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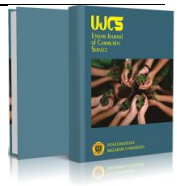

Educational Programme on Iron and Vitamin D Supplementation for Parents of Toddlers at Risk of Stunting

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Abstract: Stunting is a chronic nutritional problem in toddlers that affects physical growth, cognitive development, and long-term health. One of the risk factors for stunting is iron and vitamin D deficiency, both of which play important roles in children's growth and development. Educating parents about iron and vitamin D supplementation serves as a promotive and preventive strategy to reduce the risk of stunting, particularly among at-risk toddlers. This community service activity aimed to analyze the effect of parental education on the use of iron and vitamin D supplements among toddlers at risk of stunting. A pre-experimental design with a one-group pretest–posttest approach was employed. The participants were parents who received structured education on the benefits, dosage, and methods of administering iron and vitamin D supplements. The pretest results showed low knowledge in 22% of respondents, moderate in 22%, and high in 56%, while the posttest results indicated low knowledge in 5%, moderate in 10%, and high in 85%. Statistical analysis showed a significant increase in knowledge ($p = 0.020$), accompanied by improved practical understanding as observed from participants' responses. This activity contributes to stunting prevention efforts by enhancing community-level micronutrient literacy.

Keywords: Supplementation Education, Iron, Vitamin D, Toddlers, Stunting.

Introduction

Stunting is a chronic nutritional problem that remains a major public health challenge in Indonesia and other developing countries. This condition is characterized by low height-for-age due to chronic malnutrition occurring from the prenatal period through to early childhood, particularly during the first 1,000 days of life (Martorell & Young, 2012). Stunting not only affects physical growth but also impacts cognitive development, learning ability, productivity in adulthood, and increases the risk of non-communicable diseases later in life (Dewey & Begum, 2011).

According to the results of the 2024 Indonesian Nutrition Status Survey (SSGI), the national prevalence of stunting remains at 19.8%; although this figure has decreased, it still indicates that the issue of stunting has not yet been fully resolved (Ministry of Health of the Republic of Indonesia, 2025). This situation underscores the need to strengthen targeted and sensitive nutritional interventions, particularly among infants at risk of stunting, to support the achievement of the national target for accelerating the reduction of stunting. Inadequate intake of micronutrients, particularly iron and vitamin D, is one of the key determinants contributing to the occurrence of stunting.

Iron contributes to the formation of hemoglobin, oxygen transport, and cellular metabolic processes that support children's growth and development. Iron deficiency in infants is often associated with anemia, which can impair children's growth and cognitive development (Gannika, 2023). Meanwhile, vitamin D plays an essential role in calcium and phosphorus metabolism, bone formation and mineralization, and linear growth (Lestari et al., 2014). Several studies indicate that vitamin D deficiency is associated with

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growth retardation and an increased risk of stunting in children (Putra et al., 2025).

The provision of iron and vitamin D supplements is one of the specific nutritional interventions recommended to improve nutritional status and support the growth and development of infants and young children (WHO, 2016). However, the effectiveness of supplementation depends not only on the availability of supplements, but also on parents' level of knowledge, attitudes, and adherence to administering supplements correctly and consistently (Metri et al., 2024). Several studies report that parents' limited understanding of the benefits, dosage, and administration of supplements is a major barrier to the implementation of supplementation programmes for infants and young children (Amira & Setyaningtyas, 2021).

Nutrition education for parents is a promotive and preventive strategy that plays a vital role in enhancing the success of supplementation interventions. Education delivered in a structured and need-based manner has been shown to improve parents' knowledge and adherence to supplement administration, thereby having a positive impact on improvements in growth and development indicators among infants and young children (Metri et al., 2024). Nevertheless, community service activities specifically examining the impact of education on the administration of iron and vitamin D supplements on the growth and development of infants at risk of stunting remain limited, particularly within the context of communities in Indonesia. Based on the above, this community service initiative aims to analyze the impact of education on the administration of iron and vitamin D supplements on the growth and development of infants at risk of stunting. The results of this initiative are expected to provide a scientific basis for the development of effective nutrition education strategies as part of efforts to accelerate the reduction of stunting through family- and community-based approaches.

Method

This stunting awareness campaign was carried out at the Sapphire Residence housing estate in Karangwangkal, East Purwokerto Sub-district, Banyumas Regency, Central Java Province, Indonesia. The community service initiative ran for two months, from November to December.

Participants in this initiative were parents of toddlers aged 6–59 months who were classified as being at risk of stunting in the Karangwangkal area of Purwokerto. The sample was taken using purposive sampling, taking into account inclusion and exclusion criteria. Inclusion criteria included parents of toddlers who were willing to act as respondents and participate in the entire series of activities. Exclusion criteria included parents who did not complete the entire intervention series. The sample size for this activity was 18 parents of toddlers.

Educational methods were delivered to parents through interactive lectures, discussions, and educational materials in the form of leaflets and guidance sheets. The educational content covered the definition of stunting, the role of iron and vitamin D in child growth, the benefits of supplementation, correct dosages and administration methods, and the importance of adherence to the supplementation regimen.

Result and Discussion

The community service took place at the Sapphire Housing Estate in Karangwangkal Village, Purwokerto, on 29 November 2025. The programme of activities included a pre-test, a lecture and interactive discussion, and a post-test.

Figure 1. Registration of Participants

Figure 2. Delivery of lectures and discussions

The results obtained indicate that prior to the educational intervention, the majority of parents of toddlers at risk of stunting had a low to moderate level of knowledge regarding the administration of iron and

vitamin D supplements. This low level of knowledge was particularly evident in relation to the benefits of iron and vitamin D for toddler growth, the recommended dosage, and the correct and safe methods of administering the supplements. The pre-test results showed that 22% had low knowledge, 22% had moderate knowledge and 55% had high knowledge. This was linked to the parents' low level of education: 3 had primary school education, 2 had lower secondary school education, 3 had upper secondary school education and 10 had higher education (D3, S1, S2 and S3). It was also due to the parents' occupations.

Table 1. Pretest and Posttest Score Categories

Score	Category
<70	Low
71-89	Medium
90-100	High

Following the educational intervention, there was a significant increase in parents' knowledge levels. The majority of respondents showed an improvement in their knowledge scores and fell into the 'good knowledge' category. This improvement was evident across almost all knowledge indicators, particularly regarding the role of iron in preventing anaemia and supporting growth, as well as the role of vitamin D in bone formation and the linear growth of toddlers.

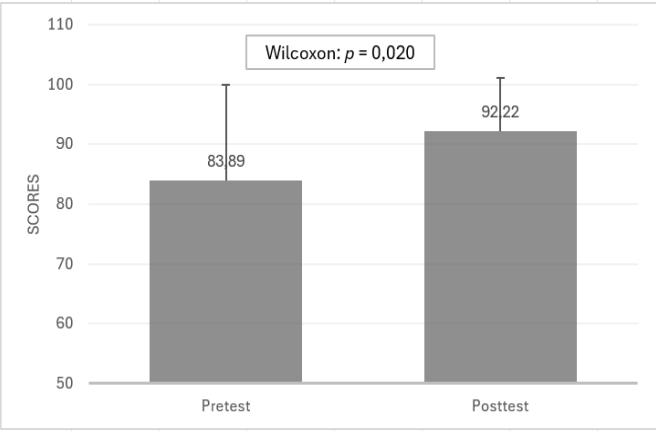

Figure 3. Mean + SD of pre-test and post-test scores

Statistical analysis of the pre-test and post-test data revealed a statistically significant difference between parents' knowledge scores before and after the educational intervention ($p < 0.05$). This indicates that education on the administration of iron and vitamin D supplements has a significant impact on improving the knowledge levels of parents of toddlers at risk of stunting.

Figure 4. Distribution of books on stunting

These results indicate that nutrition education plays a crucial role in improving parents' knowledge regarding the administration of iron and vitamin D supplements to toddlers at risk of stunting. The low level of parental knowledge prior to the intervention aligns with findings from previous community service activities, which noted that a lack of understanding regarding micronutrients is one of the factors hindering the success of stunting prevention at the household level (Amira & Setyaningtyas, 2021).

The significant increase in knowledge following the provision of education indicates that a structured educational approach, supported by appropriate materials, is effective in improving parents' understanding. These findings are consistent with the research by Metri et al. (2024), which reported that nutrition education effectively improves knowledge and practices regarding the administration of micronutrients among parents of young children. Good knowledge forms an important foundation for shaping health attitudes and behaviors, including adherence to the routine administration of iron and vitamin D supplements.

Figure 5. Post-test administration

Theoretically, improved parental knowledge influences child-rearing behavior and nutritional provision, ultimately leading to improved growth and development in infants (Yunitasari et al., 2021). Parents who understand the benefits, dosage, and correct administration of supplements are more likely to be compliant and consistent in providing them to their children. This compliance is crucial given that iron and vitamin D play an essential role in linear growth, bone metabolism, and the prevention of anaemia and growth disorders (Nugraheni et al., 2020).

The results of this community service initiative also support the recommendations of the Ministry of Health of the Republic of Indonesia, which emphasise the importance of nutrition education as part of specific interventions to accelerate the reduction of stunting. The education provided not only enhances knowledge but also has the potential to strengthen the role of families as the frontline in community-based stunting prevention.

However, the implementation of this community service activity still has several limitations, including the fact that the activity remains focused on a single target group and the limited duration of the mentoring, meaning that the evaluation of the educational impact can only be conducted in the short term. Therefore, it is recommended that future community service activities expand their target scope and be accompanied by continuous mentoring and monitoring to ensure the consistent application of parents' knowledge and behaviours in daily practice.

Figure 6. Group photo with participants

Conclusion

In a community outreach programme on iron and vitamin D supplementation for parents of toddlers at risk of stunting, the results showed that the education provided significantly improved parents' knowledge. This increase in knowledge is evident from a comparison of pre-test and post-test results, which indicate a change in parents' level of understanding regarding the role, benefits, and methods of administering iron and vitamin D supplements to toddlers at risk of stunting. It is hoped that this increased knowledge will support adherence to supplementation and contribute to family- and community-based efforts to prevent stunting.

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