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Stunting Prevention of Elementary School Children Based on Nutrition Education Peer Group: A Quasy Experimental

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ABSTRACT

Introduction: Stunting in elementary school children is a nutritional problem that impacts physical and cognitive development. One of the main factors causing stunting is the lack of knowledge, attitudes, and appropriate actions in maintaining children's nutrition.

Objective: This study aims to evaluate the effectiveness of peer group-based nutrition education in preventing stunting in elementary school children.

Methods: A type of quantitative research with a quasi-experimental design with experimental and control groups in two primary schools. The sample was selected by purposive sampling consisting of a treatment group and a control group of 30 samples each. The intervention was carried out for three months and was carried out in 6 meeting sessions for 3 weeks. Each session is held for 60 minutes and is guided by a facilitator who is trained through a nutrition education program carried out by peer students with materials that include the importance of nutritious diets, healthy living behaviors, and stunting with the media of nutrition poster and leaflets, every month children are monitored using modified food recalls. Data were analyzed using paired t-test and chi-square test to compare the difference before and after the intervention.

Results: This study found a significant improvement in nutrition-related knowledge, attitudes, and actions in the experimental group compared to the control group ($p=0.001<0.05$).

Conclusion: This study proves that peer group-based nutrition education programs effectively increase knowledge, attitudes, and actions that can prevent stunting in elementary school children. Based on these findings, it is recommended to expand the application of similar interventions in schools to reduce the prevalence of stunting.

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INTRODUCTION

Stunting or growth disorders in children caused by chronic malnutrition is a serious global health problem with long-term impacts on individual physical, cognitive, and productivity development (1,2). According to a report by the World Health Organization (WHO) in 2020, around 149 million children under the age of five worldwide are stunted (3,4), and more than half of them are in the Asian region. This problem primarily affects developing countries, where access to nutritious food and adequate health facilities is still limited (5). In Asia, the prevalence of stunting in countries such as India, Indonesia, and the Philippines remains high despite prevention efforts (6). In this context, stunting is not only a health problem but also affects these countries' quality of human resources and socioeconomic welfare (7). In Indonesia, stunting is still a major nutritional problem, despite a number of policy interventions and programs to address it (8). Based on the 2018 Basic Health Research (Riskesdas), the prevalence of stunting in Indonesian children under five reached 30.8% (9). This figure shows that about 1 in 3 children under five in Indonesia experience growth disorders that negatively impact their cognitive abilities and physical development (10). One of the areas experiencing high prevalence is rural areas and areas with limited access to health and education services. Stunting in elementary school children is also a concern because, at this age, children are still in a critical growth period and are greatly influenced by their diet and knowledge of the importance of balanced nutrition (11,12).

The leading causes of stunting in children include factors such as nutritional deficiency, recurrent infections, and low parental knowledge and awareness about the importance of a healthy diet (13,14). In addition, lack of access to adequate health services and socioeconomic factors also plays a role in the high stunting rate. In primary school children, this problem can be exacerbated by children's ignorance of healthy nutrition and poor eating habits, such as the consumption of instant and unbalanced foods, which are common among children at that age (5,15–17). Therefore, it is important to involve children in educational programs that increase their knowledge and change attitudes and actions related to healthy eating and lifestyle (18). Various studies have been conducted to find solutions to prevent and overcome stunting in children. Research by Suwarta et al. (19) shows that nutrition education provided to mothers positively impacts children's nutritional status, but the impact is limited to mothers who already have basic nutrition knowledge. A study by Manggabarani et al. (20) assessed the success of the peer group approach in nutrition education in adolescents and found that peer-to-peer learning can improve understanding and healthy living habits. This approach is more straightforward to accept because children feel more comfortable and can share experiences with their peers. This opens up potential to implement peer group-based nutrition education at the primary school level as a more effective way to reduce the risk of stunting through increasing children's knowledge, attitudes, and actions related to nutrition (21).

One of the approaches that is considered effective in stunting prevention is peer group-based nutrition education. This educational program involving peer groups allows children to share knowledge about the importance of good nutrition in daily life (22–24). In addition, this approach can also change children's attitudes and behaviors related to the consumption of nutritious foods, which will ultimately positively impact their nutritional status. Peer groups can be more efficient agents of change than traditional approaches that rely on information from adults or healthcare professionals (25–27). Peer group-based nutrition education is an approach that is increasingly gaining attention in public health programs, significantly increasing children's knowledge, attitudes, and actions on the importance of good nutrition (28). The peer group model takes advantage of peer interaction that can increase the effectiveness of delivering nutritional information and is more receptive to children than the education model based on adults or health workers (29). Therefore, peer group-based nutrition education in elementary schools is a potential solution to overcome stunting and improve children's nutrition quality in Indonesia. This study aims to evaluate the effectiveness of a peer group-based nutrition education approach in improving elementary school children's knowledge, attitudes, and actions toward stunting prevention. By involving peers in the education process, it is hoped that more meaningful and sustainable changes can be created to prevent stunting in children in Indonesia.

METHOD

Research Design

This type of research is quantitative, using a quasi-experimental design with an experimental group and a control group. This research was carried out in two elementary schools in Padangsidempuan. The experimental group received peer group and poster-based nutrition education interventions, while the control group received more

traditional nutrition education or no intervention (leaflet). The two groups were compared to determine the intervention's impact on the change in the bound variable.

Popula³⁶ and Sample

The population of this study is elementary school children in grades IV and V in two elementary schools located in areas with high stunting prevalence and considering socioeconomic variation. The students were selected by non-random (purposive s¹⁹ampling) from two elementary schools in Padangsidempuan. The research sample consisted of 2 groups, namely the experimental group and the control group. Each group consists of 30 students, with incl³⁷on criteria, namely students in grades IV and V who have parents who agree to participate in the research and are willing to participate in all stages of the research.

Inclusion and Exclusion Criteria

Inclusion Criteria: Students in grades IV and V, aged 9-12 years, are willing to participate in a peer group-based nutrition education program and obtain permission from their parents.

Exclusion Criteria: Students who have chronic diseases that affect their nutritional status or received a previous intensive nutrition education program.

Research Procedure

This research consists of several main stages, namely:

Preparation and Recruitment of Participants

Schools that are the location of the research are notified of the purpose and benefits of the research. Permission from the school and parents of students will be obtained before the research begins. After getting approval, students will be selected based on predetermined inclusion criteria.

Pretest

Before the intervention i⁹s carried out, all participants from the experimental and control groups⁴⁶ will be given a pretest to measure the level of knowledge, attitudes, and actions related to nutrition and stunting prevention. This pretest will be a questionnaire that measures aspects of nutritional knowledge, attitudes towards healthy eating, and good eating habits.

Peer Group-Based Nutrition Education Intervention

The experimental group will participate in a peer group-based nutrition education program carried out in 6 meeting sessions for 3 weeks. Each session will be held for 60 minutes, guided by a trained facilitator, and given a poster. The control group will be given a leaflet. s⁵⁴ material presented included topics such as the importance of balanced nutrition, how to choose nutritious food, the impact of stunting on children's growth and development, and how to prevent stunting through healthy diet and living habits. In each session, students will be invited to discuss and share information about the topics discussed and practice healthy eating in daily life. The control group will receive the same material but will be delivered through a lecture method from a teacher or health worker without involving peer interaction.

Posttest

⁹ After the intervention, both groups will take a posttest similar to the pretest to measure changes in their knowledge, attitudes, and actions related to nutrition and stunting. This posttest will be carried out immediately after the intervention is completed and repeated after 3 months to measure the resilience of the changes that occur.

Research¹⁹ instruments

The instrument used in this study is this questionnaire, which will measure students' knowledge, attitudes, and actions about the importance of balanced nutrition, food groups, and the adverse effects of stunting.

Data Analysis

The data obtained was analyzed using statistical software with the SPSS program. Comparisons between the experimental and control groups will be made using paired t-tests to measure changes in knowledge, attitudes, and actions and chi-square tests for categorical variables. The p-value < 0.05 is considered significant.

Research Ethics

This research follows the applicable research ethics guidelines, including obtaining approval from the Research Ethics Committee and permission from the school and parents of students. Participation in this study is voluntary, and students can withdraw at any time without any consequences. The data obtained is kept confidential and only used for research purposes.

RESULTS

Table 1. Analysis of Characteristics of Elementary School Children in the Experimental Group and Control Group

Variable	Intervention (n=30)	Control (n=30)	p
	Average±SD/%	Average±SD/%	
Age (Years)			
10	13 (43.3)	20 (66.7)	0.119*
11	17 (56.7)	10 (33.3)	
Gender			
Man	9 (30.0)	8 (26.7)	0.774*
Woman	21 (70.0)	22 (73.3)	
Class			
IV	13(43.3)	20 (66.7)	0.069*
V	17 (56.7)	10 (33.3)	
BMI	15.20±3.04	15.44±2.91	0.762**
Weight (kg)	26.03±3.48	26.16±3.49	0.763**
Height (cm)	132.00±11.48	131.13±10.64	0.883**

Source: Primary Data, 2024; *Chi Square; **Independent T-Test

This table shows that the age distribution in the two groups (experimental and control) is relatively balanced, with the majority of children between the ages of 10 and 11 years old. There was no significant difference between the experimental and control groups in terms of age distribution, suggesting that the two groups had similar age characteristics. It is important to ensure that the age factor does not affect the results of nutrition education interventions. In both groups, the distribution of the sexes also did not appear balanced, with an unequal number of boys and girls. This characteristic ensures that gender variables do not have the potential to affect differences in study results, considering that potential differences in diet or healthy lifestyle habits between the sexes may affect nutritional status. Therefore, gender equality in both groups reduces any bias that may arise. Most of the students in the study were in grades IV and V, with little difference between the experimental and control groups. This reflects a balanced representation of primary school students in a critical growth and development period. It is important to see if class diversity can affect children's understanding and involvement in nutrition education programs. BMI values in both groups showed a similar range, with most children in the normal BMI category but some in the underweight or overweight category. The average weight of the children in the experimental and control groups was relatively comparable. Although there was variation in weight between individuals, no significant differences could affect the study results. The average height of the children in the two groups also did not show a significant difference. Most children are at a height appropriate to their age, with some variations that are quite normal for the primary school population. Therefore, these two groups can be considered homogeneous in the fundamental aspects that can affect the study results so that the differences found in the variables of knowledge, attitudes, and nutritional actions after the peer group-based nutrition education intervention can be considered as the result of the program implemented.

Table 2. Changes in Student Knowledge Before and After Peer Group Nutrition Education Intervention on Stunting Prevention in Elementary School Children

Knowledge	Pre	Post	p*	Δ1
Intervention	8.20±2.84	17.00±1.36	(0.000)	↑8.80±0.66
Control	7.93±1.85	8.20±1.32	(0.211)	↑0.27±0.53

Source: Primary Data, 2024; Δ1 = Difference Pre–Post 1; *uji paired t test

Table 2 shows that the intervention group had an average score of 8.20 ± 2.84 of the students' knowledge before the intervention, and the average score of the student's knowledge after the intervention was 17.00 ± 1.36 . The p-value for this change was 0.000, indicating a significant difference between the scores before and after the intervention. The change in mean score was $\uparrow 8.80 \pm 0.66$, which indicates a considerable increase in knowledge after the peer group-based nutrition education intervention. Meanwhile, the control group had an average score of student knowledge before the intervention of 7.93 ± 1.85 , and the average score of student knowledge after the intervention was 8.20 ± 1.32 . The p-value for this change was 0.211, suggesting that the difference between the control group is before and after intervention scores was insignificant. The change in the mean score was $\uparrow 0.27 \pm 0.53$, which indicates a minimal and insubstantial increase in knowledge. The intervention group experienced a very significant improvement in their knowledge after participating in the nutrition education intervention. A p-value of 0.000 indicates that this change did not occur by chance and that there was a strong association between the intervention and improving students' knowledge. The average increase in knowledge score is 8.80, with a standard deviation of 0.66. This shows that peer group-based nutrition interventions significantly increase students' knowledge about stunting prevention. The control group, which did not receive the nutrition education intervention, showed a minimal improvement in their knowledge scores (only 0.27) and with a p-value of 0.211, which means that this change was not statistically significant. This slight increase can be considered a natural or accidental change, not the result of an intervention. Although there was a slight increase in scores, this number was minimal and insufficient to significantly impact students' knowledge, as a finding that peer group-based nutrition education interventions have proven to be effective in increasing students' knowledge about stunting prevention in elementary school children. A significant change in knowledge (p-value < 0.05) and a significant increase in the average score ($\uparrow 8.80$) indicates the success of this program. In contrast, the control group did not show significant changes, which confirms that without nutrition education interventions, the increase in students' knowledge does not occur by itself.

Table 3. Changes in Students' Attitudes Before and After Peer Group Nutrition Education Intervention Towards Stunting Prevention in Elementary School Children

Attitude	Pre	Post	p*	Δ1
Intervention	13.00±5.11	35.20±1.86	(0.000)	↑22.20±3.25
Control	11.83±4.62	13.20±5.12	(0.000)	↑1.37±0.50

Source: Primary Data, 2024; Δ1 = Difference Pre–Post 1; *uji paired t test

Table 3 illustrates the change in the student's attitude in the intervention group, with the average score of student attitude before the intervention being 13.00 ± 5.11 and the average score of student attitude after the intervention being 35.20 ± 1.86 . The p-value for the difference in pre and post-scores was 0.000, which indicates a very significant difference between pre and post-scores. The average change in attitude score was $\uparrow 22.20 \pm 3.25$, which showed a substantial increase in attitudes towards stunting prevention after participating in peer-group-based nutrition education interventions. Meanwhile, the control group showed that the average score of students' attitudes before the intervention was 11.83 ± 4.62 , and the average score of students' attitudes after the intervention was 13.20 ± 5.12 . The p-value for the difference in scores before and after the intervention was 0.000, indicating a significant difference between the pre and post-test scores, although this change was smaller than that of the intervention group. The mean change in attitude scores was $\uparrow 1.37 \pm 0.50$, which indicates a minimal improvement in students' attitudes after the intervention in the control group. The intervention group showed a very significant improvement in their attitudes towards stunting prevention. The p-value of 0.000 indicates that this change is much more significant than the possibility of coincidence, so it can be concluded that peer group-based nutrition education effectively changes

students' attitudes. The mean change in attitude score was 22.20, a considerable increase compared to the pre-intervention value. This increase reflects a positive attitude change towards stunting prevention, most likely triggered by the understanding and information obtained during the intervention. Although the control group also showed an increase in attitude scores (from 11.83 to 13.20), this difference was much smaller and was not comparable to that of the intervention group. This 1.37 increase can be considered the result of other external factors or natural changes, but it does not indicate a significant impact of the intervention factor. A p-value of 0.000 in the control group showed this change was statistically significant. However, this minimal change indicated that the peer group-based nutrition education intervention had a much more significant impact than no intervention, as a finding that peer group-based nutrition education interventions have proven to be very effective in increasing students' attitudes towards stunting prevention. A significant increase in average scores ($\uparrow 22.20$) and a significant p-value (0.000) showed that this intervention positively changed students' attitudes. Although there was an increase in scores in the control group, the change was minimal ($\uparrow 1.37$) and practically insignificant. These changes are more indicative of a natural difference than the impact of a structured intervention.

Table 4. Changes in Student Actions Before and After Peer Group Nutrition Education Intervention on Stunting Prevention in Elementary School Children

Action	Pre	Post	p*	$\Delta 1$
Intervention	14.00 \pm 5.33	34.43 \pm 2.66	(0.000)	$\uparrow 20.43 \pm 2.67$
Control	12.57 \pm 4.25	15.03 \pm 7.48	(0.119)	$\uparrow 2.46 \pm 3.23$

Source: Primary Data, 2024; $\Delta 1$ = Difference Pre-Post 1; *uji paired t test

Table 4 presents data on changes in the actions of the intervention group, with the average score of the student's action before participating in the intervention being 14.00 \pm 5.33 and the average score of the student's action after participating in the intervention being 34.43 \pm 2.66. The p-value for this change is 0.000, which indicates that the change in this action is statistically significant. The change in the mean action score was $\uparrow 20.43 \pm 2.67$, which showed a significant increase in student actions related to stunting prevention after a peer group-based nutrition education intervention. Meanwhile, the control group with the average score of students' actions before the intervention was 12.57 \pm 4.25, and the average score of students' actions after participating in the intervention was 15.03 \pm 7.48. The p-value for this change is 0.119, which indicates that the change in action in the control group is not statistically significant. The mean change in action score was $\uparrow 2.46 \pm 3.23$, which indicates a relatively small increase in action after the intervention and is not proportional to the increase in the intervention group. The intervention group experienced a significant increase in actions after participating in peer-based nutrition education. A p-value of 0.000 indicates that this change is real and does not occur by chance. The average change in action score was 20.43, with a standard deviation of 2.67, which indicates a significant increase in action. This reflects that peer group-based nutrition education interventions can motivate students to be more active in implementing stunting prevention measures in their daily lives. The control group showed a minor increase in their actions ($\uparrow 2.46$) with a p-value of 0.119, meaning this change was not statistically significant. This slight increase showed no substantial change in action in the control group without the nutrition education intervention. Although there was a slight increase in action scores, this number was much smaller and less significant than the intervention group. This shows that the intervention has a more significant impact on student actions, as a finding that peer group-based nutrition education interventions have proven to be very effective in improving student actions related to stunting prevention. A significant increase in action scores ($\uparrow 20.43$) and a very significant p-value (0.000) showed that this approach successfully encouraged students to be more active in taking preventive measures against stunting, and the control group, although showing an improvement, experienced only a tiny change ($\uparrow 2.46$) and was not statistically significant, indicating that without the intervention, the student's actions did not change significantly.

Table 5. Differences in Knowledge, Attitudes, and Actions of Students Before and After Peer Group Nutrition Education on Stunting Prevention in Elementary School Children

Variable	Intervention (n=30)	Control (n=30)	p
	Average±SD/%	Average±SD/%	
Pretest knowledge	8.20±2.84	7.93±1.85	0.669**
Posttest knowledge	17.00±1.36	8.20±1.32	0.000**
Attitude pretest	13.00±5.11	11.83±4.62	0.357**
Attitude posttest	35.20±1.86	13.20±5.12	0.000**
Action pretest	14.00±5.33	12.57±4.25	0.255**
Action posttest	34.43±2.66	15.03±7.48	0.000**

**Independent T-Test

Table 5 presents that the intervention group's average score of students' knowledge before the intervention was 8.20 ± 2.84 , and the control group's average score of students' knowledge before the intervention was 7.93 ± 1.85 with a p-value of 0.669 indicating that there was no significant difference in knowledge scores between the intervention group and the control group before the intervention was carried out. After being given peer group nutrition education, the intervention group with the average score of students' knowledge after the intervention was 17.00 ± 1.36 , and the control group with the average score of students' knowledge after the intervention was 8.20 ± 1.32 with a p-value of 0.000 indicating that the change in knowledge between the intervention group and the control group after the intervention was very significant. The intervention group showed a considerable improvement in their knowledge. Likewise, attitudes in the intervention group with an average score of students' attitudes before the intervention was 13.00 ± 5.11 , and a control group with an average score of students' attitudes before the intervention was 11.83 ± 4.62 with a p-value of 0.357 indicating that there was no significant difference in attitude scores between the intervention group and the control group before the intervention. After being given peer group nutrition education, in the intervention group, the average score of students' attitudes after the intervention was 35.20 ± 1.86 . In the control group, the average score of students' attitudes after the intervention was 13.20 ± 5.12 with a p-value of 0.000, indicating that the change in attitudes between the intervention group and the control group was very significant. The intervention groups showed a considerable improvement in their attitudes towards stunting prevention.

Meanwhile, the action in the intervention group with the average score of students' actions before the intervention was 14.00 ± 5.33 , and the control group with the average score of students' actions before the intervention was 12.57 ± 4.25 with a p-value of 0.255 showed that there was no significant difference in the action scores between the intervention group and the control group before the intervention. After being given nutrition education by the peer group, the intervention group with the average score of students' actions after the intervention was 34.43 ± 2.66 , and the control group with the average score of students' actions after the intervention was 15.03 ± 7.48 with a p-value of 0.000 indicating that the change in actions between the intervention group and the control group after the intervention was very significant. The intervention group showed a considerable improvement in their actions towards stunting prevention. As a finding before the intervention, both the intervention and control groups had almost equal knowledge scores, with no significant difference ($p = 0.669$). However, after the peer group-based nutrition education intervention, the intervention group showed a very significant improvement in their knowledge of stunting prevention ($p = 0.000$), while the control group did not show the same improvement. There was no significant difference in attitudes between the intervention group and the control group before the intervention ($p = 0.357$), after the intervention, the intervention group showed a significant change in attitude ($p = 0.000$) with a much higher mean score than the control group, which showed only a minor improvement. Before the intervention, the two groups showed no significant difference in actions ($p = 0.255$). After the intervention, the intervention group showed a significant improvement in their action towards stunting prevention ($p = 0.000$), while the control group experienced a much more minor and insignificant increase. Peer group-based nutrition education interventions have proven effective in increasing student knowledge, attitudes, and actions related to stunting prevention. This result can be seen from a very significant increase in each of the measured variables, knowledge, attitudes, and student actions, with a very small p-value (all < 0.05). The control group showed a minor and insignificant increase in the same variable, which

suggests that the changes that occur are minimal in the absence of a peer group-based nutrition education intervention).

DISCUSSION

The Effect of Peer Group Nutrition Education on Stunting Prevention Knowledge in Elementary School Children

Nutrition education with a peer group approach allows students who understand the material better to educate their friends. This expands the scope of educational materials and allows the delivery of information in a language that is easier for fellow students to understand. This peer group learning is supported by various studies that show that the learning process involving peers tends to be more effective because they can support each other in understanding the material being taught (30). This study found that peer group-based nutrition education significantly influences increasing students' knowledge about stunting prevention in elementary school children. This shows that the group of students who received nutrition education interventions experienced significant changes in their understanding of the importance of nutrition to prevent stunting.

The significant increase in students' knowledge of stunting prevention after this intervention indicates that the peer group-based approach effectively conveys information on topics previously considered less interesting or challenging for students to understand. Students involved in peer groups are more open to discussion and questioning, which can improve their understanding in more depth. In addition, teaching by peers can reduce barriers to communication, as they share the same language and can more easily understand the needs and conditions of their peers (31). Better knowledge about stunting and nutrition can encourage students to take better preventive measures at home and school. For example, they can educate their families about the importance of a nutritious diet, practice healthy living habits, and be more concerned about friends at risk of stunting (32).

Previous research has also shown that a peer group-based approach to nutrition education can increase students' knowledge and attitudes regarding health issues, including nutrition. For example, Oliver et al. (33), in their research on using peer group models for nutrition education in developing countries, found that peer group education is highly effective in improving children's understanding of nutrition and health and their healthy behaviors. In addition, research by Nurlaela and Rasmaniar (28) conducted in Indonesia also showed that nutrition education involving peer groups can improve knowledge about stunting prevention. This study involved primary schools in areas with a high prevalence of stunting, and the results showed that children involved in peer group-based education programs experienced a significant increase in knowledge related to the importance of balanced nutritional intake for optimal growth. Based on the theory of social learning by Albert Bandura, learning does not only occur through direct experience, but also through observation and interaction with others. In the context of peer group-based nutrition education, students learn from observations of their peers, which strengthens their understanding of the importance of nutrition for stunting prevention. This process reinforces the concept that peer-based learning has advantages in improving understanding and changing behaviors, as students feel more valued and more engaged in discussions (34). In the context of peer group education, more knowledgeable students can mentor their peers who have less understanding, helping them go beyond the limits of their abilities with peer support. This explains why this approach effectively increases knowledge about stunting prevention (35). Based on these findings, the peer group-based nutrition education approach can be used as an effective strategy in stunting prevention programs at the elementary school level. This program can be implemented in more schools, especially in areas with a high prevalence of stunting. Governments and health organizations can adopt this model to expand the reach of nutrition education by involving students as agents of change in their communities. These findings align with previous studies showing peer group-based education's success in improving children's health understanding. Therefore, peer group-based nutrition education can effectively prevent stunting among elementary school children (36).

The Effect of Peer Group Nutrition Education on Stunting Prevention Attitudes in Elementary School Children

This considerable increase shows that the peer-based education approach has changed students' attitudes toward the importance of stunting prevention (37). Peer group-based nutrition education interventions provide information and motivate students to change their attitudes about the importance of a healthy diet, balanced nutrition, and healthy living habits as preventive measures against stunting (38). The findings in this study show that peer

group-based nutrition education significantly influences students' attitudes toward stunting prevention in elementary school children. This significant increase in attitudes reflects the success of peer group-based education in influencing students' perception of critical health issue, namely stunting. A positive attitude towards stunting prevention will encourage students to understand the importance of nutrition in physical growth and change their behavior at home and in their surroundings (39).

One of the main reasons for the success of this approach is the use of peer group learning, which allows students who understand health topics better to convey information to their peers. This process allows for interactive discussions that make it easier for students to understand the material and feel more involved in learning. This follows the concept of social learning according to Albert Bandura, which states that individuals tend to imitate and accept the behaviors they see in their peers (40). Additionally, the peer-based approach allows students to feel more comfortable discussing and asking questions. In peer groups, students feel they have equality in understanding and experience, making them more open to absorbing the information provided and making it easier to change their attitudes and behaviors (41).

Previous research conducted by Huitink et al. (42) in Indonesia showed that the peer group-based education approach positively impacts students' attitudes toward nutrition and health issues. In this study, children involved in peer-based education showed a significant increase in attitudes toward healthy eating and better living habits. This finding is in line with research conducted by Hadi et al. (43), who stated that peer group-based nutrition education programs in elementary schools can increase students' knowledge and attitudes about nutrition and stunting prevention. In addition, Zhou et al. (44) also found that peer group-based education was very effective in improving children's attitudes and behaviors regarding health, including healthy eating habits, which contributed to the prevention of stunting. This study shows that when children are involved in peer groups to learn important topics such as stunting prevention, they are more likely to adopt a positive attitude and disseminate the information they learn to others (45). This finding can be explained using the Social Learning Theory from Bandura et al. (46), which emphasizes the importance of observation and its imitation in the learning process. In the context of peer group-based nutrition education, students observe and imitate their peers' positive attitudes to better understand nutrition's importance in preventing stunting. This social learning is particularly effective because students tend to be more receptive to information from peers who are perceived to have experience and understanding closer to them, compared to other sources of information, such as teachers or parents (46). Peer group-based nutrition education can be a very effective strategy to change students' attitudes toward stunting prevention in elementary schools. This program can be integrated into the nutrition education curriculum in schools, especially in areas with a high prevalence of stunting. A peer group-based approach allows for a wider dissemination of information and can encourage students to become agents of change in their families and societies (29,47,48).

2 The Effect of Peer Group Nutrition Education on Stunting Prevention Measures in Elementary School Children

This considerable increase shows that the peer group approach increases students' knowledge and attitudes regarding stunting prevention and encourages more tangible behavior changes or actions in preventing stunting (49). These preventive actions can include dietary changes, healthy eating habits, and counseling to family or friends about the importance of balanced nutrition for optimal growth (50). The findings in this study show that peer group-based nutrition education significantly influences stunting prevention measures in elementary school children. The significant improvement in stunting prevention measures in the intervention group can be explained through the social learning mechanism applied in the peer group approach. Students who better understand the importance of nutrition to prevent stunting can share this knowledge with their friends, thereby expanding the influence of nutrition education. In addition, they are also more motivated to take preventive measures in daily life after getting relevant and easy-to-understand information (51). Peer group learning allows students to learn through hands-on experience, share information, and discuss ideas that can be applied in the context of their lives. Another advantage of this approach is the urge to change behavior in groups, as students tend to feel more valued when their peers can see their actions (52). For example, after getting an education, students may encourage their parents to provide nutritious meals at home, share knowledge with classmates, or become more active in physical activity to support healthy growth. These changes suggest that the increase in nutrition-related knowledge and attitudes occurs not only at the cognitive level but also at the level of practical behavior or action (53).

Previous research has supported these findings, suggesting that a peer group-based approach effectively influences changes in stunting prevention-related measures. For example, Adethia et al. (54), in their research on peer group-based nutrition education in Indonesia, found that students involved in peer-group education programs experienced increased knowledge and attitudes and actual actions in implementing healthy diets and providing education to their families. They reported an increase in preventive measures such as avoiding fast food, increasing the consumption of vegetables and fruits, and educating families about the importance of balanced nutrition (55). Another study by (Adethia et al. (54) also showed that peer-based interventions improved disease prevention measures among students, including those related to nutrition and health. Students who study with their peers tend to be more open and active in taking preventive measures because they feel more supported and valued in their group. Ball et al. (56) also found that peer group-based nutrition education programs implemented in elementary schools can increase students' preventive actions in stunting prevention. They noted that students involved in the program became more educated about balanced nutrition and practiced that knowledge in their daily lives (56). This finding can be explained by the social learning theory put forward by Albert Bandura, which states that individuals learn from observation, imitation, and interaction with others in a group. In peer group-based nutrition education, students learn from their peers who are more knowledgeable and informed about stunting prevention. This process increases their self-efficacy or self-confidence to change their behavior to be healthier (34). In addition, more knowledgeable students can help their peers understand nutrition and health concepts. By interacting in peer groups, students support each other to apply the knowledge they have acquired daily. The concept of a proximal developmental zone in which more informed students guide their peers applies in this context. In this finding, a peer group-based approach to nutrition education can effectively improve stunting prevention measures among elementary school children. Educational programs like this should be implemented in more schools, especially in areas with a high prevalence of stunting. The peer-group-based approach provides an opportunity to expand the scope of education and motivate students to change their actions directly (54,57–61).

Research Limitations

This study has limitations in its limited sample size, reducing its ability to generalize to a more extensive and more diverse population. In addition, the relatively short duration of the intervention is also a limitation because the long-term influence of peer group-based nutrition education on students' knowledge, attitudes, and actions cannot be measured with certainty. Future research can provide a deeper understanding of the influence of peer group-based nutrition education in stunting prevention in children and adolescents and can be implemented more widely in various regions in Indonesia.

CONCLUSION

Based on the results of this study, it can be concluded that peer group-based nutrition education effectively improves the knowledge, attitudes, and actions of elementary school children related to stunting prevention. Significant improvements in these three variables suggest that these interventions can help children better understand the importance of healthy diets and motivate them to adopt healthy lifestyle habits in their daily lives. Peer group-based education programs have proven more effective than traditional educational methods that do not involve peer interaction. Therefore, this approach can be one of the effective strategies to prevent stunting in Indonesia, especially for children of primary school age who are in a critical period of growth.

AUTHOR'S CONTRIBUTION STATEMENT

Nurhalimah Batubara: Conceptualization, methodology, data curation, and writing—original draft, (2) Yuli Arisyah Siregar: Supervision, validation, and writing—review & editing, (3) Anto J. Hadi: Data collection, investigation, and formal analysis, (4) Haslinah Ahmad: Statistical analysis, visualization, and interpretation of results, (5) Adi Antoni: Funding acquisition, project administration, and resources management, (6) Abdullah: Literature review, data validation, and manuscript proofreading.

CONFLICTS OF INTEREST

The author stated that there was no conflict of interest related to this study. No financial, professional, or personal relationship can affect the integrity or objectivity of this research. All data and results presented in this study are honest and transparent, without any influence from outside parties that can affect the conclusions taken.

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