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Parenting Education Intervention on the Growth and Development of Stunted Toddlers in the Puskesmas Fakfak Area, West Papua Province

Elzina Dina De Fretes[1], Yosina Atanai[2]

[1,2]Department of Nursing, Nursing Diploma Study Program Fak-fak, Politeknik Kesehatan Kemenkes Sorong, West Papua, Indonesia

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ABSTRACT

Background: Stunting remains a critical public health issue in Indonesia, particularly in remote areas such as the Puskesmas Fakfak area, West Papua Province. Stunting, which results from chronic malnutrition, affects the physical and cognitive development of children. Effective strategies to combat stunting are needed, focusing on improving parental knowledge, attitudes, and behaviors regarding child nutrition and care practices. Objectives: This study aims to evaluate the effectiveness of educational interventions in improving the knowledge, attitudes, and behaviors of parents in supporting the growth and development of stunted toddlers in the Puskesmas Fakfak area, West Papua Province. Methods: The research method employed was quasi-experimental with a pre-test and post-test design. The educational intervention consisted of counseling sessions and focused group discussions covering topics such as nutrition, the importance of exclusive breastfeeding, and proper parenting practices. Results: The results of the study indicated a significant increase in parental knowledge, with the average score rising from 3.5 before the intervention to 4.8 after the intervention ($t = 7.89$, $p < 0.001$). Parents also demonstrated a positive change in attitudes, as evidenced by an increase in the average score from 3.6 to 4.9 ($t = 8.12$, $p < 0.001$). Furthermore, parental behaviors showed a significant improvement, with the average score increasing from 3.4 to 4.8 ($t = 7.65$, $p < 0.001$). Conclusion: This research highlights the effectiveness of educational interventions in enhancing parental knowledge, attitudes, and behaviors, which, in turn, can contribute to the mitigation of stunting. It is recommended that similar programs be implemented in other areas facing stunting issues and that longitudinal studies be conducted to assess the sustainability of the interventions' impact.

Corresponding Author:

Elzina Dina De Fretes,
Department of Nursing,
Nursing Diploma Study Program Fak-fak,
Politeknik Kesehatan Kemenkes Sorong,
Fakfak, 98612, Indonesia,
Email: defreteselsye @gmail.com

INTRODUCTION

Stunting, a condition that inhibits the growth and development of toddlers, is typically caused by prolonged malnutrition(Soliman et al., 2021). The prevalence of stunting in Indonesia has shown a general decline from 24.4% in 2021 to 21.6% in 2023 (Laksono et al., 2022). However, in regions such as the Fakfak Health Center and several others in Indonesia, stunting remains a concern, with rates in Fakfak District reaching 24.32% in 2022 and 25.05% in the Fakfak Health Center, surpassing the desired target of less than 14%.

The long-term impacts of stunting on child development and society as a whole are significant, affecting mental capacity, learning ability, and academic achievement. Good parenting practices play a crucial role in preventing stunting, influencing children's nutritional intake (Li et al., 2023; Precious et al., 2023). The Indonesian government has issued Presidential Regulation No. 72 of 2021 on Accelerating Stunting Reduction, demonstrating a commitment to addressing this issue(Sekretariat Wakil Presiden, 2022). Educating parents on proper parenting practices supports this policy by emphasizing the importance of good nutrition for child development (Balantekin et al., 2020; Woźniak et al., 2022).

The Fakfak Health Center, like many other regions in Indonesia, faces challenges in addressing stunting, including the need to change community attitudes toward child nutrition and health. While the importance of parenting in preventing stunting is recognized, it remains unclear how specific parenting practices affect the growth and development of stunted toddlers in the Fakfak Health Center area. Previous research has shown that good parenting practices can influence children's nutritional intake, thus preventing stunting (Saleh et al., 2021; Soviyati et al., 2023). However, further research is needed to understand how specific parenting practices affect the growth and development of stunted toddlers in the Fakfak Health Center area.

There is a lack of in-depth research on how parenting education can be used as a tool to prevent and address stunting in this region. This study aims to fill this knowledge gap by focusing on how parenting education can be utilized to prevent and address stunting in the Fakfak Health Center area. The effectiveness of various parenting education methods in preventing stunting is also yet to be determined. Some studies have shown that mobile application-based education can be effective in improving parental knowledge and behavior regarding parenting and nutrition (Chua & Shorey, 2022; Karssen et al., 2021; Outhwaite, 2023; Zare et al., 2023; Zarnowiecki et al., 2020). However, further research is needed to evaluate the effectiveness of these education methods in the context of the Fakfak Health Center.

This study will explore how parenting education methods, including lectures, counseling, and mobile application-based education, can be applied in the Fakfak Health Center area to enhance parental knowledge of parenting and nutrition. While several studies have been conducted on related topics, including the relationship between parenting and stunting occurrence, the effectiveness of education in improving parental knowledge and behavior regarding parenting and nutrition, and research on stunting prevention programs in Indonesia (Santosa et al., 2021; Supadmi et al., 2024).This study will contribute to the field by exploring how parenting education can be used as a tool to prevent and address stunting in the Fakfak Health Center area.

RESEARCH METHOD

This study employs a quasi-experimental design with a pre-test and post-test approach to measure changes in parents' knowledge and behavior before and after an educational intervention on infant caregiving and nutrition. The research is conducted in the operational area of the Fakfak Community Health Center, West Papua Province, selected due to its significant prevalence of stunting. The study duration spans six months, with the first two months allocated for preparation and initial data collection, followed by two months for implementing the educational program, and the final two months for concluding data collection and analysis.

The study population comprises parents or caregivers of infants within the Fakfak Community Health Center's operational area, sampled using purposive sampling techniques. The sample consists of 100 parents or caregivers divided into intervention and control groups, with the intervention group receiving the educational program.

Instruments utilized include pre- and post-intervention questionnaires to measure parents' knowledge, attitudes, and behaviors. Each questionnaire comprises 30 items divided into three main sections: knowledge, attitudes, and behaviors, with 10 items each. The knowledge section assesses parents' understanding of infant nutrition, the importance of exclusive breastfeeding, the definition and consequences of stunting, the benefits of immunization, hygiene, and early stimulation. The attitudes section evaluates parents' views on the importance of caregiving patterns and proper nutrition. Questions in this section cover attitudes toward providing nutritious food, the importance of hygiene, support for immunization, stimulation, and interaction with the child, as well as responsive caregiving. The behavior section measures parents' actual practices in caregiving patterns and nutrition provision for infants, including the frequency of vegetable and fruit consumption, handwashing habits before feeding the child, adherence to immunization schedules, routines of taking the child for health check-ups, and daily interactions such as playing and reading stories to the child.

Data analysis entails descriptive analysis to depict sample characteristics and the distribution of research variables, along with t-test statistical analysis to compare changes between the intervention and control groups. Ethical approval has been obtained from the Research Ethics Committee of the Health Polytechnic of the Ministry of Health in Sorong, and informed consent has been acquired from participants, ensuring confidentiality of participant data. The research procedure encompasses preparation, initial data collection, educational implementation, final data collection, data analysis, and report compilation.

RESULTS AND DISCUSSIONS

Results

The Characteristics of the Sample

This study involved 100 parents or caregivers of toddlers in the Puskesmas Fakfak area, with the majority of respondents aged between 20-30 years (40%) and mostly female (80%). The most common level of education was high school (35%), and the most prevalent occupation was homemaker (50%). The majority of parents had a monthly income ranging from Rp 1,000,000 to Rp 2,000,000 (40%). The toddlers involved in this study were mostly aged between 25-36 months (30%), with a nearly equal distribution of genders, comprising 55% male and 45% female. Initial nutritional status indicated that 15% of toddlers were malnourished, 30% were undernourished, 45% were well-nourished, and 10% were overnourished. These data provide a comprehensive overview of the sample background and aid in further analysis of the effectiveness of the educational intervention. The data are presented in Table 1 below.

Table 1. Sample characteristics

Characteristic	(N)	(%)
Parent Age		
< 20 years	10	10%
20-30 years	40	40%
31-40 years	35	35%
> 40 years	15	15%
Parent Gender		
Male	20	20%
Female	80	80%

Characteristic	(N)	(%)
Education Level		
No schooling	5	5%
Elementary school	20	20%
Middle school	30	30%
High school	35	35%
College	10	10%
Occupation		
Housewife	50	50%
Farmer/Fisherman	20	20%
Private employee	10	10%
Government employee	10	10%
Entrepreneur	5	5%
Other	5	5%
Toddler Age		
6-12 months	15	15%
13-24 months	25	25%
25-36 months	30	30%
37-48 months	20	20%
49-60 months	10	10%
Toddler Gender		
Male	55	55%
Female	45	45%
Initial Nutritional Status		
Severe malnutrition	15	15%
Underweight	30	30%
Good nutrition	45	45%
Overweight	10	10%

Parental Knowledge Pre and Post Intervention

This study measured changes in parental knowledge regarding toddler nutrition, the importance of exclusive breastfeeding, the definition and impact of stunting, immunization schedules, the benefits of hygiene, and early stimulation before and after the educational intervention. The collected data indicated a significant improvement in knowledge scores after the intervention.

Table 2. Parental knowledge pre and post intervention

No	Knowledge	Average Score Before Intervention	Average Score After Intervention	Score Change (%)
1	Protein-rich foods for toddlers	3.5	4.8	37.1
2	Importance of exclusive breastfeeding for the first 6 months	3.8	5.0	31.6
3	Definition of stunting	3.0	4.7	56.7
4	Long-term impacts of stunting on children	2.9	4.6	58.6
5	DPT immunization schedule	3.7	4.9	32.4
6	Benefits of immunization for toddler health	3.6	4.8	33.3
7	Importance of washing hands before eating	3.4	4.7	38.2

No	Knowledge	Average Score Before Intervention	Average Score After Intervention	Score Change (%)
8	Correct way to wash hands	3.2	4.5	40.6
9	Importance of playing and interacting with toddlers	3.9	5.0	28.2
10	Activities that stimulate cognitive development	3.5	4.8	37.1

Before the intervention, parental knowledge regarding protein-rich foods for toddlers had an average score of 3.5, which increased to 4.8 post-intervention, indicating a 37.1% improvement. Understanding the importance of exclusive breastfeeding for the first six months increased from 3.8 to 5.0, with a 31.6% increase. Knowledge about the definition of stunting saw the largest increase, from an average score of 3.0 before the intervention to 4.7 after the intervention, representing a 56.7% increase.

Furthermore, knowledge about the long-term impacts of stunting on children increased from 2.9 to 4.6, indicating a 58.6% increase. Knowledge scores regarding the DPT immunization schedule and the benefits of immunization for toddler health also showed increases of 32.4% and 33.3%, respectively.

Regarding hygiene, knowledge about the importance of handwashing before meals increased from 3.4 to 4.7 (a 38.2% increase), and knowledge about proper handwashing techniques increased from 3.2 to 4.5 (a 40.6% increase). Knowledge about the importance of playing and interacting with toddlers increased from 3.9 to 5.0 (a 28.2% increase), while understanding of activities that stimulate cognitive development increased from 3.5 to 4.8 (a 37.1% increase).

Parental Attitudes Pre and Post Intervention

This study measured changes in parental attitudes regarding various aspects of toddler care and nutrition before and after the educational intervention. The collected data indicated a significant improvement in attitude scores after the intervention

Table 3. Parental attitudes pre and post intervention

No	Attitude	Average Score Before Intervention	Average Score After Intervention	Score Change (%)
1	Prioritizing the provision of nutritious food	3.6	4.9	36.1
2	Importance of exclusive breastfeeding for toddler health	3.7	5.0	35.1
3	Importance of washing hands before eating	3.4	4.8	41.2
4	Maintaining cleanliness of the home environment	3.5	4.9	40.0
5	Importance of complete immunization	3.8	5.0	31.6
6	Following the immunization schedule	3.6	4.9	36.1
7	Playing with children helps mental development	3.9	5.1	30.8
8	Providing special time for daily interaction	3.5	4.8	37.1
9	Importance of responding quickly to toddler needs	3.8	5.0	31.6
10	Giving full attention when a toddler needs it	3.7	4.9	32.4

Before the intervention, parental attitudes regarding providing nutritious food as a top priority had an average score of 3.6, which increased to 4.9 post-intervention, indicating a 36.1% improvement. Attitudes towards the importance of exclusive breastfeeding for toddler health increased from 3.7 to 5.0, with a 35.1% increase. Attitudes towards the importance of handwashing before meals increased from 3.4 to 4.8, representing a 41.2% increase.

Attitudes regarding the importance of maintaining cleanliness in the home environment increased from 3.5 before the intervention to 4.9 after the intervention, indicating a 40.0% increase. Attitudes towards the importance of complete immunization increased from 3.8 to 5.0 (a 31.6% increase), and attitudes towards adhering to immunization schedules increased from 3.6 to 4.9 (a 36.1% increase).

Furthermore, parental attitudes regarding playing with children aiding in their mental development increased from 3.9 to 5.1, with a 30.8% increase. Attitudes towards the importance of allocating special time for daily interaction with children increased from 3.5 to 4.8, showing a 37.1% increase. Attitudes towards promptly responding to the needs of toddlers increased from 3.8 to 5.0, with a 31.6% increase, and attitudes towards providing full attention when toddlers need it increased from 3.7 to 4.9, with a 32.4% increase.

Parental Behavior Pre and Post Intervention

This study measured changes in parental behavior related to various aspects of toddler care and nutrition before and after the educational intervention. The collected data indicated a significant improvement in behavior scores after the intervention.

Table 4. Parental Behavior Pre and Post Intervention

No	Behavior	Average Score Before Intervention	Average Score After Intervention	Score Change (%)
1	Frequency of giving vegetables and fruits	3.2	4.6	43.8
2	Habit of washing hands before feeding the child	3.3	4.8	45.5
3	Compliance with immunization schedule	3.5	4.9	40.0
4	Taking the child for regular health check-ups	3.4	4.7	38.2
5	Daily interaction with the child (playing and storytelling)	3.7	5.0	35.1
6	Providing balanced nutritious food	3.6	4.9	36.1
7	Following balanced nutrition guidelines from healthcare workers	3.4	4.8	41.2
8	Stimulating child's motor development	3.5	4.9	40.0
9	Stimulating child's cognitive development	3.6	5.0	38.9
10	Habit of maintaining personal and environmental hygiene	3.3	4.7	42.4

Before the intervention, the frequency of giving vegetables and fruits to children had an average score of 3.2, which increased to 4.6 post-intervention, indicating a 43.8% improvement. The habit of washing hands before feeding the child increased from 3.3 to 4.8, with a 45.5% increase. Compliance with immunization schedules increased from 3.5 to 4.9, representing a 40.0% increase.

The behavior of taking the child for routine health check-ups increased from 3.4 before the intervention to 4.7 after the intervention, showing a 38.2% increase. Daily interaction with the child, such as playing and storytelling, increased from 3.7 to 5.0, with a 35.1% increase. Providing balanced nutritious food increased from 3.6 to 4.9, indicating a 36.1% increase.

Furthermore, the behavior of following balanced nutrition guidelines from healthcare providers increased from 3.4 to 4.8, with a 41.2% increase. Behavior in stimulating child motor development increased from 3.5 to 4.9, showing a 40.0% increase. Behavior in stimulating child cognitive development increased from 3.6 to 5.0, with a 38.9% increase. Lastly, the habit of maintaining personal hygiene and cleanliness of the environment increased from 3.3 to 4.7, representing a 42.4% increase

Education programm efectivity

Normality Test Results

The Shapiro-Wilk test results indicated that the p-value for all variables (knowledge, attitudes, and behaviors) both before and after the intervention was greater than 0.05. This suggests that there is no strong evidence to reject the null hypothesis, indicating that the data follows a normal distribution.

Table 5. Normality test for parental knowledge

Variable	W Statistic	p-value	Distribution
Knowledge Pre-Intervention	0.97	0.18	Normal
Knowledge Post-Intervention	0.95	0.08	Normal

Table 6. Normality test for parental attitudes

Variable	W Statistic	p-value	Distribution
Attitude Pre-Intervention	0.96	0.14	Normal
Attitude Post-Intervention	0.94	0.07	Normal

Table 7. Normality test for parental behaviors

Variable	W Statistic	p-value	Distribution
Behavior Pre-Intervention	0.95	0.12	Normal
Behavior Post-Intervention	0.93	0.05	Normal

Significance Test Results for Changes in Parental Knowledge, Attitudes, and Behaviors

Table 8. Paired t-test for parental knowledge

Variable	Mean Score Pre-Intervention	Mean Score Post-Intervention	t-value	p-value	Significance
Knowledge	3.5	4.8	7.89	< 0.001	Significant

Parental knowledge significantly increased with an average score of 3.5 pre-intervention and 4.8 post-intervention. The paired t-test yielded a t-value of 7.89 with a p-value < 0.001, indicating a statistically significant change.

Table 9. Paired t-test for parental attitudes

Variable	Mean Score Pre-Intervention	Mean Score Post-Intervention	t-value	p-value	Significance
Attitude	3.6	4.9	8.12	< 0.001	Significant

Parental attitudes also showed a significant improvement with an average score of 3.6 pre-intervention and 4.9 post-intervention. The paired t-test yielded a t-value of 8.12 with a p-value < 0.001, indicating a significant change.

Table 10. Paired t-test for parental behaviors

Variable	Mean Score Pre-Intervention	Mean Score Post-Intervention	t-value	p-value	Significance
Behavior	3.4	4.8	7.65	< 0.001	Significant

The parental behaviors also experienced a significant improvement with an average pre-intervention score of 3.4 and a post-intervention score of 4.8. The paired t-test yielded a t-value of 7.65 with a p-value < 0.001, indicating a statistically significant change.

The statistical analysis results demonstrate that the educational intervention conducted in the Puskesmas Fakfak area, West Papua Province, effectively enhances parental knowledge, fosters positive attitudes, and improves behaviors regarding childcare and the development of toddlers experiencing stunting. The significant improvements across all variables indicate that this educational program successfully achieves its objectives and can be recommended for broader implementation in efforts to combat stunting.

DISCUSSION

This study aimed to evaluate the effectiveness of an educational intervention on changes in parental knowledge, attitudes, and behaviors in supporting the growth and development of toddlers with stunting in the Puskesmas Fakfak area, West Papua Province. The research findings indicate a significant improvement in all three aspects following the intervention. These findings have important implications for stunting prevention strategies, a crucial public health issue in Indonesia, particularly in remote areas such as West Papua.

The increase in knowledge scores from 3.5 to 4.8 demonstrates that the educational intervention successfully enhances parental understanding of nutrition, the importance of exclusive breastfeeding, and the consequences of stunting. This increase is statistically significant ($t = 7.89$, $p < 0.001$). Improved knowledge enables parents to make more informed decisions regarding childcare practices and their children's nutrition. For example, knowledge of the importance of exclusive breastfeeding not only aids in stunting prevention but also enhances overall toddler health.

These results are consistent with previous studies showing that nutrition education can increase parental knowledge and contribute to better feeding practices. Better understanding of the definition and consequences of stunting also increases parental awareness and vigilance regarding their child's growth, allowing for earlier and more effective interventions (Czarniecka-Skubina et al., 2024; De Rosso et al., 2022; Hossain et al., 2024; Oliver et al., 2023; Raut et al., 2024).

Parental attitudes also underwent a significant positive change, with scores increasing from 3.6 to 4.9 ($t = 8.12$, $p < 0.001$). More positive attitudes toward providing nutritious foods, the importance of immunization, and personal and environmental hygiene indicate that the intervention successfully influences parental perceptions and beliefs.

These attitude changes are crucial as positive attitudes often form the basis for sustained behavioral changes (Maddocks, 2023; Mandarić et al., 2022; Michaelsen & Esch, 2023). More positive attitudes toward immunization, for instance, can increase immunization coverage and reduce the risk of vaccine-preventable diseases among toddlers. Improved attitudes toward personal and environmental hygiene can also reduce the incidence of infections and diseases contributing to stunting.

Parental behaviors showed a significant improvement, with average scores increasing from 3.4 to 4.8 ($t = 7.65$, $p < 0.001$). Improvements in behaviors such as the frequency of giving vegetables and fruits, the habit of washing hands before feeding the child, and compliance with immunization schedules indicate that education not only enhances knowledge and attitudes but also encourages tangible actions.

These behavioral changes are highly significant as appropriate actions directly impact child health and development. For example, better handwashing habits can reduce the risk of intestinal

infections often leading to diarrhea, a major cause of stunting in children (Ejemot-Nwadiaro et al., 2021; Fontaine et al., 2023; Khan et al., 2021; Ogutu et al., 2022; Shrestha et al., 2020). Compliance with immunization schedules also protects children from various diseases that can hinder their growth and development.

These findings are in line with previous studies showing that educational interventions are effective in improving health-related knowledge, attitudes, and behaviors. For instance, a study in Ethiopia found that maternal nutrition education significantly improved knowledge and infant feeding practices (Admasu et al., 2022). Another study in India also reported that maternal health education increased knowledge and practices related to child nutrition and environmental health (Andersen et al., 2024).

Based on these findings, it can be deduced that structured and sustainable educational interventions have great potential to address stunting issues by increasing knowledge, fostering positive attitudes, and promoting better behaviors among parents. A hypothesis for further research could be that increased parental knowledge through education programs correlates directly with improved nutritional status and growth of toddlers.

These findings have important practical implications for public health programs. Successful educational intervention programs in the Puskesmas Fakfak area can be replicated in other regions facing similar stunting issues. Additionally, these programs can be integrated into routine healthcare services at health centers, such as immunization and child health check-ups, to achieve broader coverage and greater impact.

Despite promising results, there are some challenges and limitations to consider. One of them is the sustainability of the observed behavioral changes. This study only measured short-term changes after the intervention. Longitudinal studies are needed to assess whether these changes are sustained in the long term. Furthermore, this study was conducted in a specific area, so the results may not be generalizable to the entire Indonesian population.

Another limitation is the reliance on self-reporting from participants to measure behavioral changes, which may be influenced by social bias or a desire to provide answers perceived as desirable by researchers. The use of observation methods or independent verification could provide more accurate data on behavioral changes. This study demonstrates that educational interventions are effective in improving parental knowledge, changing positive attitudes, and improving behaviors related to childcare and toddler nutrition in the Puskesmas Fakfak area. The significant improvements in all three aspects indicate that good education programs can substantially contribute to stunting prevention. Implementing similar programs in other areas facing stunting issues can help address this public health problem more effectively.

To enhance program effectiveness further, sustainable and inclusive strategies involving various stakeholders including healthcare workers, local governments, and the community are needed. Additionally, further research with longitudinal designs and more robust measurement methods can provide a deeper understanding of the long-term impacts of these educational interventions. Thus, this research not only provides significant scientific contributions but also offers practical solutions that can be applied in efforts to combat stunting in Indonesia and other regions facing similar

CONCLUSION

This study evaluates the effectiveness of an educational intervention on parental knowledge, attitudes, and behaviors in supporting the growth and development of toddlers with stunting in the Puskesmas Fakfak area, West Papua Province. The analysis indicates a significant improvement in all three measured aspects. The education successfully enhances parental knowledge of nutrition and appropriate childcare practices, as well as influencing their attitudes and beliefs regarding the importance of good nutrition and caregiving practices. Moreover, the intervention successfully promotes positive behavioral changes related to feeding, hygiene, and

adherence to immunization schedules. Replicating this program in other areas with similar stunting issues is recommended, necessitating close collaboration between healthcare professionals, local governments, and the community. Further studies with longitudinal designs are required to assess the sustainability of observed changes, while the use of observational methods or independent verification can enhance data accuracy. Additionally, educational materials need to be updated according to local needs and recent developments in pediatric nutrition and health, with more effective use of interactive media for information dissemination.

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