

Evaluation of Changes in Knowledge and Attitudes Following Community-Based Nutrition Education: A Case Study of Stunting Prevention

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ABSTRACT

This community service program was conducted to support the Ministry of Health's specific interventions to accelerate stunting reduction, focusing on meeting the nutritional needs of mothers before and during pregnancy and of children aged 6–24 months. The program aimed to improve community knowledge and attitudes toward nutrition and stunting prevention through a knowledge–attitude–behavior (KAB)-based education model in Ngambarsari Village. Activities were integrated into *Posyandu* services, including anthropometric measurements, nutrition counseling, educational sessions for mothers of toddlers and adolescents, and the distribution of nutrition guidebooks to ensure sustainability. The study employed a Pre-Experimental Design with a One-Group Pretest–posttest approach without a control group. A total of 55 participants were included in the evaluation. Program effectiveness was measured by comparing pre- and post-intervention cognitive and affective scores using descriptive analysis, the Kolmogorov–Smirnov normality test, and paired t-tests. The results showed significant improvements in knowledge ($p = 0.008$) and attitudes ($p = 0.003$). The mean cognitive score increased from 87% to 91%, whereas the affective score increased from 86.0% to 90.3%. Community-based nutrition education effectively enhanced understanding of exclusive breastfeeding, complementary feeding, balanced nutrition, hygiene practices, and child growth monitoring. However, gaps remain in dietary supervision and routine growth monitoring practices, indicating the need for continuous assistance in this area. Overall, structured and collaborative community-based interventions can strengthen the local capacity for sustainable stunting prevention.

Keywords: community service, nutrition education, pre-experimental design stunting prevention, posyandu

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INTRODUCTION

Stunting remains one of the major public health problems in Indonesia. The prevalence of stunting in Indonesia in 2022 was 21.6% according to the Indonesian Nutritional Status Survey (SSGI). Stunting is a condition of impaired growth resulting from chronic malnutrition and recurrent infections, and it develops during the first 1,000 days of life, from conception to two years of age. A child is classified as stunted if their height-for-age is below minus 2 standard deviations according to the WHO Child Growth Standards (Ministry of Health, 2020).

In Wonogiri Regency, the stunting rate decreased from 24.4% in 2021 to 18.0% in 2022. However, stunting remains a health problem that must be addressed at the village level. In Ngambarsari Village, Karangtengah Subdistrict, data from Integrated Health Service Post (hereinafter referred to as *Posyandu*) cadres and village midwives in 2024 indicated that 31 toddlers were stunted. Initial identification of the partner's problems revealed limitations among *Posyandu* cadres in conducting nutrition education, such that several families remained unaware of the importance of balanced nutrition, exclusive breastfeeding, complementary feeding (MPASI), and regular monitoring of child development. This condition has the potential to affect child-rearing practices and nutritional patterns.

Various studies have shown that stunting is influenced by multiple factors, including maternal nutritional status during pregnancy, child feeding practices, infectious disease, family socioeconomic conditions, and access to health services, sanitation, and clean water. A child's nutritional status is directly influenced by nutrient intake and health status, and indirectly influenced by household food security, parenting patterns, access to health services, and sanitation conditions (Ministry of Health, 2023). Socioeconomic factors, including parental education level and family income, also play a role in a family's ability to meet a child's nutritional needs (Tebi et al., 2021). Insufficient nutrition knowledge may lead to feeding practices based on satiety rather than nutritional quality or adequacy for children (Nurmalasari et al., 2020).

To accelerate the reduction of stunting, the Ministry of Health has implemented specific interventions to meet the nutritional needs of mothers before and during pregnancy, as well as children aged 6-24 months, through nutrition provision (Ministry of Health, 2023). These interventions can only succeed if supported by community-based health services operating at the front line and capable of working directly with families. *Posyandu* is a participatory community health service facility in which *Posyandu* cadres are responsible for communicating health information, monitoring toddler growth, and supporting families (Siregar, 2021). Health workers also serve as motivators and facilitators of community behavior change in stunting prevention (Azarine, 2023).

One approach to strengthening stunting prevention efforts is community-based nutrition education. Education serves as a means of enhancing knowledge and promoting positive attitudes that support parenting practices and contribute to children's nutritional wellbeing. The Knowledge-Attitude-Behavior (KAB) theory posits that improved knowledge leads to more positive attitudes, and that changes in attitude subsequently support the desired behavior change.

Based on this situation, a study on the effectiveness of community-based nutrition education in developing community awareness and attitudes toward stunting prevention is needed. The nutrition education program in Ngambarsari Village was organized through an interdisciplinary partnership involving students from the Thematic-Innovation Community Service Program (hereinafter referred to as *KKN-TI*), *Posyandu* cadres, village midwives, village government, and community leaders as a community-oriented intervention. This study aimed to assess changes in participants' knowledge and attitudes

following their participation in community-based nutrition education as part of stunting prevention efforts in Ngambarsari Village. Unlike most stunting education studies, which typically report only program implementation or participant satisfaction levels, this study focuses on measuring changes in knowledge and attitude using a one-group pretest-posttest design as an indicator of the effectiveness of community-based nutrition education integrated with *Posyandu* services.

METHODS

Program Implementation Method

This community service activity employed a quantitative approach using a Pre-Experimental Design with a One-Group Pretest-Posttest design, in which measurements were taken before and after the intervention without a comparison control group (Campbell & Stanley, 1963; Creswell & Creswell, 2018). Sugiyono (2019) states that the one-group pretest-posttest design is a simple experimental design conducted on a single group without a control group to observe changes resulting from a treatment. This design was selected to evaluate the effectiveness of the nutrition education program in improving community knowledge and attitudes related to stunting prevention.

The education program was implemented through two forms of activity, namely *Posyandu Remaja* (Integrated Health Service Post for Adolescent) and *Posyandu Balita* (Integrated Health Service Post for Toddler) in Ngambarsari Village. *Posyandu Remaja* was conducted once (June 29, 2024) in *Dusun Bulu* with 40 participants. *Posyandu Balita* was conducted ten times during the period of June 29 to August 2, 2024, across eleven *Dusun* or hamlet locations with a total of 675 participants (in *Dusun Godang*, *Dusun Jati*, *Dusun Bulu*, *Dusun Tanggung*, *Dusun Ngambar Wetan*, *Dusun Ngambar Kulon*, *Dusun Klepu*, *Dusun Pojok*, *Dusun Ngunut*, *Dusun Sempu*, and at the Ngambarsari Village Hall).

Posyandu Remaja activities included: (1) measurement of nutritional status (body weight, height, upper arm circumference, waist circumference, and hemoglobin level), (2) nutrition consultation with the implementation team and a nutritionist from Karangtengah Community Health Center (*Puskesmas*), and (3) education on stunting and the prevention of early marriage. *Posyandu Balita* consisted of two main stages, namely: (1) anthropometric measurement of toddlers (body weight, height/length, mid-upper arm circumference (MUAC), and head circumference); and (2) nutrition and stunting education covering causes, effects, characteristics, and prevention through exclusive breastfeeding, complementary feeding (MPASI), and balanced nutrition principles, conducted jointly with the program implementation team and a nutritionist from Karangtengah Community Health Center. The media used included PowerPoint presentations, leaflets, posters, and anthropometric measurement tools (scales, microtoise, MUAC tape, and measuring tape).

Data Collection Method

Evaluation of program effectiveness was conducted during the *Posyandu Balita* activities using pre-test and post-test questionnaires administered to pregnant women, mothers of toddlers, women of reproductive age, and *Posyandu* cadres. Of the total 675 participants in the program activities, 55 respondents voluntarily completed the questionnaires. The research instrument consisted of 20 knowledge questions and 9 attitude questions. The question content covered eating habits, exclusive breastfeeding, complementary feeding (MPASI), child parenting patterns, and clean and healthy living behavior. The questionnaire was an adapted instrument developed based on Infant and Young Child Feeding or IYCF (known as *PMBA* in Indonesia) materials, *Posyandu* guidelines, and literature on maternal nutrition knowledge and stunting prevention.

This program consisted of two activities: *Posyandu Remaja* and *Posyandu Balita*. The pre-test and post-test evaluation in this study was conducted only among *Posyandu Balita* participants, specifically mothers of toddlers who took part in the nutrition education sessions. The *Posyandu Remaja* activity was conducted as part of the community service program but was not included in the quantitative evaluation reported in this article.

Data Analysis Method

Data were processed through the stages of cleaning, coding, and data entry, and were subsequently analyzed using Microsoft Excel 2019 and SPSS version 25. Correct answers on the knowledge dimension were scored 1 (one), and incorrect answers were scored 0 (zero). Positive attitude responses were scored 1 (one), and negative attitude responses were scored 0 (zero). Normality testing was conducted using the Kolmogorov-Smirnov test, while differences between pre-test and post-test scores were analyzed using the Paired T-test. Descriptive analysis and frequency distribution were used to describe changes in respondents' knowledge and attitude levels as indicators of the success of the education program.

RESULTS AND DISCUSSION

Nutrition Education Based on the Knowledge-Attitude-Behavior (KAB) Model

One behavioral theory widely used in health interventions is the knowledge-attitude-behavior (KAB) model, which posits that knowledge influences an individual's attitude and affective evaluation, which in turn influences behavior (Teo et al., 2023). The KAB model explains that changes in the cognitive aspect (knowledge) can shape attitudes, and these attitude changes ultimately drive behavior change (Ajzen & Fishbein, 1980). The three behavioral domains, namely knowledge, attitude, and nutrition practice, are interrelated and together form a unified process of health behavior change (Notoatmodjo, 2014).

The stunting prevention strategy in Ngambarsari Village was implemented through stunting prevention education and nutrition consultation targeting pregnant women, mothers of infants and toddlers, women of reproductive age, and *Posyandu* cadres (Figures 1, 2, 3, 4). Increased knowledge gained through the education sessions is expected to be applied in improved parenting practices, such as providing complete and nutritionally adequate food according to children's needs. In addition, the education sessions were also aimed at encouraging clean and healthy living behavior to prevent infections that could hinder children's growth and development.



Figure 1. Nutrition education for *Posyandu* cadres on stunting prevention (*Dusun Ngambarwetan*, Ngambarsari Village)



Figure 2. Nutrition education for mothers of toddlers on stunting prevention (*Dusun Ngunut*, Ngambarsari Village)



Figure 3. Nutrition education for adolescents on adolescent health and stunting prevention (Ngambarsari Village)



Figure 4. Nutrition education for mothers of toddlers on stunting prevention (*Dusun Ngambarkulon*, Ngambarsari Village)

Comparison of Knowledge and Attitude Categories: Pre-Test and Post-Test

The results of the pre-test and post-test questionnaires completed by pregnant women, mothers of infants and toddlers, women of reproductive age, and *Posyandu* cadres showed an increase in both knowledge and attitude scores following the stunting prevention education intervention.

The mean knowledge score increased by 4%, from 87% at pre-test to 91% at post-test. Similarly, the mean attitude score increased by 4%, from 86% at pre-test to 90% at post-test.

The improvement in knowledge was also reflected in the frequency distribution across the low, moderate, and high score categories. Scores were categorized as low if <60%, moderate if 60-80%, and high if >80% (Khomsan, 2021).

Table 1. Frequency distribution of cognitive questionnaire scores

No.	Category	Pre-Test (%)	Post-Test (%)	Change
1	Low	0	0	0
2	Moderate	22	7	-15
3	High	78	93	+15
4	Mean	87	91	+4

Table 1 shows that no respondents fell into the low category at either pre-test or post-test. The proportion of respondents in the moderate category decreased by 15%, from 22% to 7%. Conversely, the proportion of respondents in the high category increased by 15%, from 78% to 93%.

Table 2. Question items, mean percentage (%) of correct answers in the pre-test and post-test, and change in knowledge score

No.	Question Item	Pre-Test (%)	Post-Test (%)	Score Change (%)
1	Exclusive breastfeeding means giving infants only breast milk, with no other food or liquids.	100	100	0
2	Mothers should give exclusive breastfeeding until 6 months of age.	93	96	+4
3	We call the first milk produced colostrum.	98	100	+2
4	Children over 12 months no longer need breast milk. (-)	42	56	+15
5	Balanced nutrition includes staple food, animal protein, plant protein, vegetables, and	98	100	+2

	fruit.			
6	Toddlers need varied food based on balanced nutrition guidelines.	98	100	+2
7	Children over 9 months only need three main meals. (-)	36	40	+4
8	The Growth Monitoring Card (KMS) helps mothers track toddler growth.	98	98	0
9	Food variety can improve a child's appetite.	100	100	0
10	Feeding undernourished toddlers aims to make them feel full and sleep well. (-)	69	78	+9
11	Giving eggs to toddlers causes boils. (-)	95	98	+4
12	Eggs and tempeh provide good sources of nutrients.	80	89	+9
13	Fruit harms toddlers because it causes diarrhea. (-)	95	98	+4
14	Heredity alone causes delayed growth in toddlers. (-)	87	93	+5
15	Mothers can give toddlers fruit as a snack.	96	96	0
16	A varied diet supports toddler growth.	93	96	+4
17	Mothers should weigh toddlers monthly at the Posyandu to track growth.	100	98	-2
18	A toddler's weight below the red line indicates good nutrition. (-)	87	93	+5
19	Weight gain compared to last month indicates good growth.	96	95	-2
20	Insufficient formula milk causes undernutrition in toddlers.	80	89	+9
Mean Score		87	91	+4

Note: (-) = Negative Statement

Table 2 shows that the majority of respondents in both the pre-test and post-test fell into the "high knowledge" category. Nevertheless, a shift in distribution was observed, indicating an increase in the number of respondents in the high category following the health education intervention. This finding suggests that the KAB model nutrition education was able to strengthen respondents' understanding of the material provided, enabling them to answer cognitive questions more accurately after the intervention.

Conceptually, these findings support the KAB model, which positions knowledge as the initial foundation for behavior change. Increased knowledge serves as an essential prerequisite for shaping positive attitudes toward correct nutrition practices, which are subsequently expected to translate into sustained changes in parenting behavior and children's nutritional fulfillment.

Changes in Knowledge Scores (Cognitive Aspect)

Table 2 presents a comparison of the mean percentage of correct answers in the pre-test and post-test for 20 cognitive items covering eating habits, exclusive breastfeeding, complementary feeding (MPASI), parenting patterns, and clean and healthy living behavior.

Overall, most items showed an increase in score following the intervention. The mean score increased from 87% to 91%, representing a rise of 4%.

Although the increase in the mean knowledge score was only 4%, this result should be interpreted in light of the participants' relatively high baseline score. With a pre-test value of 87%, the available room for improvement was more limited than would be the case if the baseline score had been low. Therefore, the increase to 91% indicates that the

intervention was still able to improve participants' understanding in several aspects that had previously been less well understood.

Several key findings are noted below:

- a. The item with the highest increase was item 4 ("Children over 12 months still need to be breastfed"), which increased by 15%. This indicates improved understanding regarding the importance of continued breastfeeding after the age of one year.
- b. Item 10 ("The purpose of feeding undernourished toddlers is so that they feel full and sleep well") increased by 9%, reflecting a better understanding that the purpose of feeding is not merely to induce satiety but to meet nutritional needs.
- c. Items 12 and 20, related to sources of nutrients (eggs, tempeh, and causes of undernutrition), also increased by 9%.
- d. Several items showed a slight decrease, namely item 17 (monthly weighing of toddlers at the *Posyandu*) and item 19 (interpretation of weight gain as an indicator of healthy growth), both of which decreased by 2%. This minor decrease may be attributed to possible confusion in interpreting the questions or to understanding that was not yet fully consistent regarding growth indicators. This finding suggests that, despite the overall improvement, further reinforcement of material related to growth monitoring and interpretation of the Growth Monitoring Card (KMS) is still needed.

Overall, these results indicate that the KAB model is effective in improving respondents' understanding of nutrition and parenting practices. The improvement observed particularly in items that previously had relatively higher error rates suggests that the health education intervention successfully addressed specific knowledge gaps.

Attitude Change (Affective Aspect)

The affective aspect was analyzed based on nine questions related to attitudes toward eating habits, exclusive breastfeeding, complementary feeding (MPASI), parenting patterns, and clean and healthy living behavior. Table 3 shows that respondents in the low attitude category decreased from 4% to 2% (-2%); the moderate category decreased from 15% to 11% (-4%); the high category increased from 82% to 87% (+5%); and the mean score increased from 86% to 90% (+4%).

Table 3. Frequency Distribution of Affective Aspect Scores in the Pre-Test and Post-Test

No.	Category	Pre-Test (%)	Post-Test (%)	Change (%)
1	Low	4	2	-2
2	Moderate	15	11	-4
3	High	82	87	+5
	Mean Score	86	90	+4

The majority of respondents fell into the high attitude category both before and after the intervention. Nevertheless, a shift in distribution toward the higher category was observed following the health education intervention. This improvement in the affective aspect is important because, within the KAB model, attitude change represents a transitional stage between knowledge and actual behavior. A positive attitude toward nutrition and parenting practices serves as an indicator of readiness to implement knowledge in daily life.

Table 4 shows an increase in the mean attitude score from 86.0% to 90.3%, representing a rise of 4.3%. This finding indicates that the Knowledge-Attitude-Behavior (KAB) model health education intervention not only enhanced knowledge but also strengthened respondents' positive attitudes toward nutrition and toddler parenting practices.

Several key findings are noted below:

- The item with the highest increase was item 5 ("Before feeding my toddler, I always wash my hands with soap"), which increased by 7.8%. This reflects heightened awareness of hygiene practices as part of infection and stunting prevention.
- Items 2 and 4 each increased by 7.3%, indicating strengthened understanding and attitude regarding the importance of dietary variety and adequate nutrient intake for toddlers.
- These findings indicate that the intervention was effective in shaping attitudes supportive of balanced nutrition practices and clean and healthy living behavior.

Several items require further reinforcement:

- Item 6 decreased by 2.0%. This suggests that some respondents may not yet fully recognize the importance of supervising food given to children by caregivers or other parties, even though controlling food intake is essential to ensure the quality and safety of children's food.
- Item 7 increased by only 0.8%, indicating that the perception that "what matters is that the child is full and enjoys the food" remains fairly strong. This finding points to the need for further emphasis on the fact that the nutritional quality and content of food are more important than satiety alone.

The affective aspect items that performed well were item 1 (commitment to exclusive breastfeeding) and item 5 (handwashing before feeding), both of which showed significant improvement (see Table 4). These findings indicate that the intervention successfully strengthened respondents' commitment to fundamental preventive and promotive practices in stunting prevention.

Table 4. Statement Items, Mean Pre Test and Post Test Scores, and Change in Attitude (Affective Aspect) Scores

No	Statement Item	Pre Test (%)	Post Test (%)	Change (%)
1.	I will exclusively breastfeed my child from birth until six months of age.	86.3	92.8	+6.5
2.	I need to know the types of food sources required by toddlers under five.	81.8	89.0	+7.3
3.	Mothers must know their child's food needs according to age and developmental stage.	83.3	90.0	+6.8
4.	I believe toddlers under five do not need dietary variety to meet their nutritional needs. (-)	82.8	90.0	+7.3
5.	Before feeding my child, I always wash my hands with soap.	83.3	91.0	+7.8
6.	I do not need to monitor the food consumed by my child even when given by another person/caregiver. (-)	91.0	89.0	-2.0
7.	In my opinion, what matters most when feeding a child is that the child is full and enjoys the food. (-)	88.8	89.5	+0.8
8.	I do not need to bring my child to the <i>Posyandu</i> (Integrated Health Service Post) every month to monitor growth. (-)	91.3	94.0	+2.8
9.	I will consult a health worker if my toddler's weight decreases compared to the previous month and falls in the red zone.	86.3	87.8	+1.5

Mean Score	86.0	90.3	+4.3
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Note:

(-) = Negative statement

Normality and Difference Test Analysis

Normality testing using the Kolmogorov Smirnov test was conducted prior to the difference testing. The results showed that the significance values (p values) for knowledge and attitude scores, both at pretest and posttest, were above 0.05, indicating that the data were normally distributed. Accordingly, the analysis proceeded using the parametric paired t test to examine differences in mean scores before and after the intervention.

The results of the paired t test indicated significant differences between the pretest and post test scores for both the knowledge and attitude variables ($p < 0.05$). These findings demonstrate that the KAB Model nutrition education program was statistically effective in improving respondents' knowledge and attitude related to stunting prevention. The mean increase of 4% observed in both variables reflects not only a descriptive change but also a statistically meaningful one. Methodologically, these results reinforce the notion that behavior based educational interventions have a measurable impact on the cognitive and affective aspects of the target community.

Analysis of Differences between Pre-Test and Post-Test Scores

Based on the results of the paired t test, significance values (2 tailed) of 0.008 were obtained for the cognitive aspect and 0.003 for the affective aspect. As both values were smaller than $\alpha = 0.05$, it can be concluded that there were significant differences between the pre test and post test scores for both aspects.

Table 5. Results of the paired samples t test for knowledge scores before and after nutrition education

Paired Samples Test									
	Paired Differences		Std. Error Mean	95% Confidence Interval of the Difference		t	df	Significance	
	Mean	Std. Deviation		Lower	Upper			One-Sided p	Two-Sided p
Pre test –	-	4.00595	.87417	-5.44253	-	-	20	<.001	<.001
Post test	3.61905				1.79556	4.140			

Descriptively, most indicators showed an increase in knowledge scores following the health education intervention. The paired t-test on the mean indicator scores revealed a statistically significant increase between the pre- and post-intervention conditions ($t = -4.140$; $p < 0.001$). This finding indicates that, overall, the community-based nutrition education was able to improve the knowledge aspects measured by the evaluation indicators.

Table 6. Results of the Paired Samples t Test for Attitude Scores Before and After Nutrition Education

Paired Samples Test									
Pair	Paired Differences					t	df	Significance	
	Mean	Std. Dev	Std. Error Mean	95% Confidence Interval of the Difference				One-Sided p	Two-Sided p
				Lower	Upper				
Pre test – Post test	-4.25000	3.36658	1.06461	-6.65831	-1.84169	-3.992	9	.002	.003

Descriptively, the majority of indicators showed an increase in attitude scores following the education program. The paired t test conducted on the mean indicator scores revealed a significant increase between the pre and post education conditions ($t = -3.992$; $p = 0.003$). This finding indicates that, overall, the community based nutrition education program was effective in improving the aspects measured across the evaluation indicators.

Table 7. Effect Size of Change in Participants' Attitude Before and After Community Based Nutrition Education

Paired Samples Effect Sizes					
		Standardizer ^a	Point Estimate	95% Confidence Interval	
				Lower	Upper
Pre Test – Post test	Cohen's d	3.36658	-1.262	-2.089	-.399
	Hedges' correction	3.68386	-1.154	-1.909	-.365
a. The denominator used in estimating the effect sizes. Cohen's d uses the sample standard deviation of the mean difference. Hedges' correction uses the sample standard deviation of the mean difference, plus a correction factor.					

The Cohen's d value of 1.262 and Hedges' g value of 1.154 indicate a large effect size, suggesting that the increase in scores observed following the education program was not only statistically significant but also carried substantial practical significance across the indicators evaluated.

Table 8. Effect Size of Change in Participants' Knowledge Before and After Community Based Nutrition Education

Paired Samples Effect Sizes					
		Standard izer ^a	Point Estimate	95% Confidence Interval	
				Lower	Upper
Pre Test – Post test	Cohen's d	4.00595	-.903	-1.406	-.385
	Hedges' correction	4.16443	-.869	-1.352	-.371
a. The denominator used in estimating the effect sizes. Cohen's d uses the sample standard deviation of the mean difference. Hedges' correction uses the sample standard deviation of the mean difference, plus a correction factor.					

A Cohen's *d* value of -0.903 and Hedges' *g* value of -0.869 indicate a large effect size. This suggests that the increase in knowledge scores observed after the intervention was not only statistically significant but also carried substantial practical meaning across the evaluated indicators.

These results indicate that the stunting prevention education program was statistically effective in improving respondents' knowledge and attitudes. The significant improvement in the cognitive aspect indicates that the education materials successfully enhanced understanding related to exclusive breastfeeding, complementary feeding (MPASI), balanced nutrition, and child growth monitoring. The significant improvement in the affective aspect reflects a shift toward more positive attitudes regarding stunting prevention practices. Nevertheless, several misconceptions remained, particularly concerning the importance of parental supervision of children's food intake and the understanding that nutritional quality is more important than satiety alone. This finding suggests that educational interventions need to be conducted on an ongoing basis, with greater emphasis on monitoring feeding patterns after weaning and on routine weight monitoring at *Posyandu*.

Comparison with Previous Studies

The significant improvement in knowledge and attitude following the intervention supports the KAB Model, which posits that knowledge is an early determinant in the formation of attitude and behavior (Ajzen & Fishbein, 1980; Notoatmodjo, 2014). This result is also consistent with the findings of Teo et al. (2023), who emphasized that improved health literacy through structured education can influence affective evaluation and individual readiness for change.

The findings of this study are consistent with Nurmallasari et al. (2020), who stated that low maternal knowledge correlates with inadequate feeding practices. With increased knowledge gained through the education program, respondents developed a better understanding of the importance of balanced nutrition, exclusive breastfeeding, and age appropriate complementary feeding. This indicates that community based interventions have the potential to gradually improve child rearing practices. Simbolon (2024) reported that knowledge was found to be the most dominant contributing factor. Azarine et al. (2023), Deviatin et al. (2022), Adam et al. (2024), and Sitorus (2024) collectively demonstrated that knowledge, family support, and the role of health workers make substantial contributions to stunting prevention behavior.

Nonetheless, although the mean increase of 4% was statistically significant, the magnitude of improvement was substantively moderate. This may be attributable to respondents' relatively high baseline scores, as pre test results were already within the high category. This condition suggests that the subsequent challenge lies not only in improving knowledge but also in ensuring the internalization of attitudes and the consistency of long term behavioral change.

Furthermore, changes in knowledge and attitude do not directly reflect actual behavioral change in daily practice. Health behavior theory indicates that a knowledge behavior gap may exist. Therefore, the sustainability of the program and ongoing support through *Posyandu* are essential to prevent the observed changes from being merely temporary.

In the context of Ngambarsari Village, the approach involving *Posyandu* cadres, KKN-TI students, village midwives, and community leaders reflects a collaborative, community based intervention model. This approach aligns with the principles of community empowerment in stunting prevention efforts, in which behavioral change is determined not only by individual factors but also by social and institutional support. This finding is consistent with the study by Islam et al. (2017) among Char Land communities in

Bangladesh, which showed that populations in remote areas often face limited access to basic health services due to a shortage of facilities, health personnel, and supporting services, underscoring the strategic value of a collaborative, community based intervention model.

Taken together, these findings demonstrate not only the statistical effectiveness of the education program in improving knowledge and fostering positive attitudes but also underscore the importance of structured, participatory, and sustainable education strategies for stunting prevention at the village level.

Program Impact on Partners and Sustainability

Beyond enhancing participants' knowledge and fostering positive attitude change, the community based nutrition education program also contributed to the development of *Posyandu* cadres, community engagement, and the strengthening of health services at the village level. *Posyandu* cadres were involved in every phase of the program, from target identification through education, anthropometric measurement, and participant mentoring, thereby enhancing cadres' skills in delivering nutrition information and stunting prevention messages to the community. As a result, cadres served not only as implementers of *Posyandu* activities but also as community health education agents.

Interview results with the village midwife indicated that active participation of the community and *Posyandu* cadres in the education activities was a key factor contributing to the program's success. The stunting prevention program in Ngambarsari Village demonstrated that community based health interventions play a strategic role in improving community knowledge and attitudes related to nutrition and child care. The findings show that the KAB Model education program significantly improved respondents' cognitive and affective aspects, which theoretically constitute a prerequisite for behavioral change. This is consistent with the studies of Novitasari and Asmia (2025) and Sitorus (2024), which emphasized the critical role of health workers and the community in stunting prevention efforts.

Through community participation, the activities conducted with *Posyandu* also brought together mothers of children under five, adolescent girls, *Posyandu* cadres, village midwives, village government officials, and *KKN-TI* students for joint learning sessions. The involvement of these diverse target groups reflects increased community awareness of nutrition and stunting prevention. The village midwife also reported relatively high participation in discussion sessions, nutrition consultations, and growth monitoring activities for children under five.

The following is a testimonial from the village midwife of Ngambarsari:

"The community appeared more enthusiastic and engaged, attending and actively asking questions more than in previous Posyandu activities, thanks to this program..."
(Village Midwife of Ngambarsari)

The program also produced outputs intended for sustained use, including a nutrition and food guidebook distributed to *Posyandu* cadres as educational material. The availability of this guidebook enables cadres to continue delivering education independently to pregnant women, breastfeeding mothers, mothers of children under five, and women of reproductive age after the program concludes. Thus, the benefits of the program extend beyond the intervention period and continue to serve as a source of information and educational material at the village level.

From the standpoint of *Posyandu* services, the program sought to strengthen the capacity of *Posyandu* as a site for child weighing as well as for nutrition education and consultation within the community. The integration of anthropometric measurement, nutrition consultation, education, and educational media further expanded the role of

Posyandu in stunting prevention. This approach strengthened synergy among *Posyandu* cadres, village midwives, the Community Health Center (*Puskesmas*), village government, and the university in providing more comprehensive health services to the community.

The sustainability of the program is supported by enhanced operational capacity of *Posyandu* cadres, the availability of reusable educational media, and the establishment of multi stakeholder collaboration to promote community health activities in Ngambarsari Village. Consequently, the program's contribution to the community extends beyond knowledge and attitude improvement to include the strengthening of *Posyandu* institutions and community capacity for sustainable stunting prevention.

Overall, the program not only improved community knowledge and attitudes regarding stunting prevention but also strengthened the capacity of *Posyandu* cadres as health education agents, increased community participation in *Posyandu* activities, provided sustainable educational media in the form of a nutrition guidebook, and reinforced collaboration among the community, village government, *Puskesmas*, and the university in stunting prevention efforts.

In addition, sustainable nutrition practices such as the development of school gardens and household gardens represent a potential strategy. This is consistent with the study by Hume et al. (2022), which examined the impact of community gardens on dietary patterns, health, behavior, and social outcomes. Their findings indicated that participation in community gardens was associated with increased fruit and vegetable intake and healthier dietary behavior.

CONCLUSION

The Knowledge Attitude Behavior (*KAB*) based nutrition education program, implemented through the community service activities (*KKN-TI*) in Ngambarsari Village, was successful in improving participants' knowledge and fostering positive attitudes regarding nutrition and stunting prevention. The assessment results revealed significant differences between pre test and post test scores in knowledge ($p = 0.008$) and attitude ($p = 0.003$), indicating that the intervention was effective in deepening participants' understanding and shaping more positive attitudes toward stunting prevention practices. Notably, the most substantial improvements in knowledge and attitude were observed in aspects related to breastfeeding and dietary variation, healthy eating patterns, and clean living practices. However, several indicators remained relatively low, particularly those concerning understanding and attitudes toward monitoring children's food intake and regularly tracking the growth and development of under five year old children. These findings underscore the need for continuous education and support from *Posyandu* (Integrated Health Post) services to sustain and further enhance participants' understanding. The program also contributed to the development of an educational medium in the form of a nutrition guidebook, which can be utilized for further educational activities and has the potential to strengthen the capacity of *Posyandu* cadres. In addition, the program fostered collaboration among *Posyandu* cadres, village midwives, village government officials, Community Health Centers (*Puskesmas*), *KKN-TI* students, and community members to improve maternal and child health at the community level. This study has several limitations, as it employed a pre experimental design without a control group. The evaluation was limited to assessing knowledge and attitude in the short term and did not examine actual behavioral change or the intervention's effects on nutritional status and stunting incidence. Further research employing a more robust design with a comparison group is recommended, along with the use of behavioral change measurement methods such as direct observation or dietary

intake assessment through the 2×24 hour food recall method, to provide a more comprehensive picture of program effectiveness. This study emphasizes the importance of fostering an evaluation culture within community service and empowerment initiatives. Evaluations conducted before, during, and after an intervention represent a form of scientific and social accountability, ensuring that the resources, time, and effort invested genuinely benefit the target community. The evaluation outcomes can further serve as a basis for recommendations to enhance the quality of future program implementation.

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest.

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