

Research Article

The Effectiveness of Education Through Peer Groups on Increasing Knowledge, Attitudes and Implementation of Balanced Nutrition in Preventing Anemia (In Adolescent Girls at SMPN 1 Paringin)

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Abstract: Adolescence is a crucial period in the human life cycle for improving the Human Development Index. Growth during adolescence is more rapid than in previous periods, resulting in increased nutritional needs. Rapid growth and high activity levels in adolescents can impact nutritional needs. Therefore, adolescents, especially adolescent girls, are a group that is vulnerable to nutritional problems, including anemia and KEK. These problems in girls are closely related to stunting. This study aims to determine the effectiveness of peer group education on improving knowledge, attitudes, and the application of balanced nutrition in preventing anemia in adolescent girls. The research method used a quasi-experimental non-equivalent control group design. The sample size was 62 people. The sampling technique used purposive sampling. The data obtained were then analyzed using paired t-test statistics and Wilcoxon for paired difference tests. The results showed that the overall p-value obtained was <0.05, indicating a difference before and after the intervention in improving knowledge, attitudes, and the application of balanced nutrition in preventing anemia. Peer Group Education is effective in improving knowledge, attitudes, and the application of balanced nutrition in preventing anemia in adolescent girls.

Keywords: Anemia; Attitudes; KEK; Knowledge; Peer Group.

1. Introduction

Defined as the population aged 10-19 years (WHO, 2022), according to Regulation of the Minister of Health of the Republic of Indonesia Number 25 of 2014, adolescents are those aged 10-18 years. According to the Population and Family Planning Agency (BKKBN), adolescence is defined as the transition from childhood to adulthood, with the age range of adolescents aged 10-24 years and unmarried. Adolescence is a crucial part of the human life cycle for improving the Human Development Index. Data from the Central Statistics Agency (BPS) in 2024 showed that the number of adolescent girls aged 10-14 years was 10,757,900 and those aged 15-19 years was 10,707,700, bringing the total population aged 10-19 years to 21,465,600, or 7.6% of the population in 2024.

Growth during adolescence is faster than in previous years, resulting in increased nutritional needs. Rapid growth and high activity levels in adolescents can impact nutritional needs. Therefore, adolescents are a vulnerable group to nutritional problems, including anemia and certain types of chronic energy deficiencies (CED). This is also closely related to the incidence of stunting (Alwi, 2022). Malnutrition is a major obstacle to human resource development, especially in developing countries like Indonesia. Stunting not only impacts physical health, such as suboptimal height and weight growth, but also impacts cognitive development, learning capacity, and economic productivity in adulthood (Tampy, 2020).

A balanced diet means that the quantity and variety of food consumed meets the body's daily needs for energy, protein, iron, folic acid, vitamin C, and other micronutrients. A study

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in Malang found that 59.04% of the incidence of anemia in adolescent girls was due to unhealthy dietary practices. The analysis showed a significant relationship between unhealthy dietary practices and anemia status (Setyaningsih, 2022).

Presidential Regulation Number 72 of 2021 regulates the national strategy for accelerating stunting reduction, the implementation of stunting reduction programs, coordination of stunting reduction program organizers, monitoring, evaluation, reporting, and funding. One of the target groups for the implementation of stunting reduction programs is adolescents. Early stunting prevention and comprehensive nutritional interventions are needed to break the intergenerational cycle of stunting.

According to the 2023 Indonesian Health Survey (SKI), the prevalence of anemia among 15-24 year olds was 15.5%. This figure also shows that women have a higher prevalence of anemia, at 18%, compared to men, at 14.4%. Despite a decrease compared to five years ago, the figure of 15.5% is still considered high. According to the WHO, an anemia rate of 10% of the population is considered high (Ministry of Health, 2023). The percentage of adolescent girls consuming iron supplements (IBF) reached 37.5%, still below the target of 50% (Ministry of Health, 2023). This indicates the low level of iron supplementation among adolescent girls.

Adolescent girls can take preventative measures by consuming one iron supplement per week, engaging in at least 30 minutes of physical activity daily, and adopting a balanced diet. Nutrition education for adolescent girls can be provided to prevent stunting early on. This education can be provided through various methods. Research by Naulia (2021) shows that nutrition education influences improvements in attitudes and behaviors regarding nutritional fulfillment. Therefore, it can serve as a reference for effective promotive and preventive efforts to address the challenge of stunting. Furthermore, according to Simbolon (2022), peer modeling for adolescents is considered an effective intervention for preventing stunting by developing healthy adolescents as a planned generation. This is further supported by research by Andini (2022), which showed that digital peer-group-based education successfully increased knowledge and adherence to iron tablet consumption among adolescents in the intervention group.

Given the urgency of stunting prevention, the problem is not limited to toddlerhood but has roots much earlier, particularly in the pre-pregnancy and pregnancy periods. The nutritional status of adolescent girls, including anemia and macro- or micronutrient deficiencies, will affect pregnancy and the condition of the newborn, which in turn influences the risk of stunting. Widaryanti (2024) explains that a package of essential health interventions for adolescent girls is a strategic step to break the intergenerational cycle of stunting. Therefore, nutrition education interventions through peer groups targeted at adolescents have strategic value for inclusion in a more comprehensive series of stunting prevention interventions.

2. Proposed Method

The study was conducted from July to September 2025, for 7 weeks (3 weeks of educator intervention and 4 weeks of peer group intervention). The research design used a quasi-experimental non-equivalent control group design. The study population was all 182 female adolescents at SMPN 1 Paringin. The research sample was calculated by Lemeshaw (1997) which amounted to 62 people. The sampling technique used a purposive sampling technique with inclusion criteria, namely: female adolescents aged between 13-15 years, able to communicate well, willing to receive intervention during the study and approved by the teacher in charge. Next, a random selection was carried out on the study population to choose a control group and a treatment group, namely 31 people each with a ratio of educators and sampling of 1: 5 or 6. The next stage was a pre-test to identify the application of balanced nutrition and anemia prevention with a questionnaire. After that, the case group was given treatment by being given peer group education on balanced nutrition and anemia prevention. Meanwhile, the control group was given a booklet on balanced nutrition to read and study independently. Furthermore, after 4 weeks of activity, the results were analyzed using statistical tests if the data was normally distributed using a paired t-test with a sig value <0.05 ($\alpha = 0.05$), but if the data was not normally distributed then the test used was the Wilcoxon test with a sig value <0.05 ($\alpha = 0.05$), to analyze the effectiveness between groups using the Independent Sample T-Test if the data was normally distributed and the Mann Whitney test if the data was not normally distributed.

3. Results and Discussion

Results

The research results obtained the following respondent characteristics:

Table 1. Distribution of Respondent Characteristics.

Variabel	Group			
	Treatment		Control	
	Frequency	Percentage	Frequency	Percentage
Age				
13	10	32.3	12	38.7
14	12	38.7	13	41.9
15	9	29	6	19.4
Total	31	100	31	100
Grade				
VII	14	45.2	13	41.9
VIII	10	32.3	12	38.7
IX	7	22.5	6	19.4
Total	31	100	31	100
Parents' Occupation				
Civil Servant/Police	4	12.9	3	9.6
Private Sector	6	19.4	7	22.5
Self-Employed	10	32.3	8	25.8
Laborer	11	35.4	13	41.9
Total	31	100	31	100

Based on Table 1, the general characteristics of respondents in the treatment and control groups indicate that the majority of respondents were 14 years old. At the grade level, the majority were in seventh grade, while parental occupation data indicated the largest percentage worked as laborers.

Table 2. Frequency Distribution of Knowledge, Attitudes, and Implementation of Balanced Nutrition in Anemia Prevention.

Variabel	Group							
	Treatment				Treatment			
	Pretest		Posttest		Pretest		Posttest	
	Freq	Percentage	Freq	Percentage	Freq	Percentage	Freq	Percentage
Knowledge								
Good	0	0	29	93.5	0	0	9	29
Sufficient	3	9.7	2	6.5	5	16.1	19	61.3
Poor	28	90.3	0	0	26	83.9	3	9.7
Total	31	100	31	100	31	100	31	100
Attitude								
Positive	19	61.3	26	83.9	11	35.5	18	58.1
Negative	12	38.7	5	16.1	20	64.5	13	41.9
Total	31	100	31	100	31	100	31	100
Implementation of Balanced Nutrition								
Good	0	0	23	74.2	0	0	5	16.1
Enough	14	54.8	6	25.8	4	12.9	21	67.1

Not enough	17	45.2	0	0	27	87.1	5	16.1
Total	31	100	31	100	31	100.0	31	100

Based on Table 2, the descriptive analysis results show that before the intervention, most respondents in the treatment group (90.3%) had insufficient knowledge. However, after the intervention, there was a significant increase, with 93.5% in the good knowledge category. Meanwhile, in the control group, before the booklet was administered, 83.9% had insufficient knowledge. After the booklet, 61.3% were in the sufficient knowledge category. The descriptive analysis of attitudes in the treatment group showed that 61.3% had a positive attitude before the intervention, increasing to 83.9% after the intervention. Meanwhile, in the control group, before the booklet, there was an increase from 35.5% to 58.1% of respondents with a positive attitude. Regarding the implementation of balanced nutrition in preventing anemia, before the intervention, most respondents in the treatment group (54.8%) were in the sufficient knowledge category. After the intervention, there was a significant increase, with 74.2% of respondents in the good knowledge category. Conversely, in the control group, before the booklet was administered, most respondents were in the insufficient knowledge category (87.1%), and after the booklet, 67.1% were in the sufficient knowledge category.

Table 3. Differences in Knowledge, Attitudes, and Implementation of Balanced Nutrition in Preventing Anemia Before and After Intervention in the Treatment and Control Groups

Variabel	Group	Mean	SD	P-Value
Knowledge	Treatment			
	Pretest	14.42	6.265	.000 ^a
	Posttest	40.84	3.067	
	Control			
	Pretest	16.74	7.005	.000 ^a
	Posttest	33.19	6.478	
Attitude	Treatment			
	Pretest	27.55	2.718	.000 ^a
	Posttest	45.65	2.234	
	Control			
	Pretest	27.03	3.199	.000 ^a
	Posttest	45.61	1.644	
Implementation of Balanced Nutrition	Treatment			
	Pretest	32.90	2.663	.000 ^a
	Posttest	46.16	3.348	
	Control			
	Pretest	29.45	2.718	.000 ^a
	Posttest	40.32	4.331	

Based on the results of statistical tests, it shows that in the treatment group there was an increase in the average knowledge score from 14.42 ± 6.265 to 40.84 ± 3.067 , with a p value = 0.000 ($p < 0.05$), which indicates a significant difference between the pretest and posttest. In the control group, a significant increase was also found from 16.74 ± 7.005 to 33.19 ± 6.478 ($p = 0.000$), but the increase was smaller than the treatment group. Statistical analysis on the attitude variable showed an increase in the average attitude score in the treatment group from 27.55 ± 2.718 to 45.65 ± 2.234 , with a p value = 0.000, indicating a significant change. The control group also experienced an increase from 27.03 ± 3.199 to 45.61 ± 1.644 .

($p = 0.000$). The treatment group's average score for balanced nutrition implementation increased from 32.90 ± 2.663 to 46.16 ± 3.348 ($p = 0.000$), while the control group's score increased from 29.45 ± 2.718 to 40.32 ± 4.331 ($p = 0.000$).

Table 4. Effectiveness of Peer Group Education on Improving Knowledge, Attitudes, and Implementation of Balanced Nutrition in Preventing Anemia in Adolescent Girls

Variables	Peer Group	Mean Rank	P-Value
Knowledge	Control (Booklet)	41.26	.000
	Peer Group	21.74	
Attitude	Control (Booklet)	37.32	.011
	Peer Group	25.68	
Implementation of Balanced Nutrition	Control (Booklet)	36.95	.017
	Peer Group	26.05	

Based on the difference test between groups using the Mann-Whitney test, it shows that the mean rank value of the peer group (41.26) is higher than the control group (21.74) with a p value = 0.000, there is a significant difference between the two groups, meaning that the nutrition education intervention through peer groups is proven to be more effective in increasing respondents' nutritional knowledge compared to the use of booklets. The results of the difference test between groups show that the mean rank of the peer group (37.32) is higher than the control (25.68) with a p value = 0.011, which means there is a significant difference between groups, meaning that the peer group approach is more effective in forming positive attitudes towards the implementation of balanced nutrition compared to booklet-based education. In the variable of the implementation of balanced nutrition in preventing anemia, the results of the difference test between groups show that the mean rank of the peer group (36.95) is higher than the control group (26.05) with a p value = 0.017. This indicates a significant difference between the two groups, where the peer group intervention is more effective in improving the implementation of balanced nutrition in adolescents.

Discussion

The Effectiveness of Peer Group Education on Improving Knowledge of Balanced Nutrition in Preventing Anemia in Adolescent Girls

Based on the results of statistical tests in the overall study, both the treatment and control groups showed a significant increase in knowledge before and after the intervention, with a p -value < 0.05 , even though the control group was only given a booklet to read and study independently. A Mann-Whitney test showed that the mean rank of the peer group (41.26) was higher than the control group (21.74) with a p -value of 0.000, indicating a significant difference between the two groups. This indicates that the nutrition education intervention through peer groups was proven to be more effective in improving respondents' nutritional knowledge than the use of booklets.

This study aligns with research by Astuti (2020), which showed that peer group education interventions significantly increased knowledge compared to booklets alone. In the peer group, education interventions through peer groups, in addition to providing explanations of the booklet's contents, also emphasized discussion methods. According to Diniyati (2025), the success of education through peer groups can be attributed to the social closeness and similar status of the participants, making communication more open, relevant, and easily accepted, especially for respondents in mid-adolescence, aged 13-15, who are at a stage where they greatly need the presence and role of their peers. Furthermore, this stage is also a time when adolescents experience confusion and hesitation between choices. During mid-adolescence, there is a tendency toward self-love, typically characterized by choosing close friends with similar characteristics (Asiya, 2020).

Increasing knowledge about nutrition, including iron, balanced nutrition, and anemia factors, is crucial for adolescents to recognize their nutritional needs and thus prevent anemia. Various studies have also shown that peer group interventions can significantly increase knowledge scores. This is supported by Nuryani's (2018) research, which showed that the peer educator group of adolescents experienced an increase in knowledge scores of 28.77 ± 23.58 (p -value = 0.000), which means there was a significant change in knowledge scores before and after the intervention of providing balanced nutrition education through peer educators. With adequate knowledge, adolescents can be wiser in choosing food.

The Effectiveness of Peer Group Education on Improving Attitudes About Balanced Nutrition in Preventing Anemia in Adolescent Girls

A Mann-Whitney analysis of the attitude variable showed that the mean rank of the peer group (37.32) was higher than the control group (25.68) with a p-value of 0.011. This indicates that the peer group intervention resulted in a significant increase in positive attitudes toward balanced nutrition in the treatment group compared to the control group. This indicates that education not only provides information but also changes participants' perspectives and readiness to implement balanced nutrition. According to Pakpahan (2021), attitude is a closed reaction or response from a person to a stimulus or object. Furthermore, attitude is also a closed reaction or response from a person to a stimulus or object. Attitude change is a key element in the behavior change model.

This is in line with research by Lutfiasari (2023), who concluded that a systematic review of peer groups has proven to change attitudes about anemia prevention in adolescents. This is also supported by Yurisma's (2024) research, which found a significant difference in adolescent girls' attitudes toward anemia before and after receiving education in a peer group (p-value 0.000). Peer encouragement, which demonstrates or supports positive attitudes toward balanced nutrition, tends to lead group members to adopt these attitudes to maintain social acceptance. Furthermore, group discussions provide the freedom to express the importance of balanced nutrition and anemia prevention in adolescents, enabling them to shift from passive to active attitudes.

The Effectiveness of Peer Group Education on Improving the Implementation of Balanced Nutrition in Preventing Anemia in Adolescent Girls

The results showed that the peer group intervention group experienced a significant increase in the implementation of balanced nutrition compared to the control group, with the mean rank of the peer group (36.95) being higher than the control group (26.05) with a p-value of 0.017. This indicates that the peer group approach not only influences knowledge and attitudes but also encourages concrete nutrition-related behaviors, which are crucial in the context of anemia prevention (including iron intake, increased meal frequency, and practices consistent with balanced nutrition). This study aligns with Nuryani and Permata's (2018) study, which showed that peer education increased the balanced nutrition behavior score by 7.56 ($p=0.000$) in the peer educator group. This study also corroborates Hidayati's research, which found that peer group education is more effective in improving good nutritional behaviors in school-age children than children learning independently from nutrition modules.

Peer group interventions are one strategy in anemia prevention, especially among adolescents and other vulnerable groups. Education through peer groups can strengthen the chain of change starting from knowledge, then attitudes and implementation of appropriate actions as in the questionnaire, namely: consuming iron, one of which is by taking iron tablets regularly, increasing the frequency of eating, avoiding inhibiting factors such as drinking tea or coffee near meal times. In addition, peer groups as a communication and education strategy can reach adolescent groups better because they are often influenced by their peers, and the group structure allows for the exchange of experiences, challenges, and solutions relevant to their own conditions including economic obstacles, local food culture, and social agendas such as physical activity or menstruation. Adolescent girls are an important target in stunting prevention through good family planning, maintaining health to avoid anemia and Chronic Energy Deficiency, and understanding stunting prevention efforts from an early age.

6. Conclusions

The results of this study indicate that educational intervention through peer groups can improve knowledge, attitudes, and implementation of balanced nutrition in preventing anemia before and after the intervention. Differences in knowledge, attitudes, and implementation of balanced nutrition in the treatment group were higher compared to the control group, indicating that peer group education is more effective in improving knowledge, attitudes, and implementation of balanced nutrition among adolescents.

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