(Research Article)

The effect of nutrition education on anemia using lecture method, leaflet media, and Tiktok on behavior change among adolescent girls

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Abstract

The purpose of this study was to analyze the effect of providing nutrition education using lecture methods, leaflets, and TikTok on changes in adolescent girls' behavior. Research data were collected using a questionnaire and analyzed using univariate and bivariate analysis. The results showed that there were differences in the respondents before and after the provision of nutrition education using lecture method, leaflets, and TikTok media. Before the intervention, most of the respondents were in the poor category in terms of knowledge, attitudes, actions, and behaviors. After the intervention, most respondents were in the good category. The p-value for each evaluation category, namely knowledge, attitude, action, and behavior are $0.000 \leq 0.05$. This means that there is an effect of nutrition education on anemia through lecture methods, leaflet media, and TikTok on behavior change among adolescent girls in SMP Negeri 1 Tapa.

Keywords: Anemia; Nutritional Education; Adolescent Behavior

1. Introduction

Health education is an educational activity carried out through the dissemination of messages that instill confidence so that people are not only aware, know, and understand, but are expected to accept and be able to carry out a recommendation that has to do with health (Cahyati, 2023). In order to improve the health status of an individual, group or community, it is necessary to carry out sustainable nutrition education efforts to change behavior to improve health status. Nutrition education or nutrition education is a process whose purpose is to change community behavior which includes increasing knowledge, changing attitudes and behavior of individuals, families, and specific groups in the community in maintaining healthy living behavior and playing an active role in realizing optimal health status (Mahlufi, 2021).

To support the process of providing health education, it is necessary to pay attention to educational methods and media. The lecture method of nutrition education is a method used to deliver messages verbally (Hartanti, 2021). In addition to methods, it is also necessary to use media as a tool for delivering messages when providing education. Attractive media can accelerate cognitive, affective, and psychomotor changes (Putri, et al., 2021).

Media that can be used in providing education are visual media and audiovisual media. Visual media such as leaflets is a medium used as a tool, means, and support resource to convey health messages in the form of text and images on paper. The advantage of this media is that it contains important information in just one paper and can be studied at any time because it can be carried anywhere (Ifanisari, 2022). Audiovisual media that can be used to conduct health education is video media. Audiovisual media in the form of videos can be used to increase interest in counseling activities (Firdawiyanti, 2023). One of the video media that can be used to conduct education is TikTok media. Currently,

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the TikTok application is not only an entertainment media, but can also be used as an educational media. Many content-creators present knowledge content in the TikTok application (Rahmana, et al., 2022).

Adolescent girls are the population most vulnerable to nutritional deficiencies, especially iron deficiency or iron nutritional anemia. Based on data from the Basic Health Survey (Riskesdas) 2018, the prevalence of anemia among 5–14-year-olds in Indonesia was 26.8 percent. Adolescent girls are at higher risk of anemia than young men. This is because adolescent girls menstruate every month. In addition, adolescent girls tend to be very concerned about their body shape, so they limit their food intake and have many food restrictions (Almatsier, 2018).

In Gorontalo Regency, based on data from the Gorontalo Regency Health Office in 2022, the number of anemia cases among adolescent girls in secondary schools was 376 students, spread across districts and cities. In Bone Bolango Regency itself, based on the latest data from the Bone Bolango Regency Health Office in 2023, the prevalence of anemia tends to increase, where in January there were only 5 people and rose to 61 people in July 2023. Junior High School (SMP) Negeri 1 Tapa, Bone Bolango Regency, was the school with the highest percentage of anemia incidence in Bone Bolango Regency in July 2023, where out of 95 students in class VII, 21 students suffered from anemia.

Based on initial observations, according to the principal of SMP Negeri 1 Tapa, it is known that some female students often feel dizzy and faint during ceremonies. The teacher in charge of the School Health Unit (UKS) explained that several female students often came to the UKS with complaints of dizziness and weakness. This happens because the students do not eat breakfast before going to school, and especially when they arrive at school, they prefer to eat less nutritious snacks. When the students return home, they prefer to play with gadgets until they forget to eat. The behavior of students who tend to pay less attention to nutritional intake is influenced by the students' lack of health knowledge, especially in the prevention of anemia.

Based on this explanation, the researcher is interested in conducting a study entitled "The Effect of Nutrition Education on Anemia Using the Lecture Method, Leaflet Media, and TikTok on Behavior Change in Adolescent Girls in SMP Negeri 1 Tapa". The purpose of this study is to analyze whether there is an effect of providing nutrition education using lecture method, leaflet media, and TikTok on behavior change in adolescent girls.

2. Methods

This research is a quantitative study using the pre-experimental method. The design used is a one-group pre-test and post-test design. The data collection instrument used is a closed-ended questionnaire in the form of structured questions or statements. The data analysis used in this study includes univariate analysis and bivariate analysis.

3. Research Result

3.1. Univariate Analysis

3.1.1. Pre-test

Frequency distribution of the pretest on the variable of knowledge before the nutrition education about anemia

The pre-test results of adolescent girls' knowledge about anemia are presented in Table 1. The results in the table show that most of the adolescent girls, namely 42 respondents (84%) had insufficient knowledge about anemia.

Table 1 Pre-test Analysis of Knowledge Before the Nutrition Education on Anemia in Students of Class VII at SMP Negeri 1 Tapa

No.	Category	Frequency	Percentage (%)
1	Less	42	84
2	Moderate	8	16
3	Good	0	0
Total		50	100

Source: Primary data, 2023

Frequency distribution of the pretest on the variable of attitude before the nutrition education about anemia

The results of the pretest on the attitude of adolescent girls towards anemia are presented in Table 2. The results in the table show that most of the adolescent girls, namely 42 respondents (84%) are in the less category.

Table 2 Pre-test Analysis of Attitude Before the Nutrition Education on Anemia in Students of Class VII at SMP Negeri 1 Tapa

No.	Category	Frequency	Percentage (%)
1	Less	42	84
2	Moderate	7	14
3	Good	1	2
Total		50	100

Source: Primary data, 2023

Frequency distribution of the pretest on the variable of action before the nutrition education about anemia

The pre-test results of adolescent girls' actions regarding anemia are presented in Table 3. The results in the table show that all adolescent girls, namely 50 respondents (100%), are in the less category.

Table 3 Pre-test Analysis of Action Before the Nutrition Education on Anemia in Students of Class VII at SMP Negeri 1 Tapa

No.	Category	Frequency	Percentage (%)
1	Less	50	100
2	Moderate	0	0
3	Good	0	0
Total		50	100

Source: Primary data, 2023

Frequency distribution of the pretest on the variable of behavior before the nutrition education about anemia

The results of the pre-test of the adolescent girls' attitude towards anemia are presented in Table 4. The results in the table show that most of the adolescent girls, namely 44 respondents (88%) fall into the less category.

Table 4 Pre-test Analysis of Behavior Before the Nutrition Education on Anemia in Students of Class VII at SMP Negeri 1 Tapa

No.	Category	Frequency	Percentage (%)
1	Less	44	88
2	Moderate	6	12
3	Good	0	0
Total		50	100

Source: Primary data, 2023

3.2. Post-test

3.2.1. Frequency distribution of the posttest on the variable of knowledge after the nutrition education about anemia

The results of the post-test knowledge of adolescent girls after receiving nutrition education on anemia are presented in Table 5. The results in the table show an increase in the knowledge of adolescent girls compared to before the education was given. A total of 47 respondents (94%) had knowledge about anemia in the good category and as many as 3 respondents (6%) had knowledge about anemia in the fair category.

Table 5 Post-test Analysis of Knowledge After the Nutrition Education on Anemia in Students of Class VII at SMP Negeri 1 Tapa

No.	Category	Frequency	Percentage (%)
1	Less	0	0
2	Moderate	3	6
3	Good	47	94
Total		50	100

Source: Primary data, 2023

3.2.2. Frequency distribution of the posttest on the variable of attitude after the nutrition education about anemia

The results of the post-test attitudes of adolescent girls after receiving nutrition education on anemia are presented in Table 6. The results in the table show an increase in the attitude of adolescent girls compared to before the education. All the respondents, namely 50 respondents (100%) have an attitude towards anemia in the good category.

Table 6 Post-test Analysis of Attitude After the Nutrition Education on Anemia in Students of Class VII at SMP Negeri 1 Tapa

No.	Category	Frequency	Percentage (%)
1	Less	0	0
2	Moderate	0	0
3	Good	50	100
Total		50	100

Source: Primary data, 2023

3.2.3. Frequency distribution of the posttest on the variable of action after the nutrition education about anemia

The post-test results of adolescent girls' actions after receiving nutrition education on anemia are presented in Table 7. The results in the table show an increase in adolescent girls' actions compared to before the education was given. A total of 49 respondents (98%) had actions in the good category.

Table 7 Post-test Analysis of Action After the Nutrition Education on Anemia in Students of Class VII at SMP Negeri 1 Tapa

No.	Category	Frequency	Percentage (%)
1	Less	0	0
2	Moderate	1	2
3	Good	49	98
Total		50	100

Source: Primary data, 2023

3.2.4. Frequency distribution of the posttest on the variable of behavior after the nutrition education about anemia

The results of the post-test behavior of adolescent girls after receiving nutrition education on anemia are presented in Table 8. The results in the table show an increase in the behavior of adolescent girls compared to before the education was given. A total of 49 respondents (98%) had good behavior.

Table 8 Post-test Analysis of Behavior After the Nutrition Education on Anemia in Students of Class VII at SMP Negeri 1 Tapa

No.	Category	Frequency	Percentage (%)
1	Less	0	0
2	Moderate	1	2
3	Good	49	98
Total		50	100

Source: Primary data, 2023

3.3. Bivariate Analysis

Comparative analysis of pre-test and post-test on the variable of knowledge before and after nutrition education about anemia using lecture methods, leaflet media, and TikTok

The results of the pre-test and post-test comparison of knowledge are shown in Table 9. The results in the table show a p-value of 0.000 (less than $\alpha = 0.05$). This means that there is a difference in knowledge before and after providing nutrition education about anemia in adolescent girls through lecture methods, leaflet media, and TikTok.

Table 9 Comparative Analysis of Pre-Test and Post-Test on The Variable of Knowledge Before and After Nutrition Education About Anemia Using Lecture Methods, Leaflet Media, and TikTok

Category	Knowledge				p-value
	Pre-test		Post-test		
	n	%	n	%	
Less	42	84%	0	0%	
Moderate	8	16%	3	6%	0.000
Good	0	0%	47	94%	

Source: Primary data, 2023

Comparative analysis of pre-test and post-test on the variable of attitude before and after nutrition education about anemia using lecture methods, leaflet media, and TikTok

The results of the pre-test and post-test comparison of attitudes are shown in Table 10. The results in the table show a p-value of 0.000 (less than $\alpha = 0.05$). This means that there are differences in attitudes before and after providing nutrition education about anemia in adolescent girls through lecture methods, leaflet media, and TikTok.

Table 10 Comparative Analysis of Pre-Test and Post-Test on The Variable of Attitude Before and After Nutrition Education About Anemia Using Lecture Methods, Leaflet Media, and TikTok

Category	Attitude				p-value
	Pre-test		Post-test		
	n	%	n	%	
Less	42	84%	0	0%	
Moderate	7	14%	0	0%	0.000
Good	1	2%	50	100%	

Source: Primary data, 2023

Comparative analysis of pre-test and post-test on the variable of action before and after nutrition education about anemia using lecture methods, leaflet media, and TikTok

The results of comparing the pre-test and post-test on the action are shown in Table 11. The results in the table show a p-value of 0.000 (less than α = 0.05). This means that there is a difference in action before and after providing nutrition education about anemia in adolescent girls through lecture methods, leaflet media, and TikTok.

Table 11 Comparative Analysis of Pre-Test and Post-Test on The Variable of Action Before and After Nutrition Education About Anemia Using Lecture Methods, Leaflet Media, and TikTok

Category	Action				p-value
	Pre-test		*Post-test*		
	n	%	n	%	
Less	50	100%	0	0%	
Moderate	0	0%	1	2%	0.000
Good	0	0%	49	98%	

Source: Primary data, 2023

3.4. Comparative analysis of pre-test and post-test on the variable of behavior before and after nutrition education about anemia using lecture methods, leaflet media, and TikTok

The results of the pre-test and post-test comparison of behavior are shown in Table 12. The results in the table show a p-value of 0.000 (less than α = 0.05). This means that there are differences in behavior before and after providing nutrition education about anemia in adolescent girls through lecture methods, leaflet media, and TikTok.

Table 12 Comparative Analysis of Pre-Test and Post-Test on The Variable of Behavior Before and After Nutrition Education About Anemia Using Lecture Methods, Leaflet Media, and TikTok

Category	Behavior				p-value
	Pre-test		*Post-test*		
	n	%	n	%	
Less	44	88%	0	0%	
Moderate	6	12%	1	2%	0.000
Good	0	0%	49	98%	

Source: Primary data, 2023

4. Discussion

4.1. Pre-test

Pre-test on the variable of knowledge before nutrition education on anemia through lecture methods, leaflet media, and TikTok among adolescent girls at SMP Negeri 1 Tapa

The results of the pre-test of knowledge showed that out of 50 respondents, there were 42 respondents (84%) who had knowledge about anemia in the poor category, 8 respondents (16%) had knowledge about anemia in the sufficient category, and no respondents (0%) had knowledge about anemia in the good category. This is because the students pay less attention when given counseling about anemia by the Puskesmas, so the students know little about anemia. The students' lack of knowledge about anemia causes them to pay less attention to food intake sources of nutrients that can prevent anemia.

The results of this study are in line with the research conducted by Ardana (2023) on adolescents at SMKN 10 Jember where from the results of his research it is known that most of the respondents have a poor level of knowledge about anemia. Lack of knowledge about the symptoms, effects, and prevention of anemia can lead adolescent girls to consume foods that are low in iron, so that the iron intake needed by adolescents does not meet their needs, and this can increase the risk of adolescent girls suffering from anemia (Putri et al, 2021).

Pre-test on the variable of attitude before nutrition education on anemia through lecture methods, leaflet media, and TikTok among adolescent girls at SMP Negeri 1 Tapa

The results of the attitude pretest showed that out of 50 respondents, 42 respondents (84%) had an attitude in the poor category, 7 respondents (14%) had an attitude in the moderate category, and only 1 respondent (2%) had an attitude in the good category. This is related to the lack of knowledge of adolescent girls about anemia, causing the attitude of adolescent girls towards statements about anemia including symptoms, signs of causes, and prevention efforts against anemia is still lacking.

This study is in line with research conducted by Laksmita and Yenie (2018), where it is known that lack of knowledge and attitude towards anemia can lead to poor dietary intake. This study is also in line with research conducted by Kusuma (2020), where the attitude of female students was shown to be related to iron intake in adolescents. An individual's attitude toward food will influence food choices, which will affect nutrient intake.

One of the factors influencing attitudes is education. Education requires various forms of media to be able to provide education containing information that has a major influence on the formation of people's opinions and beliefs, where new information about something provides a new cognitive basis for the formation of attitudes (Nomiaji, 2020).

Pre-test on the variable of action before nutrition education on anemia through lecture methods, leaflet media, and TikTok among adolescent girls at SMP Negeri 1 Tapa

The results of the pre-test showed that out of 50 respondents, all respondents (100%) had actions in the poor category. This is due to the lack of education provided to students about anemia, which affects the lack of actions taken by students towards the prevention of anemia. This study is in line with the study conducted by Rista, et al. (2018), which showed that the average result of actions before education through leaflet media was only 63.5, and this value is lower when compared to the average value of actions after education.

Given the high incidence of anemia in Indonesia, anemia prevention measures are very important. Preventive measures can be taken by providing education that includes health information in various educational media (Christin, et al., 2022). Providing nutrition education about anemia to adolescents can be a preventive measure for anemia supported by educational media, namely visual media such as brochures, leaflets, and Microsoft PowerPoint, and audio-visual media, such as videos (Fadhilah, 2021).

Pre-test on the variable of behavior before nutrition education on anemia through lecture methods, leaflet media, and TikTok among adolescent girls at SMP Negeri 1 Tapa

The results of the pre-test of behavior seen from the combined average of knowledge, attitudes, and actions showed that out of 50 respondents, there were 44 respondents (88%) whose behavior was categorized as less, 6 respondents (12%) whose behavior was categorized as sufficient and there were no respondents (0%) for good category behavior. This is due to the level of knowledge, attitudes, and actions related to anemia in schoolgirls before being given education, most of which are in the insufficient category, so the impact on behavior towards anemia is still in the insufficient category. The results of this study are consistent with research conducted by Nia (2022) at SMA Muhammadiyah 13 Jakarta, which shows that as many as 45.7% of students have poor nutritional behavior.

Education is an interactive process that can promote learning as an effort to increase new knowledge, attitudes, and actions for behavior change (Rahmawati, 2023). In the process of providing education that aims to change behavior, several factors influence it, namely the methods and educational media used (Notoatmodjo, 2018).

4.2. Post-test

The effect of nutrition education on anemia using lecture methods, leaflet media, and TikTok on knowledge change in adolescent girls at SMP Negeri 1 Tapa

The results showed a change in the knowledge of the respondents in the good category from 0% to 94% or as many as 47 respondents. This change in knowledge is also shown by the results of paired t-test pre-test and post-test which obtained a p-value of $0.000 \leq 0.05$, which means that there is an effect of nutrition education on anemia through lecture methods, leaflet media and TikTok media on changes in knowledge of respondents.

The results of this study are consistent with the research conducted by Masyur (2021) that the category of good knowledge increased after an intervention in the form of counseling. The increase was from 0% to 47.4% or up to 18 people. A study was also conducted by Najahah (2018) on the effect of balanced nutrition counseling on adolescent girls on the level of knowledge of adolescent girls in the Islamic boarding school NW Penimbung. This study shows the results that there is a significant difference in knowledge between before and after counseling with a significance value of 0.000 (less than α = 0.05).

Most human knowledge is acquired through the eyes and ears (Widhi & Putri, 2022). The more often one is exposed to information, the more one's knowledge will increase (Sugiarti, et al., 2019). Providing educational materials through lecture methods, pamphlets, and videos can help increase knowledge (Marwan, et al., 2017).

The effect of nutrition education on anemia using lecture methods, leaflet media, and TikTok on attitude change in adolescent girls at SMP Negeri 1 Tapa

The results showed a change in the attitude of the respondents in the good category, which was originally 2% or as many as 1 respondent increased to 100% or as many as 50 respondents. This change in attitude is also indicated by a p-value of $0.000 \leq 0.05$, which means that there is an effect of nutrition education about anemia through lecture methods, leaflet media, and TikTok media on the change in attitude of respondents.

This study is in line with the study conducted by Ardie and Sunarti (2019), who examined the effect of video media on knowledge and attitudes about balanced nutrition among grade V students in SDN 016 Samarinda Seberang. The results of the Wilcoxon test gave a p-value of 0.028 (less than α = 0.05) for attitudes, so there was an effect of video media on the attitudes of the experimental group after treatment.

According to the World Health Organization in the book The Health Aspects of Food and Nutrition, nutrition education is an educational approach to improve a person's knowledge and attitudes about nutrition. The higher the nutritional knowledge, the more the attitude and behavior of food consumption will be influenced (Cania, 2022). Providing education directly or through media such as pamphlets and videos can provide strong enough suggestions for the formation of opinions and beliefs that are effective in shaping a person's attitude (Nomiaji, 2020).

The effect of nutrition education on anemia using lecture methods, leaflet media, and TikTok on action change in adolescent girls at SMP Negeri 1 Tapa

The results showed a change in the respondents' actions in the good category, which initially 0% increased to 98% or as many as 49 respondents. This change in action is also indicated by a p-value of $0.000 \leq 0.05$, which means that there is an effect of nutrition education about anemia through lecture method, leaflet media, and TikTok media on changes in respondents' actions. This shows that respondents began to take anemia prevention measures after receiving nutrition education about anemia through the lecture method, leaflet media, and TikTok media.

The results of this study do not agree with the research conducted by Elmika, et al. (2018), where results of his research showed that there were no significant changes in actions before and after being given education through leaflet and *camil* media, where the significance value obtained was 0.064 (greater than α = 0.05). According to Rusdi, et al. (2021), nutrition education can influence the behavior of adolescent girls regarding nutrition. Nutrition education is an educational approach to improve knowledge and attitudes that can influence actions (Warjito, et al. 2020).

The effect of nutrition education on anemia using lecture methods, leaflet media, and TikTok on behavior change in adolescent girls at SMP Negeri 1 Tapa

The results of the behavioral research are seen in the combined average of the pre-test and post-test scores for knowledge, attitudes, and actions. The overall results showed that there was a change in the behavior of the respondents in the good category, from 0% to 98% or as many as 49 respondents. This change in behavior is also indicated by a p-value of $0.000 \leq 0.05$, which means that there are changes in behavior before and after receiving nutrition education about anemia through lecture methods, leaflet media, and TikTok media.

This study is consistent with the research conducted by Warjito, et al. (2020) where there was a change in the mean value of knowledge, attitude, and behavior before and after being given nutrition education. According to Notoatmodjo's theory, media is very important in providing nutrition education. The media used must not only be attractive but also stimulate thoughts, feelings, and motivation. The media used must be absorbed and perceived through the five senses. The more media used, the clearer the understanding obtained (Putri & Ratih, 2022).

5. Conclusion

Based on the results of the study, it can be concluded that before being given nutrition education about anemia through lecture method, leaflet media, and TikTok media, most of the respondents were still in the poor category, both in terms of knowledge, attitudes, actions, and behavior. After receiving nutrition education on anemia through the lecture method, leaflet media, and TikTok media, there was an increase in the knowledge, attitudes, actions, and behaviors of the respondents. Most of the respondents were in the good category with a significance value of 0.000 (less than α = 0.05). This means that there is an effect of providing nutrition education about anemia through lecture method, leaflet media, and TikTok media on the knowledge, attitudes, actions, and behavior of respondents.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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