and during pregnancy and after delivery, maternal body stature (short stature), closely spaced pregnancies, too young or too old mothers, frequent pregnancies, inadequate nutritional intake during pregnancy, failure to initiate early breastfeeding (IMD), failure of exclusive breastfeeding, early weaning process, quantity, quality, and safety of complementary feeding given can also be factors contributing to stunting. Furthermore, socio-economic conditions and sanitation in living areas are also associated with stunting. Economic conditions are closely related to the ability to meet nutritional intake and healthcare services for pregnant women and toddlers [24].

Addressing stunting in Indonesia requires a comprehensive and cross-sectoral approach. Investments in child nutrition, improved access to sanitation and clean water, broader health education, and support for poor families to increase their income and well-being are critical to preventing and tackling stunting.

2.3. Impact of Stunting

Child stunting is one of the major human development challenges in many countries, especially in developing countries. The impact of stunting is complex and widespread, affecting various aspects of human life, including economic, socio-cultural, and health. Economically, stunting has serious long-term impacts. Stunted children tend to have limitations in cognitive and physical abilities, which in turn can hinder productivity in adulthood. For example, stunting can lead to reduced economic productivity and increased healthcare costs, which can negatively impact national development. Studies by the World Bank show that stunting can result in a 10-12% reduction in individual income in the long term, meaning countries with high levels of stunting may experience a significant reduction in economic growth [18]. Furthermore, stunting can perpetuate cycles of poverty and inequality, as stunted children are more likely to experience poor educational outcomes and reduced economic opportunities later in life [25]. Stunting prevention efforts can have significant positive impacts on society, including improved health outcomes, increased economic productivity, and reduced healthcare costs.

In addition to the impact on individuals and families, stunting can also have broader societal impacts. The socio-cultural impact of stunting is important to consider. Stunting can have a significant impact on society, especially on affected individuals and their families. Stunted children are often stigmatized and discriminated against in their communities and neighborhoods. This stigma can hinder their social and emotional development and limit their access to education and future economic opportunities. In addition, stunting can exacerbate social and economic inequalities, as children from poor families or with limited access to good nutrition are more vulnerable to stunting. Stunted children are also likely to experience poor educational outcomes and reduced economic opportunities later in life [25].

From a health perspective, stunting increases the risk of developing various chronic diseases in adulthood, such as diabetes, heart disease, and high blood pressure. Stunting can lead to an increased risk of disease, death, and delayed motor development, as well as long-term impacts on cognitive development and productivity [26]. Stunted children are also more susceptible to infections and other infectious diseases due to a weakened immune system resulting from malnutrition. These health impacts not only affect the stunted individuals but also the health system as a whole, with increased chronic disease burden and long-term healthcare costs [13].

The importance of addressing stunting not only in terms of individual health but also in the social and economic development of a country is becoming increasingly clear. Coordinated cross-sectoral efforts are needed to address stunting, including investments in public health education, child nutrition programs, improved access to clean water and sanitation, and support for families to practice healthy and nutritious diets [27].

In solving the problem of stunting, it is important to pay attention to the local context and understand the factors that cause stunting in a particular community. Through a comprehensive and sustainable approach, as well as support from various parties including governments, non-governmental organizations, the private sector, and the wider community, it is hoped to reduce the prevalence of stunting and improve the well-being of children around the world. Addressing stunting requires comprehensive interventions that address the multiple factors that contribute to the condition, including child-related factors, parental factors, and environmental factors such as hygiene and sanitation [26].

3. Research Methodology

3.1. Research Method

This study employs a qualitative approach to delve into the understanding of policy advocacy for stunting prevention in Indonesia. A qualitative approach was chosen as it provides ample space to explore the complex perspectives, experiences, and understandings within the actual social context. This method allows researchers to gain in-depth insights into advocacy processes, policy dynamics, and factors influencing the implementation of stunting prevention policies. Qualitative research is a method that focuses on the experiences, perceptions, and emotions of individuals or groups within a specific context. Creswell presents five approaches in qualitative research: narrative, phenomenology, grounded theory, ethnography, and case study. In this study, a descriptive qualitative design is employed to describe and analyze the role of advocacy in driving stunting prevention policies in Indonesia. The descriptive approach enables researchers to comprehensively explain the observed phenomena without attempting to manipulate specific variables.

3.2. Data

This research utilizes secondary data derived from official government documents, reports from non-governmental organizations, relevant academic studies, and mass media covering advocacy issues related to stunting prevention policy in Indonesia. Additionally, a content analysis approach is employed to explore and analyze relevant secondary data. This approach allows researchers to delve into the narratives, arguments, and understandings contained within these documents.

3.3. Data Analysis Techniques

The secondary data were analyzed through in-depth reading, thematic coding, and categorization of relevant information related to advocacy for stunting prevention policy. The analysis was conducted by considering the context, objectives, and implications of the analyzed documents. Furthermore, research validity was ensured through data triangulation, comparing findings from secondary data with information obtained from other sources, such as interviews with experts or field observations. Reliability was reinforced through consistency in the analysis process and data interpretation.

Despite using secondary data, this research still aims to provide a comprehensive understanding of the role of advocacy in the context of stunting prevention policy in Indonesia. By paying attention to careful analysis processes and adequate methodological reflection, the findings from this study are expected to contribute valuable insights to understanding and developing effective policies for stunting prevention in Indonesia.

4. Results and Discussion

The government has made various efforts in combating and preventing stunting in Indonesia. Stunting handling policies are designed with various strategies to ensure the achievement of set targets. Therefore, before implementing policies, in-depth analysis must be conducted to identify the appropriate targets according to community needs. The success or failure of policies is influenced by various factors, both internal and external.

Preventing and addressing stunting require convergent nutrition interventions aimed at tackling both direct and indirect factors related to stunting. The government has a legal basis for implementing and striving to improve nutritional status to accelerate stunting prevention and mitigation, as reflected in various laws and policies, as well as involvement in global movements.

Regulation of the Minister of Health of the Republic of Indonesia No. 23/2014 on Nutrition Improvement Efforts consists of 10 chapters and 35 articles. This policy explicitly states the policy objective (Article 2), which is to ensure that everyone has access to nutrition information and nutrition education, nutritious food, and nutrition and health services. To achieve this goal, it is necessary to increase access and quality of nutrition services in accordance with advances in science and technology and to improve the food and nutrition alert system.

The issue of stunting is presented as a matter of commitment and responsibility of the central and regional governments. Regulation of the Indonesian Minister of Health No. 23/2014 on Nutrition Improvement Efforts in article 2 (1) states that the regulation of nutrition improvement efforts aims to ensure that everyone has access to nutrition information and nutrition education, nutritious food, and nutrition and health services. This policy states that the central government, local governments, and/or the community guarantee the realization of individual and community nutrition improvement [1].

4.1. Stunting Prevention Policy in Indonesia

Stunting handling is a strategic government program that must continue to be pursued until the desired targets are achieved. This means that stunting handling as a priority program requires significant funding. If there are Ministries/Agencies or Regional Governments reallocating stunting funds, it constitutes a serious violation and must be subject to strict sanctions for the future of Indonesian children [28]. It cannot be denied that the success of regional governments in addressing stunting depends greatly on the commitment of regional leaders [1]. Research conducted by Satriawan [29] states that in Peru, high leadership roles have proven capable of reducing stunting prevalence from 28.5% in 2007 to 14.4% in 2015. Similarly, in Brazil, the commitment and leadership of the president, prioritizing efforts to improve nutrition and access to healthcare services, have been able to reduce stunting prevalence from 37% to 7% over a period of 30 years [29].

Efforts to address stunting in Indonesia will undoubtedly differ from those in various other countries. This is because the factors causing stunting also vary. Some of the causes of nutritional problems in children in Indonesia, including stunting, are due to a lack of nutritional intake and health status, as well as access to environmental sanitation facilities. Factors related to nutritional problems include issues with access to nutritious food security, and social environmental factors such as parenting patterns (inappropriate child feeding), health services, and environmental health aspects like clean water facilities and sanitation provision [4]. In a study conducted by Haile and Headey [30], increasing milk consumption can be an effective strategy to reduce the problem of child malnutrition. This study highlights the importance of dairy consumption in reducing child stunting in low- and middle-income countries and encourages further investment in dairy production and trade reforms to address malnutrition in developing countries. The study also discusses the impact of dairy consumption on child nutrition and growth, with a focus on developing countries, and emphasizes the importance of animal-based foods, such as dairy, in improving child health and reducing malnutrition. This could be a solution for addressing nutritional issues in Indonesia.

In addition to nutrition-related issues, stunting is closely linked to economic or societal opinions regarding access to nutrition and healthcare services. Furthermore, there is a need for behavioral change education, especially regarding nutrition, as there is still a belief among communities that stunting is hereditary, which is not entirely true. However, neglecting the growth and development of children, which can be directly observed through abnormalities, exacerbates the child's or toddler's condition. Therefore, a comprehensive approach to addressing stunting is necessary, not only focusing on healthcare resolution.

The government has undertaken various initiatives to uphold and enforce the rights to health of children affected by stunting, as part of its responsibility. These efforts include regional and national campaigns to raise awareness, discussions to enhance collaboration and support, educational programs and training sessions, direct interventions to address malnutrition, indirect actions to ensure sufficient nutritional intake, routine healthcare assistance for poor families, and limited access to drinking water in rural areas at around 60.10%. The government has also implemented various initiatives to reduce the prevalence of stunting. It has taken steps to prevent and reduce both direct (special nutrition care) and indirect (nutrition-sensitive interventions) disruptions to the nutritional status of the population. The primary focus of these efforts is targeting individuals involved in the first 1000 days of life (HPK), including pregnant women, breastfeeding mothers, and children aged between 0 and 2 years. Significant demographic groups include children aged between 24 and 59 months, adolescents, and women of childbearing age.

Based on our research, one form of responsibility of the Indonesian government in dealing with stunting cases is by providing budget support in the form of the APBN, the central government budget. In addition to providing financial support, the government also provides assistance in the form of social support for people who are not sufficient in economic aspects, using the Family Hope Program (PKH). In the field of health and child protection, the government allocates a budget for several ministries and institutions, one of which is through the Ministry of Health and the BKKBN. The APBN budget

allocation for child welfare in the field of health and child protection was Rp. 48.3 trillion in 2022 and 49.4 trillion in 2022. 48.3 trillion in 2022 and 49.4 trillion in 2023 [31]. The state budget includes funds to accelerate stunting reduction through three interventions: sensitive interventions, specific interventions, and interventions involving multiple agencies and cross-sector collaboration. The total government budget for this initiative is IDR 34.15 trillion in 2022 and IDR 30.4 trillion in 2023. With such substantial funding, the government hopes that all involved parties in the stunting reduction program can maximize efforts and achieve the set targets.

This research found that various policies and programs have been implemented in Indonesia to combat stunting, encompassing a multi-faceted approach. The Integrated Stunting Prevention Program (P2G), initiated in 2018, aims to enhance the nutritional well-being of pregnant women and children under two years old through diverse interventions such as nutrition education, exclusive breastfeeding promotion, and improved healthcare access. Additionally, the Maternal and Child Health Handbook serves as a crucial tool for monitoring the growth and development of children under five, providing essential information on nutrition, immunizations, and other health-related topics to foster healthy practices and prevent stunting [32, 33].

Community empowerment programs have been instrumental in raising awareness and encouraging healthy behaviors within local communities by involving members in the design and execution of stunting prevention strategies, with the overarching goal of improving healthcare access and promoting overall well-being. Despite efforts to synchronize stunting prevention policies across various governmental bodies, challenges persist in their effective implementation [26]. Furthermore, advocacy programs have been pivotal in amplifying awareness about stunting and advocating for healthy practices among diverse stakeholders, including government officials, healthcare providers, and community members, in a concerted effort to prevent stunting and ensure the health of Indonesia's population [32, 34].

These policies have brought some success in efforts to reduce stunting. This is reflected in a significant decrease in the prevalence of stunting in Indonesia from 36% in 2013 to 21.1% in 2022. In addition, the success of programs that have been implemented to overcome stunting, such as the Supplementary Food Program for Pregnant Women and Toddlers (PMIB), the Integrated Stunting Prevention Program (P2G), Maternal and Child Health Cadres (KKIA), and community empowerment programs. By involving various aspects, from nutrition education to improving access to health services, these programs have made a significant contribution to reducing stunting rates. Furthermore, there is a clear effort to improve coordination between relevant departments in the political convergence of stunting prevention. This step strengthens the synergy between various policies and initiatives, increasing the effectiveness in addressing stunting holistically [32, 35].

4.2. Challenges in Stunting Prevention in Indonesia

This research found that the Indonesian government has established many policies to deal with the problem of stunting, but in reality, there are still shortcomings in these policies. Stunting achievement has not yet met the set target of 14% by 2024. The main challenge in tackling stunting is weak coordination at the provincial and district levels. Bappeda is supposed to regularly coordinate with various sectors to monitor the implementation of the Regional Action Plan on Food and Nutrition (RAD-PG), but what Bappeda does is generally limited to budget monitoring. The result is that each sector manages its programs independently without proper integration.

There is also a lack of substantial investment to support stunting prevention programs. These constraints limit the ability to implement programs optimally and achieve the desired targets. Furthermore, not all regions have stunting-specific regional work plans (RKPD), which reduces the effectiveness of implementing prevention programs. There is still a lack of understanding among the community about the importance of stunting and prevention practices, which is a barrier to achieving active participation and support from all levels of society. Issues related to collaborative data between departments are also a serious obstacle, hampering the evaluation and analysis of the success of prevention programs. Therefore, overcoming these challenges requires greater commitment from the government, the community, and various stakeholders to increase investment, awareness, and coordination in stunting prevention efforts. This finding is in line with research conducted by Vaivada et al. [19].

Furthermore, in a study conducted by Natsir [12], it is stated that despite the government having established policies regarding stunting intervention, the prevalence of stunting remains high in many areas. This is due to the insufficient number of competent human resources at the regional level, limited funds available for healthcare apparatuses with extensive coverage areas that are difficult to reach, and inadequate facilities and infrastructure for monitoring target groups (pregnant women, toddlers, etc.). Additionally, Natsir also mentions several factors hindering the implementation of stunting prevention programs, including internal factors such as societal indifference towards health and low levels of education. Furthermore, external factors include the incompetence of many bureaucrats regarding the issue, resulting in stunting problems being merely seen as projects that need to be carried out without considering their broader impacts on the economy, society, politics, and national security.

Supadmi et al. [36] also argue that the Indonesian government has focused on stunting prevention with three considerations: improving dietary patterns, parenting styles, sanitation, and access to clean water. Non-health issues often underlie stunting problems, such as economic, political, social, cultural issues, poverty, lack of women's empowerment, and environmental degradation. However, in reality, these policies are still in the implementation phase, and their success needs further evaluation. Furthermore, according to Sudigyo et al. [7], the challenges faced include limited access to quality healthcare and nutrition services, low levels of education and nutritional awareness among the populace, as well as a lack of coordination among relevant agencies in implementing stunting prevention programs. Based on policy analysis and previous research, the challenges of implementing stunting prevention policies found by this study are:

1. Interagency Coordination: Reported limitations in coordination among relevant local government bodies affect the effectiveness of implementation.
2. Access to tools and resources: Budget constraints and the availability of human resources affect program execution.
3. Shift in Mindset and Perception: The absence of specific programs and the limited understanding of the community regarding stunting, not only as a health issue but also as an economic, political, and social problem.
4. Communication and Notification: The importance of policy communication in stunting prevention has not been ideally implemented due to budget constraints and differing viewpoints.
5. Monitoring and evaluation: Requires systematic monitoring and evaluation of stunting intervention programs to maintain performance and facilitate corrections when needed.
6. Understanding the importance of integrating with other programs, such as supplementary feeding for pregnant women and malnourished toddlers.
7. Community Participation: Involving the community in decision-making processes and ownership of stunting intervention programs.

In the prevention and mitigation of stunting, it is necessary to have references that can be used in coordinating actions so that implementation can proceed smoothly. It is advisable to strengthen the National Acceleration Strategy for Stunting Prevention. The general objective of establishing this national strategy is to ensure that stunting prevention and mitigation become priorities for the government and all layers of society. Furthermore, it aims to strengthen coordination among various programs down to the village level, enhance food security, and improve monitoring and evaluation of every program/activity conducted. The acceleration of stunting prevention and mitigation is then carried out gradually and sustainably by each Province/District/City, guided by established policies.

4.3. New Policy Model Using Artificial Intelligence

The integration of artificial intelligence (AI) in combating stunting in Indonesia promises significant progress in addressing malnutrition issues in children. The use of AI in addressing stunting has been studied by several researchers. A study conducted by Sahamony et al. [37] demonstrates that the development of prediction models using machine learning, such as the Naïve Bayes algorithm, has yielded promising results in predicting child stunting with high accuracy. With an optimal prediction model in place, healthcare practitioners can identify stunting risks early and provide appropriate and effective interventions to prevent and address stunting in children.

Furthermore, Ula et al. [38] also investigated the utilization of AI in stunting prevention. The results show that artificial intelligence can aid in stunting prevention by employing machine learning to automatically classify children's nutritional status. By implementing decision tree algorithms, the system can assist healthcare workers in determining children's nutritional status with a high level of accuracy. This allows for early identification of children at risk of stunting and facilitates more efficient intervention.

The widespread use of Artificial Intelligence (AI) is indeed crucial in aiding the fight against stunting because AI can assist in the early identification of stunting risks through the development of prediction models using Machine Learning. Optimal prediction models can help healthcare practitioners provide timely and effective interventions to prevent and address stunting in children. With AI, health data analysis can be conducted more efficiently and accurately, enabling more timely and effective preventive actions in addressing stunting issues. In this study, several benefits of using AI to aid in combating stunting can be outlined as follows:

Firstly, AI can be utilized to analyze health and nutrition data from various sources simultaneously, including medical data from healthcare centers, nutrition surveys, and demographic data. By employing sophisticated data processing algorithms, AI can identify patterns related to stunting more quickly and accurately, assisting health experts and decision-makers in gaining deeper insights into the factors contributing to the problem.

Furthermore, AI can be used in the development of more efficient monitoring and evaluation systems. For instance, AI-based monitoring systems can utilize sensor technology to monitor children's growth and development in real-time, as well as identify children at risk of stunting early on. Moreover, using machine learning techniques, these systems can provide tailored intervention recommendations based on individual characteristics and identified risk factors, enabling healthcare workers to provide more targeted care.

The use of AI can also be expanded into the development of educational and outreach programs. AI-based learning systems can be designed to provide personalized and interactive information about child nutrition and care to parents and caregivers. For example, mobile applications or online platforms utilizing AI technology can offer food recommendations tailored to a child's nutritional needs based on growth data and health conditions. Consequently, parents and caregivers can better understand and implement healthy nutritional practices in their daily lives.

Furthermore, AI can also be used in developing technological solutions to improve access to healthcare and nutrition services in remote or isolated areas. For instance, the development of telemedicine applications supported by AI can enable pregnant and breastfeeding mothers to receive remote medical consultations without having to visit healthcare centers. Similarly, technological solutions like AI-supported nutritious food delivery systems can help ensure the availability of nutritious food in areas difficult to reach by conventional services.

However, in integrating AI into stunting prevention, it is crucial to consider various challenges and considerations, including ethical, privacy, and data security aspects. Challenges in using AI in stunting prevention include the availability of quality and representative data regarding children's nutritional status, especially in hard-to-reach areas. Additionally, a deep understanding of data processing and selecting the appropriate machine learning models to accurately classify children's nutritional status is required. This necessitates training and capacity-building for healthcare workers and educators to ensure

they can effectively utilize AI technology in their daily practice. Moreover, integrating AI into healthcare systems requires significant investment in infrastructure and healthcare workforce training to implement this technology effectively. If these challenges can be addressed adequately, the integration of AI into stunting prevention policies in Indonesia can be an effective solution to addressing malnutrition issues in children and improving the quality of life and the future of the next generation.

4.4. Advocacy Strategy

To address the issue of stunting in Indonesia, a comprehensive policy advocacy strategy is needed. Firstly, the initial step is to raise public awareness of the importance of balanced nutrition and proper child care. This can be achieved through educational campaigns targeting various segments of society, from rural villages to urban areas. Involving community leaders, such as religious leaders and public figures, in disseminating important messages about nutrition and child care will also help increase community acceptance and understanding.

Furthermore, policy advocacy should strive for adequate budget allocation for stunting prevention programs. This includes increasing funds for nutrition programs, maternal and child healthcare, and health education. Advocating for the importance of allocating adequate resources for stunting prevention in parliament and to decision-makers will be a strategic step in ensuring the necessary financial support.

Advocacy should also advocate for policies that support community access to quality nutrition. This includes advocating for regulations that restrict unhealthy food advertising, promoting the production and distribution of nutritious food at affordable prices, and ensuring community access to clean water and adequate sanitation. Supporting initiatives such as exclusive breastfeeding, increasing the availability of vegetables and fruits, and developing nutrition education programs for pregnant and lactating mothers are also integral parts of the advocacy strategy.

Furthermore, it is important to advocate for evidence-based and holistic policies. This means supporting ongoing research and monitoring of factors contributing to stunting, as well as developing evidence-based intervention programs that consider various aspects, including social, economic, and cultural factors. Ensuring that these policies and programs are sustainable and accessible to all segments of society is also a primary focus of this policy advocacy.

Another equally important strategy is the use of Artificial Intelligence (AI), which can strengthen stunting prevention policy monitoring and evaluation systems. By leveraging machine learning technology, AI can assist in analyzing complex data and provide deep insights into the effectiveness of ongoing stunting prevention programs. By detecting patterns emerging from real-time data, policies can be dynamically adjusted to optimize outcomes. Moreover, AI can also be used to predict stunting risks in specific populations, enabling stakeholders to take more proactive and timely preventive actions. Thus, integrating artificial intelligence into stunting prevention policies not only enhances technological aspects but also improves the accuracy and efficiency of interventions.

Lastly, policy advocacy should promote active community engagement in the planning, implementation, and monitoring of stunting prevention programs. This can be achieved by involving community groups such as mothers' groups, grassroots organizations, and non-governmental organizations at various stages of policy and program development. By directly involving the community, a greater sense of ownership over stunting prevention efforts will be fostered, thereby increasing the long-term success prospects of this advocacy strategy.

5. Conclusion

Based on the findings of this research, it can be concluded that stunting poses a serious challenge in Indonesia, requiring strong policy advocacy from both the government and society. Limited access to healthcare and nutrition services, low levels of education and nutritional awareness among the population, as well as a lack of coordination among relevant agencies, are major obstacles to stunting prevention efforts. Comprehensive policy advocacy strategies, including the use of Artificial Intelligence (AI), are expected to help identify stunting risks early, provide appropriate interventions, and advocate for adequate budget allocations. Continuous evaluation of stunting prevention policies is also key to finding more effective solutions. Therefore, greater commitment from the government and society is needed to increase investment, awareness, and coordination in advocating for stunting prevention policies, in order to improve the overall quality of life for Indonesian children.

Furthermore, in stunting prevention and mitigation, references are needed to guide coordinated actions for effective implementation. Strengthening the National Acceleration Strategy for Stunting Prevention is necessary to ensure that stunting prevention and mitigation become priorities for the government and all layers of society. Moreover, enhancing coordination among various programs down to the village level, improving food security, and enhancing monitoring and evaluation of every program/activity conducted are crucial. The acceleration of stunting prevention and mitigation should be carried out gradually and sustainably by each Province/District/City, guided by established policies.

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