Journal of Health and Nutrition Research

Volume 3 No 1 (2024): 53-61
E-ISSN: 2829-9760 (Online)
Published by Media Publikasi Cendekia Indonesia
Journal homepage: https://www.journalmpci.com/index.php/jhnr
DOI: https://doi.org/10.56303/jhnresearch.v3i1.197

The Effectiveness of Educational Media on Knowledge, Dietary Patterns, and Compliance with Iron Supplement Consumption in Anemic Adolescent Girls

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ABSTRACT

The aim of this research is to analyze the effectiveness of educational media on knowledge, eating patterns, and compliance with the Iron supplement consumption in anemic teenagers at Senior High School, SMKN 15 Samarinda. The type of research used was quasi-experimental, and the research design used a pre-test and post-test with a control group research design. The population was all 621 female students, and 72 people were screened; then, the sample was obtained from about 30 respondents by hemoglobin quick check. The sample was determined as 15 people for the flipchart media group with leaflets and 15 people for the leaflet media group. Data were analyzed using univariate and bivariate analysis. The results of the research were that anemic teenagers consisted of teenagers aged 12-16 years with a percentage of 73.3%. Educational media influenced knowledge (p 0.008) and compliance with iron supplement consumption (p 0.028) of anemic adolescents. There was no effect of educational media on the diet of anemic adolescents as sources of animal protein (p 0.217), vitamin C (p 0.217), and Fe inhibitors (p 0.217). This study concludes that education using flipcharts and leaflets affects increasing knowledge and consumption of iron supplement tablets.

ARTICLE INFO

ORIGINAL RESEARCH

Submitted: 17 October 2023
Accepted: 29 December 2023

Keywords:
Anemia; Flipchart Media; Leaflet media; Knowledge; Dietary habit; Compliance, Iron Supplement

Access this article online

Quick Response Code

Key Messages:

- Increasing pregnant women's knowledge about anemia is expected to increase pregnant women's compliance in consuming iron tablets.

Introduction

Anemia is a condition when the number of red blood cells in the blood (Hb) is insufficient for the body's physiological needs. Anemia occurs due to increased plasma volume, which dilutes Hb levels without changes in the shape of red blood cells. Meanwhile, the proportion of anemia in adolescent girls is higher than in boys (1). The prevalence of anemia in fertile women in Indonesia is 30.6%. Basic Health Research Data (Riskedas) in 2013 shows that the percentage of anemia among those aged 15-24 years is 18.4%. This number has increased to 32% in 2018 (2).

Adolescent girls are susceptible to anemia, with a ten times greater risk than boys. This is because young women menstruate every month and are growing, so they need more nutrients (Kemenkes RI, 2013). One intervention for treating and preventing anemia in adolescents is providing iron supplements as a program from the Ministry of Health. The government provides iron supplements and distributes them to target groups through government health service facilities (1). Failure to reduce anemia can result in millions of women experiencing health problems and reduced quality of life. Factors that cause teenagers to experience anemia include parental education, income, amount of pocket money, and eating habits. Meanwhile, the micronutrient factors that play a role are the intake of iron, vitamin A, folic acid, vitamin C, vitamin B12 and protein (3). Another influencing factor is nutritional knowledge in adolescents. The higher a person's knowledge about anemia, the lower the possibility of anemia. If someone understands anemia and applies something they understand, it will have a good impact on the prevention they do (4). Apart from knowledge, diet also influences anemia. Diet is something that

influences adolescent health. This is due to the quality and quantity of food consumed. Teenagers must consume various foods for energy, protein, and micronutrients to increase hemoglobin. Another factor that influences anemia is the administration of iron supplement tablets. Tthere is a relationship between adherence to iron consumption and the incidence of anemia in adolescent girls. As many as 92% of young women who do not comply with taking iron tablets are classified as anemic(5).

Educational media can support increased knowledge, eating patterns, and compliance with iron supplement consumption. Flipchart educational media can increase the average value of student and educator activities. Many media can be used in learning, but overall, the media chosen adapts to the purpose, accuracy of use, and targets being taught. Flipchart media has the advantage that it is quite easy to make, very practical, and can be taken anywhere. Apart from that, flipchart media can be used repeatedly in subsequent activities (6). Based on screening data in eight schools in the Lok Bahu Community Health Center working area in 2022, it was found that 21.4% of female students experienced anemia at the senior high school of SMKN 15 Samarinda. One effective intervention is educational media with flip charts for adolescent anemia. There has been no research regarding the effect of flip-chart media on knowledge, eating patterns, and adherence to iron supplement tablets. This prompted the author to examine the effectiveness of educational media on the level of knowledge, eating patterns, and compliance with consuming iron supplements in anemic adolescent girls at a senior high school, SMKN 15 Samarinda.

The research aims to analyze the effectiveness of educational media on knowledge, eating patterns, and compliance with the consumption of iron supplements in anemic teenagers at SMKN 15 Samarinda.

Methods

The type of research used was quasi-experimental, and this research design used a pre-test and post-test with control group research design, where this research consisted of two groups, namely the experimental class using flipcharts and leaflets as media and the control group using leaflets only (7). This research was conducted in May-July 2023. This research was conducted at SMKN 15 Samarinda. The population was 621 female students and 72 female students were screened, and then 30 teenagers were found to be anemic at SMKN 15 Samarinda. The sampling method used was total sampling. The sample in this study was all 30 anemic teenagers.

Table 1 Research Variables and Data Collection Methods

Variables	Operational definition	Measuring instrument	How to measure	Measure Results
Anemic Status	Adolescents who have Hb below normal after data collection and Hb check (screening)	Hb Quick Check	Hb examination	Mild Anemia (10 mg/dl – 11.9 mg/dl) Moderate Anemia (8 mg/dl – 9.9 mg/dl) Severe Anemia (< 8 mg/dl)
Knowledge	The knowledge possessed by anemic young women about the meaning, impact, causes, symptoms, and food sources that cause anemia	Questionnaire	Fill Questioner	Good (76-100%), Fair (56-76%), Poor (<56%) (8)
Dietary habit	Diet is a way of regulating the amount and type of food with information from anemic teenagers	FFQ form	Filling in FFQ	Frequent (≥ median), Rare (< median) (9)
Compliance with iron supplement consumption	Activities: Consuming iron supplement about 1 tablet per week regularly during March-April 2023	Iron supplement consumption check list	Interview Questionnaire	Compliance: If consume 100% (=8) of the iron supplement tablets. Non-compliance: if consume <100% (<8)

Variables	Operational definition	Measuring instrument	How to measure	Measure Results
				of the iron supplements

Before conducting the research, researchers conducted validity and reliability tests regarding the balanced nutrition knowledge questionnaire. Validation was carried out on 30 high school/equivalent female students at SMAN 14 Samarinda with specified inclusion and exclusion criteria. The questionnaire contained 15 numbers. Each correct answer would get 1 point and the wrong answer would get 0 points. Other variables, such as diet, did not use validity and reliability tests on the FFQ form because they used standard standards. Meanwhile, the questionnaire for compliance with the consumption of iron supplement tablets was also not tested for validity because the aim was only to find out.

Statistical analysis was carried out with SPSS and Ms. Excel. The form of data presentation was a frequency distribution table. A difference test was carried out before and after the intervention was given in paired groups using the Wilcoxon Signed Rank Test. Meanwhile, the test differed between 2 experimental and control groups using Mann Withney.

Research Ethics: Research Ethics This research has a research ethics number from KEPK Poltekkes Kemenkes Kaltim DP.04.03/7.1/7828/2023

Results

Table 2 shows that the age of respondents entering the early teens' category of 12-16 years in the control group was 11 people (73.3%), with the 10th-grade category being 11 people (73.3%), the institutional accounting skills competency category being 5 people (33.3%), the normal nutritional status category was 6 people (40%), and the mild anemia category was 14 people (93.3%). Meanwhile, in the experimental group, the age of respondents was 17-25 years old, 8 people (53.3%), with 8 people in the 10th-grade category (53.3%), 6 people in the marketing skills competency category (40%).The results of the test using Mann-Whitney showed no differences in the characteristics of respondents between the two groups, both the control group and the experimental group.

Table 2 Frequency Distribution of Respondent Characteristics at SMK Negeri 15 Samarinda

Characteristic	Control Group		Experimental Group		*P Value*
	n	%	n	%	
Age (Years Old)					
6-11	0	0	0	0	
12-16	11	73.3	7	46.7	0.143
17-25	4	26.7	8	53.3	
Class					
10th-grade	11	73.3	8	53.3	0.264
11th-grade	4	26.7	7	46.7	
Skill Competency					
Institutional Accounting	5	33.3	5	33.3	
Visual communication design	2	13.3	3	20	
Geomatics Engineering	1	6.7	0	0	0.402
Office Management and Business Services	3	20	1	6.7	
Marketing	3	20	6	40	
Automotive Engineering	1	6.7	0	0	

Table 3 shows the percentage of control group knowledge in the good category with a pre-test of 1 person (6.7%) and a post-test of 10 people (66.7%). There was a significant difference in respondents' knowledge after being given intervention in the form of leaflets in the control group (p=0.001). The results of the control group's knowledge showed that the average value before being given was 51.4, and after treatment, it increased to 72.5. The percentage of knowledge of the experimental group in the good category with a pre-test of 0 people (6.7%) and a post-test of 14 people (93.3%). There was a significant difference in respondents' knowledge after intervention in the form of flipcharts and leaflets in the experimental group (p=0.000). The results of the experimental group's knowledge showed that the average score before 47 and after treatment increased to 83.3. The increase in the average score of the knowledge variable in the control and experimental groups was different.

The result of the test value (p 0.008) means that there is a significant difference in the intervention of the two groups.

Table 3 Control and Experimental Group Interventions on the Knowledge of Anemic Teenager at SMKN 15 Samarinda

Knowledge	Control Group				*P value*	Experimental Group				*P value*
	Pre		*Post*			*Pre*		*Post*		
	n	%	n	%		n	%	n	%	
Good	1	6.7	10	66.7		0	0	14	93.3	
Fair	1	6.7	4	26.6	0.001*	1	6.7	1	6.7	0.000*
Poor	13	86.6	1	6.7		14	93.3	0	0	
Total	15	100	15	100		15	100	15	100	
Mean	51.4		72.5			47		83.3		
Median	51.4		72.5			53		84		
P value	0.008*									

Table 4 shows the percentage of animal protein source diets in the control group in the frequent category with a pre-test of 6 people (40%) and a post-test of 7 people (46.7%). There was no significant difference in the respondents' eating patterns after being given the intervention in the control group (p 0.083). The results of the percentage of diet sources of vitamin C in the control group were in the frequent category with a pre-test of 1 person (40%) and a post-test of 3 people (20%). There was a significant difference in the respondents' dietary patterns of vitamin C sources after being given the intervention in the control group (p 0.014). The results of the percentage of diet sources of Fe inhibitors in the control group were in the rare category with a pre-test of 3 people (20%) and a post-test of 2 people (13.3%). There was no significant difference in the dietary patterns of respondents' Fe inhibitor sources after being given the intervention in the control group (p 0.317).

Then, the percentage of animal protein source diets in the experimental group was in the frequent category, with a pre-test of 5 people (33.3%) and a post-test of 8 people (53.3%). There was no significant difference in the respondents' eating patterns after being given the intervention in the control group (p 0.705). The results of the control group's knowledge showed that the average value before treatment was 0.46 and 0.53 after treatment. There was a significant difference in the respondents' dietary patterns of vitamin C sources after being given the intervention in the control group (p 0.008). The results of the percentage of diet sources of Fe inhibitors in the control group were in the rare category, with a pre-test of 7 people (46.7%) and a post-test of 9 people (60%). There was no significant difference in the dietary patterns of respondents' Fe inhibitor sources after being given the intervention in the control group (p 0.157).

Table 4 Control and Experimental Group Interventions on the Eating Habits of Anemic Teenager at SMKN 15 Samarinda

Eating Habits	Control Group				*P value*	Experimental Group				*P value*
	Pre		Post			Pre		Post		
	n	%	n	%		n	%	n	%	
Source of Animal Protein										
Frequent	6	40	7	46.7	0.083	5	33.3	8	53.3	0.705
Rare	9	60	8	53.3		10	66.7	7	46.7	
Mean	0.46		0.46			0.46		0.53		
Median	0		0			0		1		
P value	0.775									
Source of Vitamin C										
Frequent	1	6.7	3	20	0.014*	0	0	7	46.7	0.008*
Rare	14	93.3	12	80		15	100	8	53.3	
Mean	0.06		0.02			0		0.46		
Median	0		0			0		0		
P value	0.217									
Inhibitor Fe										
Frequent	3	20	2	13.3	0.317	8	53.3	6	40	0.157
Rare	12	80	13	86.7		7	46.7	9	60	

Mean	0.2		0.13		0.53		0.4	
Median	0		0		1		0	
P value				0.217				
Total	15	100	15	100	15	100	15	100

Table 4 shows that the average score for the animal protein source diet variable increased in the control and experimental groups. The result of the test value (p 0.775) means that there is no significant difference in the intervention between the two groups. Then, there was an increase in the average score of the dietary variable value of sources of vitamin C in the control and experimental groups. The result of the test value (p 0.217) means that there is no significant difference in the intervention between the two groups. Meanwhile, there was an increase in the average score of the dietary variable value of the source of Fe inhibitors in the control and experimental groups. The result of the test value (p 0.217) means that there is no significant difference in the intervention between the two groups.

Table 5 shows that the percentage of compliance with iron supplement consumption in the control group was in the compliance category with a pre-test of 0 people (0%) and a post-test of 3 people (20%). There was no significant difference in respondents' adherence to iron supplement consumption after being given the intervention in the control group (p 0.083). Compliance with iron supplement consumption before the intervention, the average consumption was 0.6 and increased to 4 tablets after being given the intervention in the form of leaflets. Then, the percentage of compliance with iron supplement consumption in the experimental group was in the compliance category with a pre-test of 0 people (0%) and a post-test of 9 people (60%). There was a significant difference in respondents' adherence to iron supplement consumption after being given the intervention in the control group (p 0.014). The results of the control group's knowledge showed that the average value before being given was 0.6, and after being given treatment, it increased to 6.2. Then, there was a significant difference in the average consumption of iron supplements after being given the intervention between groups. The average iron supplement consumption in the control group was 4 tablets; in the intervention group, it was more than 6.2 tablets.

Table 5 Control and Experimental Group Interventions on Compliance with Iron Supplement Tablets for Anemic Teenagers at SMK Negeri 15 Samarinda

Compliance	**Control Group**				***p value***	**Experimental Group**				***p value***
	Pre		**Post**			**Pre**		**Post**		
	n	**%**	**n**	**%**		n	**%**	**n**	**%**	
Compliance	0	0	3	20	0.083	0	0	9	60	0.014*
Non-compliance	15	100	12	80		15	100	6	40	
Total	15	100	15	100		15	100	15	100	
Mean	0.6		4			0.6		6.2		
Median	0		3			0		5		
p value					0.028*					

Discussion

Media education on knowledge before and after being given media education to anemic teenagers

The results before treatment were mostly knowledge lacking in the control (86.6%) and experimental groups (93.3%). There was an increase in knowledge after treatment in the control group (66.7%) and the experimental group (93.3%). There were significant differences before and after the intervention was given in both the control group (p 0.001) and the experimental group (p 0.000). The results of this research are in line with research by Hidayah (2022) (10); there is a difference in knowledge before and after being given education about the dangers of smoking using flipcharts as media.

There are still anemic teenagers who have moderate and low levels of knowledge because teenagers are getting information about teenage anemia for the first time. Based on researchers' interviews with anemic teenagers, respondents admitted that they had never had an Hb test before, so they did not know if they were suffering from anemia. Meanwhile, teenagers who experience an increase in knowledge may be because the information provided is quite interesting and very focused when listening through the media so that it can increase interest in receiving information. This flipchart and leaflet media is interesting and very suitable for teenagers whose number is no more than 30 people so that the cooperation and activeness of teenagers in each session can help understanding when being

given education. The results of this research are in line with research conducted by Hidayah (2022) (10), which shows that the use of flipchart media can significantly increase the knowledge of mothers of toddlers about weaning food (p=0.000; p<0.05).

The flipchart media has an influence because respondents very quickly understand it and effectively prevent facilitators' stunting, making it easier to apply health information (10). Media can be used in learning, but the selected media adapts to the purpose, accuracy of use, and targets being taught (6). Flipcharts are very easy to carry anywhere and use, so they attract the attention of the outreach target. The results of the Mann-Whitney test show that there is a significant difference (p 0.000) in the respondents' knowledge. The group that was given media education using flipcharts and leaflets was higher, with an average post-test score of 83.3, while the group that was given leaflets alone got an average post-test score of 72.5. Educational media using flipcharts and leaflets is suitable for teenagers because it is one solution to help optimize focus in learning apart from the pictures and writing that attract attention. This research is in line with Hidayah (2022) (10), which proves that the use of flipchart media significantly (p 0.002) increases pregnant women's knowledge about complementary foods for breast milk. One support is that the average result for knowledge about complementary foods for breast milk previously had a value of 8.73, and after being given counseling using flipchart media, it had a mean of 9.67.

Media education on eating patterns before and after media education was given to anemic teenagers

The diet discussed in this study includes animal protein sources, vitamin C, and Fe inhibitors. Before being given education, the control and experimental groups mostly rarely consumed animal protein sources, with values of 60% and 66.7%, respectively. There was an increase in the frequency of eating animal protein after treatment, becoming frequent (4-6x a week) in the control group (46.7%) and experimental group (4-6x a week (53.3%). Although there was no significant difference in the results of this study in line with research by Hidayah (2022) (10), it proves that the use of flipchart media does not affect the eating patterns of hypertension sufferers before and after the intervention (p 0.184). Research needs to be conducted for at least three months to see the effect of intervention on eating patterns.

Anemic teenagers still have infrequent consumption patterns, which may be because teenagers only receive information during counseling, but supplies and eating habits still influence consumption patterns of animal protein sources. Never received education anywhere regarding anemia eating patterns. Based on researchers' interviews with anemic teenagers, respondents admitted that they could not change their diet according to expectations because it was related to the availability of food at home prepared by the family. Respondents tend to eat food that is available at home. This increase in the diet of animal protein sources among respondents may be because food sources of animal protein were available at home at the time of the interview.

The results of the diet as a source of vitamin C before being given education showed that both the control and experimental groups mostly rarely consumed sources of vitamin C, with values of 93.3% and 100%, respectively. There was an increase in the vitamin C diet after treatment, which became frequent in both the control group (20%) and the experimental group (46.7%). There was a significant difference before and after the intervention was given in both the control group (p 0.014) and the experimental group (p 0.008). However, there was no significant difference between the control and experimental groups in the frequency (1-3x/month) of dietary sources of vitamin C (p 0.217). The results of this study are not in line with research by Hidayah (2022) (10), which proves that the use of flipchart media does not affect students' snack habits before and after the intervention (p 0.372).

There are still respondents whose consumption patterns of vitamin C sources are relatively rare, perhaps because respondents are still used to old consumption patterns. Based on interviews with researchers, respondents admitted that they were unable to change their diet according to expectations because they did not like the food even though it was abundant and easy to obtain. The increase in diet sources of vitamin C among respondents in the control and experimental groups may be due to the fact that these foods are easy to find and the price of food ingredients is relatively cheap. Regarding the dietary pattern of Fe inhibitor sources before being given education, both the control and experimental groups still frequently consumed Fe inhibitor sources, with values of 20% and 53.3%, respectively. There was a change in the Fe Inhibitor diet after treatment, which became rare in the control group (86.7%) and experimental group (60%) with a frequency of 1-3x/week. There was no significant difference between eating frequency (p 0.317), or the experimental group before and after the intervention in the control group (p 0.157). The results of this research are in line with research by (10),

proving that the use of flipchart media does not affect the eating patterns of hypertensive patients before and after the intervention (p 0.796).

Respondents with low levels of Fe inhibitor consumption patterns were classified as rare, perhaps because teenagers had already received the information during counseling. Based on interviews with researchers, respondents admitted that they could not change their diet according to expectations because they still liked foods such as coffee, tea, chocolate, and milk. Nutritional media education influences diets that are sources of vitamin C, but does not influence diets that are sources of animal protein and Fe inhibitors. This may be related to providing shorter education because it is carried out during student break times for approximately 30 minutes. Other factors that support the success of a diet include knowledge, family support, communication, and nearby facilities in conveying messages (6).

The results of the Mann-Whitney test showed no significant difference in eating patterns between the two groups. Eating patterns do not experience differences due to a lack of direct intervention for families who prepare teenagers' meals or household socio-economics. The anemic teenagers rarely eat breakfast, rarely consume sources of vitamin C, and very often consume Fe inhibitors such as tea, chocolate, or coffee. This research is in line with research by Hidayah (2022) (10), which proves that the use of flipchart media has a significant effect (p 0.00) on increasing the eating patterns of third-trimester pregnant women regarding energy consumption after being given education between the control and intervention groups.

Educational media regarding compliance with the consumption of iron supplement tablets for anemic teenagers

Before being given education, all respondents were non-compliant in consuming iron supplements, both in the control group (100%) and the experimental group (100%). After being given educational treatment, there was an increase in compliance with iron supplement consumption in the control group by 20% and in the experimental group by 60%. There was no significant difference before and after the intervention was given in the control group (p 0.083), but in the experimental group, there was a difference (p 0.014). The results of this research are in line with research by Pratiwi DE (2013) (6) regarding medication adherence in hypertension sufferers using flipchart media, which showed significant results ($p < 0.005$).

Some still do not comply with consuming iron supplements, perhaps because the respondents, even though they have received information during counseling, feel that they will not experience health problems that interfere with their daily activities if they forget or do not. Based on research interviews, respondents admitted they did not comply with consuming iron supplements as expected because some people did not like the taste. Meanwhile, the increase in compliance with iron supplement consumption among respondents is probably because they have received information that iron supplements can be obtained in the school health Unit. The results of this research are also in line with research by Hidayah (2022) (10), which states that using a flipchart media can significantly increase compliance with the consumption of iron supplement tablets in pregnant women consuming iron tablets. The flipchart media increases respondents' awareness of iron needs, so quality education is used in iron supplementation compliance counseling. Flipchart media can increase medication adherence in hypertensive patients compared to those who were not given education using Flipchart media. Flipchart media can also increase dietary compliance in diabetes patients (10).

The results of the Mann-Withney test showed that between the control and experimental groups, there was a significant difference in compliance with iron supplement consumption of anemic teenagers at SMK Negeri 15 Samarinda. Iron supplement compliance experienced differences due to increased motivation after the intervention was given to anemic adolescents so that it was immediately put into practice. Flipchart and leaflet media are adequate for respondents' needs; in the experimental group they can change behavior. A study by Naila Fauziati et al. (2019) demonstrated that using a flipchart as educational media during counseling improved the knowledge of brides and grooms (11). There is an effect of using video media and booklets on the level of knowledge of reproductive health in adolescents (12). The results of this research are also in line with research by Hidayah (2022) (10), which states that the flipchart media used in treating diabetes mellitus patients effectively increases compliance with diet programs. This is because flipchart media is effective in conveying messages. According to the World Health Organization (WHO), M-Health refers to the use of mobile devices like smartphones, patient monitors, PDAs (personal digital assistants), and other wireless technologies to support medical and public health practices (13). A study by Hmone et al. (2016) showed success in promoting exclusive breastfeeding through M-Health education. This involved sending text messages 2-

3 times a week to couples with infants under four months old. The messages focused on discouraging the use of supplementary feeding for babies less than six months of age (14).

Several types of nutrition education aim to raise awareness and compliance among adolescent girls about the importance of taking iron tablets(15). Through oral iron supplementation, most individuals' hemoglobin levels return to normal after 6 months, although this also depends on individual compliance (16). Nutrition education provided for 2-3 months may not yet yield significant results in increasing hemoglobin levels at the end of the study. This is because the increase in hemoglobin levels is not very significant before the intervention is given. It is necessary to consider the presence of inhibitors of iron absorption (17).

PAKEM technique utilizes various methods such as lectures, group discussions, problem-solving, and game simulations (quizzes, role-playing, and card matching) through pamphlets, leaflets, videos, and game applications. The PAKEM method fosters rapport between researchers and respondents, encouraging them to share their thoughts freely (15). According to research, learning that involves visual, auditory, and kinesthetic components increases learning effectiveness up to 90% compared to learning limited to seeing or hearing, which has an effectiveness range of 10% to 30% (18).

Conclusion

Based on the research results, it can be concluded that providing media with flipcharts and leaflets can significantly increase pregnant women's knowledge about iron deficiency anemia. However, providing media with flipcharts and leaflets could not significantly improve the diet of pregnant women, whether it was a source of animal protein, vitamin C or Fe inhibitors. Providing media with flipcharts and leaflets can increase pregnant women's knowledge about anemia because this media provides complete information and is easy for pregnant women to understand. The information provided includes the causes, symptoms, and ways to prevent them. Increasing pregnant women's knowledge about anemia is expected to increase pregnant women's compliance in consuming iron supplements.

Funding: This research received no external funding

Acknowledgments: We would like to thank the Principal, Teachers and Students of SMK Negeri 15 Samarinda who have helped carry out this research.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Rachmi CN, Wulandari E, Kurniawan H, Wiradnyani LAA, Ridwan R, Akib TC. Buku Panduan Siswa AKSI BERGIZI. Kemenkes RI. 2019;1–188.
2. Kemenkes RI. Riset Kesehatan Dasar (Riskesdas). Jakarta: Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan RI; 2018.
3. Podungge. Buku referensi remaja Sehat Bebas Anemia. Buku refer. Sleman: Deepublish; 2022. 40 p.
4. Ahdiah A, Heriyani FF, Istiana. Hubungan pengetahuan dengan kejadian anemia remaja putri di SMA PGRI 4 Banjarmasin. Homeostasis. 2018;1(1):9–14.
5. Putri RD, Simanjuntak BY, Kusdalinah K. Pengetahuan Gizi, Pola Makan, dan Kepatuhan Konsumsi Tablet Tambah Darah dengan Kejadian Anemia Remaja Putri. Jurnal Kesehatan. 2017;8(3):404.
6. Pratiwi DE. Penerapan Media Papan Balik (Flipchart) Pada Pembelajaran Tematik Untuk Meningkatkan hasil Belajar Siswa Sekolah Dasar. Jurnal PGSD2. 2013;01(2):01–10.
7. Nurwijayanti N. Pola Makan,Kebiasaan Sarapan dan Status Gizi Berhubungan Dengan Prestasi Belajar Siswa SMK di Kota Kediri. Care : Jurnal Ilmiah Ilmu Kesehatan. 2018;6(1):54.
8. Ahmad Suryana. Metode Penelitian Metode Penelitian. Metode Penelitian Kualitatif. 2017;(17):43.
9. Kurniagustina R. Konsumsi Fast Food dengan Obesitas Siswa Kelas V SDN 01 Kalisari Jakarta Timur 2018. Skripsi, Sekolah Tinggi Ilmu Kesehatan Binawan Jakarta. 2018;(041411023).
10. Hidayah N, Imaningsih AN, Damayanti ED, Fitria NW, Ramadhani MP, Merisdiansyah WE, et al. Pengaruh Edukasi Terhadap Tingkat Pengetahuan Remaja Perempuan Desa Jipurapah Tentang Anemia Dan Gizi Seimbang. Jurnal Ilmiah Keperawatan (Scientific Journal of Nursing). 2022;8(4):612–9.
11. Fauziatin N, Kartini A, Nugraheni SA. Pengaruh Pendidikan Kesehatan Dengan Media Lembar Balik Tentang Pencegahan Stunting Pada Calon Pengantin. VISIKES: Jurnal Kesehatan Masyarakat. 2019 Sep 19;18(2):224–33.

12. Yuliwati N, Afiah ES. Monitoring Intervention Of Video Media Extension And Booklet To Improving Adolescent Reproductive Health Knowledge. International Journal of Health and Pharmaceutical (IJHP). 2022 Aug 11;2(4):708–13.
13. Asiodu IV, Waters CM, Dailey DE, Lee KA, Lyndon A. Breastfeeding and use of social media among first-time African American mothers. J Obstet Gynecol Neonatal Nurs. 2015;44(2):268–78.
14. Hmone MP, Dibley MJ, Li M, Alam A. A formative study to inform mHealth based randomized controlled trial intervention to promote exclusive breastfeeding practices in Myanmar: incorporating qualitative study findings. BMC Medical Informatics and Decision Making. 2016 Jun 4;16(1):60.
15. Febrianti KD, Ayu WC, Anidha Y, Mahmudiono T. Effectiveness of Nutrition Education on Knowledge of Anemia and Hemoglobin Level in Female Adolescents Aged 12-19 Years. Amerta Nutrition. 2023 Sep 5;7(3):478–86.
16. Nguyen M, Tadi P. Iron Supplementation. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 [cited 2023 Dec 6]. Available from: http://www.ncbi.nlm.nih.gov/books/NBK557376/
17. Piskin E, Cianciosi D, Gulec S, Tomas M, Capanoglu E. Iron Absorption: Factors, Limitations, and Improvement Methods. ACS Omega. 2022 Jun 21;7(24):20441–56.
18. DePorter B. Quantum Teaching. Jakarta: PT Mizan Publika; 2000. 254 p.