

THE EFFECT OF POWER POINT MEDIA ON STUDENTS KNOWLEDGE ABOUT ANEMIA AT SMAN 01 SIKAP DALAM

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ABSTRACT

Adolescent girls are a group that is ten times more at risk of experiencing iron deficiency, commonly known as anemia, compared to adolescent boys. Globally, the number of anemia sufferers reaches around 1.92 billion people, and in Indonesia the prevalence in adolescent girls is still quite high, namely 18%. This study aims to determine the effect of anemia prevention education using PowerPoint media on the knowledge of female students at SMAN 1 Ilmu In . This study used a pre-experimental design with a one-group pre-test and post-test approach. The study population was all 72 female students of grades XI and XII of SMAN 1 Attitude In and a total sampling technique. The intervention media used was PowerPoint. A data normality test was first performed using the Kolmogorov-Smirnov test. The statistical test used was the Wilcoxon test because the results of the normality test indicated that the free test data were normally distributed, while the post-test data were not normally distributed. This study showed an increase in the average knowledge score from 6.64 before being given education using PowerPoint media to 19.39 after being given education. The results of statistical tests showed a significant difference between knowledge before and after being given education with PowerPoint media with a p-value = 0.00 (<0.05). The use of PowerPoint media has an impact on increasing the knowledge of SMA 01 Attitude In students regarding anemia prevention. Suggestions are made for the school and the local community health center to collaborate using Power Point media to share health information with students at the school.

Keywords: Anemia Prevention, Knowledge, PowerPoint

INTRODUCTION

Young women play a major role in determining the future of the nation, because young women are the ones who will give birth to their children as the next generation of the nation, young women have risks during pregnancy and childbirth, and are exposed to other health problems, therefore they really need special attention (Indonesian Ministry of Health, 2023). Young women are a group that is ten times more at risk of experiencing iron deficiency, commonly called anemia, compared to young men. This is because young women menstruate every month and are in a period of growth, so they need more iron intake. In adolescents, iron intake is not only used to support growth, but also used to replace iron lost through blood that comes out every time she menstruates every month. Because of this very high iron requirement for women, women are at risk of iron deficiency, which can later develop into anemia. The impact of anemia on young women is that the body during the growth period is easily infected, resulting in reduced physical fitness, decreased enthusiasm for learning. The impact of anemia during pregnancy includes the risk of abortion, premature birth, the risk of giving birth to a

baby with low birth weight (LBW) which can continue until the child experiences stunting (Lailiyana & Hindratni, 2024) .

Global Burden of Disease (GBD) 2021 study reported that 1.92 billion people worldwide suffer from anemia, an increase of approximately 420 million since 1990. The most affected groups are women (33.7% aged 15–49 years) and children under 5. year. Data released by the 2018 Basic Health Research for the 15-24 age group indicates that the prevalence of anemia reached 32%, with the prevalence of anemia in young women reaching 27.2% and 20.3% in young men. According to the 2023 Indonesian Health Survey (SKI), the prevalence of anemia in young women aged 15-24 was 15.5%, with the prevalence of anemia in young women reaching 18%. According to *the World Health Organization* (WHO), the number of anemia cases of 10% of the population is considered high (Indonesian Ministry of Health, 2023).

Eating habits are how individuals or groups of individuals choose the foods they consume in response to physiological, psychological, and sociocultural influences. Adolescent girls generally exhibit unhealthy eating habits, including skipping breakfast, being reluctant to drink water, having an unhealthy diet, consuming low-nutrient and fast food, and consuming tea and coffee. As a result, they are unable to meet their nutritional needs (Sulistyoningtyas, 2018) .

The main causes of anemia in adolescents are inadequate dietary intake of iron sources, pathological bleeding due to malaria or parasitic infections such as worms. Other causes of anemia in adolescents include inadequate iron intake and absorption, inadequate knowledge about anemia, and unsupportive attitudes among adolescents (Juwa & Naingalis, 2023) .

Lack of knowledge results in anemia problems experienced by adolescent girls will have a more serious impact, considering that they are prospective mothers who will become pregnant and give birth to a baby, thus increasing the risk of maternal death, premature birth and low birth weight, experiencing complications due to the uterus being unable to contract properly or being unable to bear weight, bleeding after childbirth which often results in death (Ministry of Health of the Republic of Indonesia, 2018). Another effort that can prevent anemia in adolescents is by presenting information about iron deficiency anemia through various media and methods. The use of media can facilitate the delivery of information and make it easier for the audience to receive information (Suprpto *et al* ., 2022).

Lack of knowledge about anemia is a leading cause of anemia in adolescent girls. Knowledge is one factor that can foster intrinsic motivation (motivation that arises from within oneself without encouragement from others), which in turn influences a person's knowledge. Individuals with knowledge in a particular field will have a positive impact on their attitudes and behavior (Rotua, 2017).

According to research conducted by Khazanah *et al* ., (2023) , at SMA Al Islam 1 Surakarta, it was found that anemia education using *PowerPoint media* increased knowledge among adolescent girls. The results of this study indicate that there is a difference in the knowledge of adolescent girls before and after treatment. *PowerPoint* has a very practical ability to be used in various class sizes. This media helps adolescents to understand the information presented more effectively. *PowerPoint* also offers various interesting and not boring presentation techniques, such as the use of colors, letters, and animations that can affect the learning atmosphere. With animated text, images, or photos and the ability to combine

various image clips, animated colors, and sounds, *PowerPoint* can increase adolescent awareness and make them more interested in the material presented (Kamil, 2019).

PowerPoint also has significant advantages, including making it easier for users to organize and manage presentation materials, making it easier for audiences to understand the material by only displaying important points in the form of clear *slides*, and making the presentation of the material more memorable, especially when users add visual elements such as animations that can maintain the audience's attention and prevent boredom caused by monotactic material (Purba *et al.*, 2023). In the context of media use, *PowerPoint* presentations can be an effective medium in increasing student interest and motivation to learn. Thus, satisfactory learning outcomes can be achieved (Purwanti *et al.*, 2020).

As the frontline health service provider, Sikap Dalam Community Health Center plays a crucial role in improving public health, particularly in the prevention and management of anemia. One of its flagship programs, implemented continuously, is the Iron Supplement (FE) Program for adolescent girls and pregnant women. However, this program has not been implemented optimally, and the community health center itself has not yet conducted hemoglobin level checks for all female students in its work area. Furthermore, the community health center has never conducted education on anemia prevention using Power Point media.

Researchers conducted an initial survey which was conducted on the date February 24, 2025 at SMAN 1 Sikap Dalam, based on a questionnaire distributed by researchers to 16 female students from grades X-XI, there were 3 female students with sufficient knowledge and 13 other students with insufficient knowledge. Students with insufficient knowledge can be seen from those who do not know the normal blood cell levels in adolescent girls, habits that can inhibit iron absorption by the body and what vitamins can help increase iron absorption in the body. Female students with sufficient knowledge, do not know about the function of iron-boosting tablets, and the benefits of iron-boosting tablets, this can be seen when answering the questionnaire given.

Lack of knowledge about anemia is a precursor to anemia in adolescent girls. Knowledge is one factor that can foster intrinsic motivation (motivation that arises from within oneself without encouragement from others), which in turn influences a person's knowledge. The purpose of this study was to determine the effect of anemia prevention education using *PowerPoint media* on the knowledge of female students at SMAN 1 Sikap Dalam.

METHODS

This research is a quantitative research using the *Pre Experimental Design method*, the planning used is *Pre test and Post test design*, namely conducting one measurement in front (*pre test*) before the treatment (*treatment*) and after that another measurement (*post test*). This research was conducted at SMAN 1 Sikap Dalam, Empat Lawang Regency, South Sumatra on August 6, 2025 until completion. The population in this study were all female students of grades XI and XII of SMAN 1 Sikap Dalam, Empat Lawang Regency, South Sumatra, totaling 72 female students with a total sampling technique. The distribution of the population and sample according to class can be seen in table 1.

Table 1. Population and Sample Size

NO	Class	Population	Sample
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1	XII MIA 1	18	18
2	XII MIA 2	16	16
3	XII IS	8	8
4	XI MIA 1	11	11
5	XI MIA 2	10	10
6	XI IIS	9	9
Total		72	72

RESULTS AND DISCUSSION

1. Characteristics Respondents

Respondent characteristics can be seen in Table 2 which shows the distribution of respondents based on age and class of students at SMAN 1 Sikap Dalam.

Table 2
Respondent Characteristics

Characteristics	Frequency (n)	Percentage (%)
Age		
15 years	12	16.67
16 years	39	54.17
17 years	25	34.72
18 years	5	6.94
Total	72	100.0
Class		
XII MIA 1	18	25.00
XII MIA 2	16	22.22
XII IIS	8	11.11
XI MIA 1	11	15.28
XI MIA 2	10	13.89
XI IIS	9	12.50
Total	72	100.0

The results of this study show that respondents aged 15 years were 12 female students (16.6%), aged 16 years were 30 female students (41.6%), aged 17 years were 25 female students (34.7%), and aged 18 years were 5 female students (6.94%).

Table 3
Respondent Characteristics Based on Experience Regarding Anemia Prevention

Characteristics	Yes (n)	No (n)
Have you ever received education on anemia prevention?	0	72
Once apply anemia prevention	0	72

Ever had difficulty implementing anemia prevention?	0	72
Parents have taught and implemented anemia prevention	0	72
Amount respondents	0	72

Based on the data in Table 3, all 72 respondents (100%) had never received education on anemia prevention. This means that not a single respondent had ever received information or counseling on how to prevent anemia. Furthermore, all respondents also stated that they had never implemented anemia prevention measures in their daily lives. This indicates that not only had they not received education, but they had also not actively taken steps to prevent the disease. Furthermore, all respondents admitted to never having experienced any difficulties implementing anemia prevention measures, but this was most likely due to their lack of experience.

Furthermore, this table also shows that none of the respondents' parents have ever taught or implemented anemia prevention measures for their children. In other words, the family, especially parents, plays no role in imparting knowledge or providing examples related to anemia prevention. Overall, this table illustrates that the respondents' knowledge and experience regarding anemia prevention are very minimal. The lack of formal or informal education from their environment, including from their parents, has resulted in all respondents never implementing anemia prevention measures. This situation indicates the need for interventions in the form of more comprehensive health education to increase public awareness and knowledge about the importance of preventing anemia .

Univariate analysis was conducted to obtain the average knowledge of female students about anemia prevention knowledge before and after being given education about anemia prevention in grade XII and XI female students of SMAN 1 Sikap Dalam. The data obtained can be seen in table 4 below.

Table 4. Knowledge Before and After Providing Education About Anemia Prevention to Female Students at SMAN 1 Attitudes in

Information	n	Average	Minimum-Maximum	Standard Deviation
Knowledge <i>pre-test</i>	72	6.65	1-15	3,176
Knowledge <i>post test</i>	72	19.39	15-24	2,217

Table 4 presents data on the level of knowledge of female students at SMAN 1 before and after being given education on anemia prevention. The number of respondents in this study was 72 female students. Knowledge measurements were conducted twice, namely before education (*pre-test*) and after education (*post-test*). The results of the *pre-test* showed that the average score of female students' knowledge before being given education was 6.65. The scores ranged from a low of 1 to a high of 15, with a standard deviation of 3.176. This figure

indicates that the female students' initial knowledge about anemia is still relatively low and varies quite significantly from one student to another.

After receiving the education, *the post-test results* showed a significant improvement. The average knowledge score rose to 19.39, with a score range of 15 to 24. The standard deviation in the post-test was 2.217, meaning the variation in scores between students was smaller than in *the pre-test*. This indicates that after receiving the education, most students had a high and relatively even level of knowledge.

Table 5
Overview of Knowledge Before and After Providing Education on Anemia Prevention to
Female Students at SMAN 1 Attitudes in

No	Question Item About Prevention Anemia	<i>Pre-test</i>				<i>Post test</i>			
		Correct		Wrong		Correct		Wrong	
		N	%	N	%	N	%	N	%
1.	What is meant by anemia?	31	43.0	41	56.9	64	88.8	8	11.1
			5		4		8		1
2.	What are the signs and symptoms of anemia?	38	52.7	34	47.2	70	97.2	2	2.77
			7		2		2		
3.	What causes teenage girls to be more at risk of developing anemia?	23	31.9	49	68.0	57	79.1	15	20.8
			4		5		6		3
4.	The following is not a type of anemia.	14	19.4	58	80.5	36	50	36	50.0
			4		5				0
5.	The Impact of Anemia on teenager Is	21	29.1	51	70.8	57	79.1	15	20.8
			6		3		6		3
6.	Factor what causes woman lost substance excessive iron in body Is	15	20.8	57	79.1	62	86.1	10	13.8
			3		6		1		8
7.	What do you know as a prospective mother about the impact of suffering from anemia during pregnancy (childbirth)?	22	30.5	50	59.4	41	56.9	31	43.0
			5		4		4		5
8.	Anemia in adolescent girls can be prevented by consuming lots of	27	37.5	45	62.5	48	66.6	24	33.3
							6		3
9.	The following are sources of iron or blood-boosting foods that come from animals:	28	38.8	44	61.1	55	76.3	17	23.6
			8		1		8		1

10.	Below are sources of iron or blood-boosting foods that come from plants .	13	18.0 5	58	81.9 4	54	75.0 0	18	25
11.	What is the normal blood cell level in teenage girls?	18	25.0 0	54	75.0 0	55	76.3 8	17	23.6 1
12.	What vitamins can help increase iron absorption in the body	33	45.8 3	39	54.1 6	42	58.3 3	30	41.6 6
13.	Habit what can hinder absorption substance iron by body	18	25.0 0	55	76.3 8	59	81.9 4	13	18.0 5
14.	What is the content of blood enhancing tablets? Blood enhancing tablets	22	30.5 5	43	59.7 2	59	81.9 4	13	18.0 5
15.	The benefits of blood supplement tablets for teenagers are:	29	40.2 7	43	58.9 0	50	69.4 4	22	30.5 5
16.	What is contained in blood-boosting tablets?	21	29.1 6	51	70.8 3	45	62.5	27	37.5
17.	When is the best time to take iron tablets?	17	23.6 1	55	76.3 8	57	79.1 6	15	20.8 3
18.	After 2 hours of consuming the additional tablet blood , preferably avoid consume various food that can bother tablet work added blood that is	22	30.5 5	50	69.4 4	64	88.8 8	8	11.1 1
19.	The negative impact of taking iron tablets is	20	27.7 7	52	72.2 2	66	91.6 6	6	8.33
20.	According to the Ministry of Health of the Republic of Indonesia, the rules for taking iron tablets for teenage girls are:	4	5.47	68	95.8 3	67	93.0 5	5	6.94

21.	When will iron tablets be distributed to students at school?	8	11.1	64	90.2	66	91.6	6	8.33
			1		7		6		
22.	Below are foods that contain folic acid except	3	4.16	69	95.8	66	91.6	6	8.33
					3		6		
23.	What is not a food that contains vitamin B12 is	5	6.94	67	93.0	63	87.5	9	12.5
					5		0		
24.	Foods that contain lots of vitamin C are	9	12.5	63	87.5	41	56.9	31	43.0
			0				4		5
25.	Certain foods or drinks can interfere with the absorption of iron which is important for the production of red blood cells.	19	26.3	53	73.6	58	80.5	14	19.4
			8		1		5		4

The results of table 5 show the knowledge of female students of SMAN 1 Sikap Dalam before and after being given education about anemia prevention, there was a significant increase in understanding after the educational intervention was carried out. During the *pre-test*, the five questions with the highest scores were general questions, such as question number 2 about the signs and symptoms of anemia (52.77%), number 6 about factors causing iron loss in women (50%), number 1 about the definition of anemia (43.05%), number 12 about iron absorption vitamins (45.83%), and number 15 about the benefits of iron tablets for teenagers (40.27%). This indicates that some female students already have basic knowledge about anemia, possibly from previous experience or learning.

However, their knowledge was still very low on certain questions such as number 22 regarding foods containing folic acid (4.16%), number 20 regarding the rules for taking iron tablets according to the Ministry of Health (5.47%), number 23 regarding foods containing vitamin B12 (6.94%), number 24 regarding foods containing vitamin C (12.5%), and number 10 regarding sources of iron from plants (18.05%). The low scores on these questions indicate that female students do not understand the aspects of micronutrients and their practical application in preventing anemia.

post-test scores, reflecting the success of the educational program. The five questions with the highest post-education scores were question number 20 regarding the rules for taking iron tablets (93.05%), number 21 regarding the distribution of iron tablets in schools (91.66%), number 22 regarding foods containing folic acid (91.66%), number 18 regarding foods that can interfere with the work of iron tablets (88.88%), and number 3 regarding the reasons why teenage girls are more at risk of anemia (79.16%).

These results indicate that education is very effective in increasing knowledge on important aspects such as tablet consumption rules, distribution at school, and understanding of the risks of anemia. However, there were still several questions with low scores on the post-

test, such as number 24 on foods containing vitamin C (56.94%), number 12 on iron absorption vitamins (58.33%), number 4 on types of anemia other than iron deficiency anemia (50%), number 16 on the contents of iron supplements tablets (62.5%), and number 25 on foods/drinks that inhibit iron absorption (80.55%). Although the scores increased compared to *the pre-test*, this indicates that students' knowledge regarding nutritional content and specific food sources is still not fully mastered. Therefore, a more contextual and applicable follow-up educational approach is needed, such as introducing types of local foods containing important nutrients for anemia prevention, so that students' understanding becomes more comprehensive and can be applied in everyday life.

2. Bivariate Analysis

Test Data Normality

A data normality test was performed to determine whether the data was normally distributed or not using the *Kolmogorov-Smirnov test*. The results of this test can be seen in Table 6, as follows:

Table 6. Results of the *Kolmogorov Smirnov Test*

Variables	p- v elue .
Knowledge <i>Pre-test</i>	0.19
Knowledge <i>Post test</i>	0.02

Table 6 above presents the results of the data normality test conducted using the *Kolmogorov-Smirnov method*, which aims to determine whether the data in each variable has a normal distribution or not. In this table there are two variables tested, namely *Pre-test Knowledge and Post-test Knowledge*. The test results show that the significance value (*p-value*) for the *Pre-test Knowledge variable* is 0.19, while for the *Post-test Knowledge variable* is 0.02. Because the significance value for the *Pre-test Knowledge variable* is 0.19 which is greater than 0.05, it can be concluded that the data in this variable is normally distributed. Conversely, for the *Post-test Knowledge variable*, the significance value of 0.02 is less than 0.05, so it is concluded that the data in this variable is not normally distributed.

Thus, the results of the *Kolmogorov-Smirnov test* indicate that only the pre-test data met the assumption of normality, while the post-test data did not. This has important implications for selecting the type of statistical test to be used in the subsequent analysis stage. Because the *post-test data* were not normally distributed, the use of parametric statistical tests such as the *paired sample t-test* may be inappropriate, and it is better to consider using non-parametric tests such as the *Wilcoxon Signed Rank Test* when comparing *pre-test* and *post-test results*. In conclusion, this normality test provides a strong basis for determining the appropriate data analysis approach to maintain the validity of the research results.

Bivariate analysis is a data analysis that discusses the relationship or influence between two variables. This analysis was conducted to determine the effect of education on anemia prevention on female students of SMAN 1 Sikap Dalam. Table 7 shows the results of the average value, minimum-maximum, *p-value*, and *Wilcoxon test*.

Table 7. The Effect of Anemia Prevention Education with *PowerPoint Media* on the Knowledge and Attitudes of SMAN 1 Female Students

Variables	N	p- value	Wilcoxon
Knowledge <i>Pre-test</i>	72	000 -7,385	
Knowledge <i>Post test</i>	72		

The results in Table 7 of this study used a non-parametric statistical test, namely the *Wilcoxon test*, which is suitable for paired data *such as pre-test and post-test* in the same group. From the table, it can be seen that the number of respondents (N) who took *the pre-test and post-test* was 72 people. The *p-value* shown is 0.000 (usually written as <0.001), which means that statistically the results are very significant. This means that there is a significant difference between the level of knowledge of female students before and after being given education about anemia prevention using *PowerPoint presentation media*. In addition, *the Wilcoxon value* of -7.385 indicates that the difference is quite strong, with a negative direction indicating that *the post-test score* is generally higher than the *pre-test score* (because in the *Wilcoxon test* a negative sign indicates an increase in scores after the intervention).

Thus, the results of this study indicate that providing education through *PowerPoint media* is effective in increasing female students' knowledge about anemia prevention. This demonstrates that an engaging and informative educational approach can play a significant role in health promotion and prevention efforts, particularly among adolescent girls who are vulnerable to anemia.

Table 8. Results of the Ranking Test of Students' Knowledge Before and After Anemia Prevention Education on Students' Knowledge

	N	Mean Rank	Sum Of Rank
<i>Post test – Pre test</i>	<i>Negative Ranks</i>	0	0.00
	<i>Positive Ranks</i>	72	2628.00
	<i>Ties</i>	0	
	Total	72	

Table 8 shows results test *Wilcoxon Signed Ranks Test* used For analyze change knowledge female students before And after given education about prevention of anemia. Based on table said, all 72 participants experienced improvement knowledge after follow education, which is shown by positive ranks value of 72 (100%), with a mean rank of 36.50 and *sum of ranks* of 2628.00. Not a single student experienced a decrease in knowledge (*negative ranks* = 0) or no change (*ties* = 0). This means that no respondents showed *post-test results* that were lower or equal to *the pre-test*. These results indicate that the education provided effectively increased the knowledge of all female respondents in this study. Thus, it can be concluded that educational interventions regarding anemia prevention are very effective and have a positive effect on increasing female students' knowledge.

4. The Influence of Power Point Media on Students' Knowledge About Anemia at Sman 01 Sikap Dalam.

The use of *PowerPoint* in the educational process has proven effective as a visual aid that can attract attention, increase comprehension, and simplify the presentation of complex material. Visual media such as *PowerPoint* can combine text, images, and animation, thereby helping to improve information retention in students.

The results of the statistical test using the *Wilcoxon test* showed a *p-value* of 0.00 (<0.05), which means there is a significant difference between knowledge before and after education. With a 95% confidence level, it can be concluded that the use of *PowerPoint* as an educational medium has a significant impact on increasing students' knowledge. This finding is in line with the theory of Notoatmodjo (2017), which states that knowledge can be obtained through various sources of information and educational media, one of which is from educators and health workers with the help of learning media. Interesting and easy-to-understand media will strengthen the message conveyed and increase the effectiveness of learning.

Furthermore, this research supports the findings of Rahmi *et al.* (2023), who found that anemia prevention education using *PowerPoint* and *leaflets* significantly improved students' knowledge. This confirms that information delivery methods significantly influence learning outcomes, particularly in promoting and preventing health problems such as anemia.

Overall, the results of this study indicate that *PowerPoint-based education* not only improves students' knowledge but can also be an effective strategy for schools in implementing health education programs. Therefore, schools and educators are strongly encouraged to continue utilizing interactive and engaging educational media to convey health information to students.

Research on the effect of anemia prevention education using *PowerPoint media* on the knowledge of female students at SMAN 1 Sikap Dalam. Has limitations in terms of implementation time. This study was conducted in only one day, so the *pre-test* and *post-test filling process* was carried out on the same day after the education was provided. This condition can affect the results because the increase in *post-test scores* may not fully reflect the long-term understanding of the students, but only the effect of short-term memory after receiving the educational material. The *pre-test* and *post-test* were given a certain time interval, at least 3 weeks to truly see more stable changes in knowledge that reflect long-term memory.

CONCLUSION

Based on the results of research conducted on 72 female students at SMAN 1 Sikap Dalam, it can be concluded that. The level of knowledge of female students regarding anemia prevention before being given education was still relatively low with an average pre-test score of 6.64, and an average score of 45.83%. After the intervention using *Power Point media*, there was a very significant increase in the level of knowledge of female students, with the average *post-test score* increasing to 19.39, and the average score was 81.84%. There is a significant influence between the intervention using Power Point media about preventing anemia on the knowledge of female students at SMAN 1 Sikap Dalam.

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