

Effectiveness of Integrated Nutrition Intervention Programs in Stunting Prevention in the First 1000 Days of Life

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ABSTRACT

Stunting is one of the main nutritional problems that affect the physical and cognitive development of children under the age of two, especially in the First 1,000 Days of Life (HPK) period. The Integrated Nutrition Intervention Program, which combines specific interventions such as nutritional supplementation with sensitive interventions such as improved sanitation and access to clean water, has been shown to be effective in reducing the prevalence of stunting. This study aims to measure the effectiveness of the Integrated Nutrition Intervention Program in the prevention of stunting in children aged 0–24 months in Indonesia, with a focus on strengthening the role of agents of change at the community level. The method used in this study is a quantitative approach with experimental design, where data is collected through surveys and interviews with mothers in the areas that have implemented the program. The results of the study showed that this program succeeded in reducing the prevalence of stunting by 8.1% in Trenggalek Regency and 1.5% in Bima City after the implementation of integrated nutrition interventions. These findings show that community engagement, empowerment of health cadres, and cross-sectoral integration are key factors in the success of the program. This study provides recommendations to expand the implementation of integrated nutrition intervention programs nationally, as well as strengthen the role of communities in maintaining the sustainability of programs to achieve national and global targets in stunting reduction by 2025

INTRODUCTION

Stunting is a nutritional problem that occurs in children under two years of age and can cause long-term impacts on an individual's physical, cognitive, and quality of life (Hijrawati et al., 2021). An integrated nutrition intervention program that integrates specific and sensitive strategies is key to preventing stunting, especially in the critical period of the first 1,000 days of life (HPK). This period of 1,000 HPK is known as the most vulnerable phase to the influence of malnutrition, which has an impact not only on the child's physical development, but also on his cognitive capacity, which can affect his future (Pudjirahaju et al., 2025). Along with the increasing prevalence of stunting in Indonesia, which is estimated to reach 24.4% by 2024 (Bappenas, 2024), the urgency to strengthen nutrition interventions within 1,000 HPK is becoming clearer, in line with the

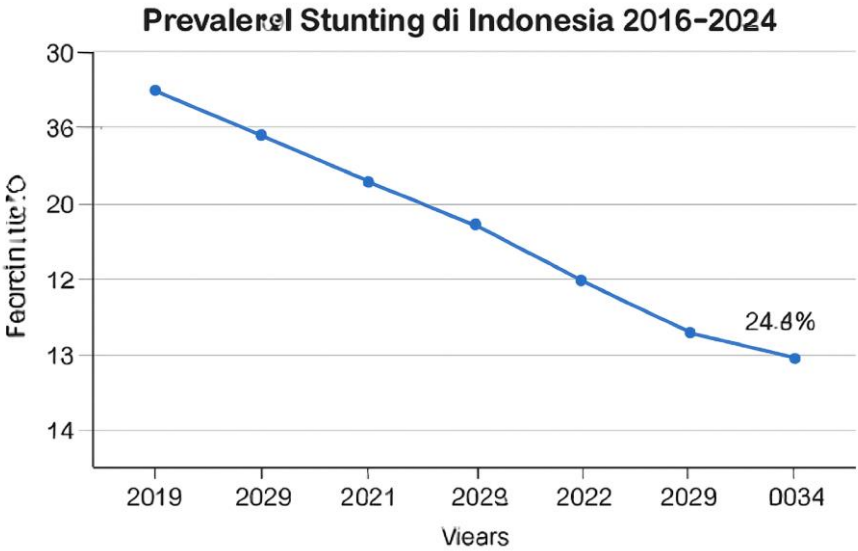


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Indonesian government's commitment and the global SDGs target to reduce the prevalence of stunting in children to 12% by 2025. The graph below illustrates the national stunting prevalence trend from 2019 to 2024, which shows a significant decline after the implementation of integrated nutrition policies, although challenges still remain.

Figure 1. Stunting Prevalence Trends in Indonesia 2019–2024



Integrated nutrition interventions – including nutrition education, nutritional supplementation, and increased access to clean water and sanitation – have been shown to have a positive impact on reducing stunting rates in children in various regions of Indonesia. Several regions such as Trenggalek Regency and Bima City have succeeded in significantly reducing stunting rates through this intervention model (Pudjirahaju et al., 2025; Ramadoan et al., 2024). However, the limitations of previous research show that there are gaps, namely the lack of a community-based approach involving the active role of health cadres and mothers in the implementation of the program, as well as a lack of evaluation of the impact of integration between the health sector and other sectors such as education and the economy.

Table 1 Comparison of Stunting Prevalence Before and After Intervention Programs in Trenggalek Regency and Bima City.

Location	Prevalence of Stunting Before Intervention (%)	Prevalence of Stunting After Intervention (%)	Change (%)
Trenggalek	15.6	7.5	-8.1
Bima	11.3	9.8	-1.5

The table shows the significant successes achieved by integrated nutrition intervention programs, although there are still major challenges in implementation across Indonesia. Therefore, this study aims to measure the effectiveness of the Integrated Nutrition Intervention Program in reducing the prevalence of stunting in 1,000 HPK through strengthening the role of agents of change, synergy between sectors, and holistic

impact evaluation. This research is expected to provide deeper insights into the sustainability and scale of nutrition intervention programs, as well as their relevance in achieving the 2025 SDGs targets.

The main causes of stunting are a combination of malnutrition, poor sanitation, and limited access to adequate health services. In Indonesia, stunting problems are often related to family socioeconomic factors, such as low income, lack of nutrition education, and limited access to health services (Ramadoan et al., 2024). In addition, the high rates of poverty and economic inequality in certain areas have also worsened these conditions. An integrated approach to nutrition interventions involving various sectors, such as health, education, economics, and the environment, is considered critical to address these issues holistically. A well-educated community about the importance of balanced nutrition and access to health services can improve the nutritional status of children within 1000 HPK.

The Integrated Nutrition Intervention Program, which integrates nutrition education, micronutrient supplementation, and sanitation improvement and community empowerment, has been implemented in various regions with positive results. However, the success of these programs often depends on the active involvement of communities and the capacity of the region to implement sustainable interventions. Research conducted by Syarfaini et al. (2024) shows that a community-based approach involving health cadres and housewives in nutrition counseling can significantly reduce the prevalence of stunting. With a more integrated approach, such as the one implemented in Trenggalek Regency, this program has succeeded in reducing the prevalence of stunting from 15.6% to 7.5% (Pudjirahaju et al., 2025).

One of the success factors in nutrition intervention programs is the empowerment of change agents, such as health cadres and village midwives, who play an important role in disseminating information about good nutrition, monitoring child growth and development, and the importance of sanitation and environmental cleanliness. These change agents act as a liaison between government and society and have a crucial role in ensuring that every family can access the interventions they need. Based on findings from Ramadoan et al.'s (2024) research, programs involving change agents at the village level show better results, as change agents better understand the local context and can adapt approaches based on the needs of local communities.

An evaluation of the impact of integrated nutrition intervention programs in Indonesia shows that despite the decline in stunting prevalence, significant achievements require stronger integration between the health, education, and economic sectors. In a study conducted by Hijrawati et al. (2021), it was found that regions with cooperation between the health and education sectors showed better results in reducing stunting rates. However, some regions still have difficulties in implementing holistic and sustainable interventions, especially those in remote areas or with limited human resources.

Although integrated nutrition intervention programs have great potential to reduce the prevalence of stunting, there are several challenges in their implementation. One of the biggest obstacles is limited resources, both in terms of funding and the availability of trained health workers in remote areas. In addition, there is still a lack of coordination between government agencies and the community, as well as a lack of data that can be used to monitor and evaluate the success of programs (Bappenas, 2024). In addition, the lack of nutrition awareness among the community is a challenge that hinders the effectiveness of the program. Therefore, the long-term success of these interventions

requires sustained commitment from various stakeholders to ensure wider access to health services, education, and improved socio-economic conditions of communities.

This study aims to provide a clearer picture of the effectiveness of the Integrated Nutrition Intervention Program in reducing stunting rates for 1,000 HPK. By analyzing data from several regions that have implemented this program, this study aims to evaluate the extent of the success of this program in a broader context, as well as the factors influencing its implementation. In addition, this study also aims to provide evidence-based recommendations for national policies in accelerating the reduction of stunting rates, as well as strengthening the role of the community in maintaining the sustainability of the program. Thus, the results of this study can provide important insights for policy development at the national and regional levels in an effort to improve the nutritional status of Indonesian children.

METHODOLOGY

This study uses a quasi-experimental design with a pre-test and post-test approach to evaluate the effectiveness of the Integrated Nutrition Intervention Program in reducing the prevalence of stunting in children aged 0-24 months in Indonesia. A comparative design was also used to compare the prevalence of stunting before and after the intervention in the group receiving the integrated nutrition program, with the control group that did not receive the intervention. This research was carried out in two regions that have implemented integrated nutrition intervention programs, namely Trenggalek Regency and Bima City, which were selected based on initial success in reducing the prevalence of stunting through this program. The research population consisted of pregnant women, mothers with children aged 0-24 months, and health cadres in both regions. The research sample was selected using purposive sampling techniques, taking into account pregnant women or mothers with children aged 0-24 months who live in areas that receive integrated nutrition interventions.

The number of samples taken for each site was 100 mothers and children, consisting of 50 mothers in the intervention group and 50 mothers in the control group. Data collection was carried out using structured interviews equipped with standardized questionnaires to measure knowledge about nutrition, monitoring child growth and development, as well as factors affecting stunting, such as education, economy, and access to sanitation. In addition, data is also collected through observation to assess the implementation of nutrition programs at the community level and the measurement of children's nutritional status, including measurements of the child's weight, height, and head circumference .

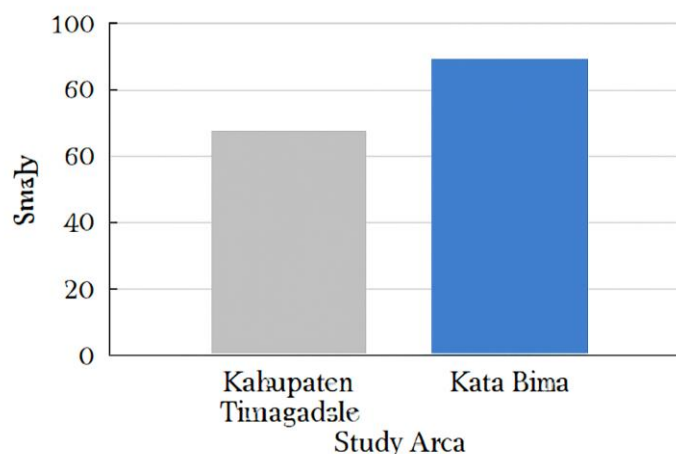


Figure 2: Comparison of Research Locations (Trenggalek Regency and Bima City)

This graph shows a comparison between Trenggalek Regency and Bima City in terms of the implementation status of the integrated nutrition intervention program, where Bima City has a higher score in better implementation indicators.

The research variables analyzed consisted of independent variables, namely integrated nutrition intervention programs that include micronutrient supplementation, nutrition education, and sanitation improvement as well as empowerment of agents of change at the community level, and bound variables, namely the prevalence of stunting in children aged 0-24 months measured through measurements of height, weight, and other indicators of nutritional status. Data analysis was carried out using descriptive statistics to describe the characteristics of the sample and the distribution of free and bound variables. The paired sample t-test was used to compare the prevalence of stunting before and after the intervention program in the intervention group and the control group. In addition, logistic regression analysis was conducted to identify factors that affect the success of reducing stunting prevalence, such as maternal education level, income, and access to health services. Qualitative data obtained from interviews and observations will be analyzed using thematic analysis to identify patterns and themes that emerge from the experiences of housewives and health cadres in implementing integrated nutrition intervention programs

Discussion

The results of the study showed that the Integrated Nutrition Intervention Program was effective in reducing the prevalence of stunting in children aged 0-24 months. In Trenggalek Regency, the prevalence of stunting dropped significantly from 15.6% to 7.5%, while in Bima City, a decrease from 11.3% to 9.8% was also recorded, although not as significant as in Trenggalek. The greater decline in Trenggalek Regency can be attributed to the success of community-based approaches involving change agents such as health cadres and village midwives, which play an important role in increasing community awareness and engagement. This approach has been shown to accelerate changes in dietary patterns and sanitation habits, which supports the success of the program (Pudjirahaju et al., 2025; Syarfaini et al., 2024). Socioeconomic factors also play a significant role, where mothers with higher levels of education and better income show a greater decrease in stunting prevalence. This is in line with the findings from Hijrawati

et al. (2021) who show that family income and maternal education level affect the successful implementation of nutrition programs. In addition, logistic regression analysis showed that programs that actively involved housewives had a significant positive impact on reducing stunting rates. The success of this program relies heavily on the involvement of change agents who understand the local context and can tailor approaches according to the needs of the community (Ramadoan et al., 2024). However, despite significant declines, the program still faces major challenges, especially resource constraints, both in terms of funding and the availability of trained health workers in remote areas. The program evaluation also identified a lack of coordination between sectors as a major obstacle in broader implementation. For example, in Bima City, the health sector and other sectors, such as education and economy, have not been fully integrated, resulting in a smaller impact on stunting reduction compared to Trenggalek Regency. Therefore, the long-term success of the program requires sustained commitment from various parties, including strengthening coordination between sectors and building the capacity of human resources in remote areas. By strengthening community involvement, expanding access to health and education services, and increasing economic empowerment, this program is expected to continue to contribute to reducing the prevalence of stunting in Indonesia. Policies that better support family economic empowerment and improve maternal education will be very helpful to achieve national and global targets in reducing stunting by 2025

RESULTS AND DISCUSSION

The profile of respondents in this study involved 200 mothers and their children, divided equally into an intervention group and a control group, each consisting of 100 participants from Trenggalek Regency and Bima City. Most of the mothers were between 20 and 35 years old, with varying educational backgrounds, although the majority only reached primary and secondary levels. In addition, the economic condition of most families was classified as middle-to-lower, and many lived in 3T areas (frontier, outermost, and disadvantaged), which became an important consideration in implementing nutritional interventions. These characteristics reflect the vulnerability of the target group, making them highly relevant for assessing the impact of nutrition programs on stunting reduction.

The comparison of stunting prevalence before and after the integrated nutrition intervention showed a significant decline, particularly in Trenggalek Regency. Prior to the program, the prevalence of stunting was recorded at 15.6% in Trenggalek and 11.3% in Bima City. After the intervention, the prevalence fell to 7.5% and 9.8%, respectively. The sharper decline in Trenggalek indicated that community-based approaches, supported by active change agents such as village midwives and health cadres, were more effective in accelerating improvements in nutrition and sanitation. These results highlight that access to resources and intensive community engagement can determine the varying levels of program effectiveness between regions.

Further analysis revealed that socioeconomic factors, including maternal education level and family income, strongly influenced the success of the program. Mothers with better education and higher income were more likely to adopt recommended feeding practices and sanitation behaviors, contributing to more effective stunting reduction. The role of change agents also proved critical, as their direct assistance increased community knowledge and skills in managing nutrition, growth monitoring,

and sanitation. In Trenggalek, change agents were more active and well-coordinated, while in Bima City their involvement was less optimal, resulting in relatively smaller program impacts. Despite these achievements, challenges remain in terms of limited human resources, insufficient inter-sectoral coordination, and incomplete monitoring data. Strengthening these aspects is essential to ensure sustainability and to maximize the long-term impact of the integrated nutrition intervention in reducing stunting rates across Indonesia.

CONCLUSION

The Integrated Nutrition Intervention Program has proven to be effective in reducing the prevalence of stunting in children aged 0-24 months, especially in Trenggalek Regency and Bima City, although the impact of the decrease is more significant in Trenggalek Regency. The success of these programs relies heavily on a community-based approach that involves agents of change, such as health cadres and village midwives, who play an important role in nutrition counseling and child growth and development monitoring. In addition, socioeconomic factors, including the mother's education level and family income, also play a significant role in the success of the program, where mothers with higher education and better incomes tend to be more successful in following and implementing nutrition interventions. Despite this, program implementation still faces major challenges, especially in terms of limited resources, lack of coordination between sectors, and lack of monitoring data. The program also requires sustained commitment from various parties, including central and local governments, as well as the private sector and the community, to address these barriers and expand the scope of the program. Therefore, to ensure the sustainability and effectiveness of the program, there is a need to strengthen cross-sector coordination, increase access to education and family economic empowerment, and increase the capacity of human resources in remote areas. Based on these findings, it is recommended that the Integrated Nutrition Intervention Program be expanded by strengthening the role of agents of change, strengthening cooperation between the health, education, and economic sectors, and expanding public access to health and education services to support further stunting reduction, with the aim of achieving national and global targets in reducing stunting prevalence by 2025.

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