Jurnal Paedagogy:
Jurnal Penelitian dan Pengembangan Pendidikan
https://e-journal.undikma.ac.id/index.php/pedagogy/index
Email:paedagogy@undikma.ac.id

Vol. 11 No. 3 : July 2024
E-ISSN: 2722-4627
pp. 518-528

Preliminary Studies : Digital-Based Family Health Education on Prevention of Anemia in Junior High School Students

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Abstract: This study aims to describe a digital-based family health education model for the prevention of anemia in Junior High School Students. This study used a descriptive method with a quantitative approach involving 100 families of female students, who filled out questionnaires regarding their knowledge of anemia, health education, use of digital media, and knowledge and compliance with consuming iron tablets. The data analysis technique in this research used frequency distribution. The results showed that most families lacked knowledge about the signs, consequences, and prevention of anemia, although almost all respondents recognized the importance of family education for anemia prevention. In addition, almost all Junior High School Students had good knowledge of anemia, and almost all families had access and use of WhatsApp as digital media. However, the compliance of Junior High School Students in consuming iron tablets needed improvement. These findings highlight the need for developing a digital-based family health education program utilizing WhatsApp to enhance knowledge and compliance in anemia prevention. It is hoped that this intervention will create sustainable behavioral changes and positively impact the health of adolescent girls.

Article History
Received: 13-04-2024
Revised: 23-05-2024
Accepted: 27-06-2024
Published: 15-07-2024

Key Words:
Family Health Education; Anemia; Digital Media; Whatsapp.

How to Cite: Ningrum, D., Hufad, A., Wahyudin, U., & Suryadi, A. (2024). Preliminary Studies : Digital-Based Family Health Education on Prevention of Anemia in Junior High School Students. *Jurnal Paedagogy, 11*(3), 518-528. doi:https://doi.org/10.33394/jp.v11i3.11913

https://doi.org/10.33394/jp.v11i3.11913

Introduction

In various countries, including Indonesia, young women still often experience anemia. Globally, up to 33.7% of women aged 15-49 years suffer from anemia in 2021 (IHME, 2023). The results of the Indonesian Health Survey show that the prevalence of anemia in Indonesia is 16.2%, with women and rural populations being more susceptible to anemia (Kemenkes RI & BKPK, 2023). The results of an international nutrition survey in 2018 found that cases of anemia among adolescent girls in West Java were 41.93% (Lestari, 2022). Sumedang Regency is one of the districts in West Java province. Based on data on anemia screening for adolescent girls in grade 7 junior high schools in Sumedang Regency for the 2022-2023 academic year, there were 26.32% of female students who were diagnosed with anemia. The percentage of junior high school students who experience anemia in the Cisitu Community Health Center working area (46.72%). At SMPN 1 Cisitu, 33 female students or 47.8% were diagnosed with anemia (Puskesmas Cisitu Kabupaten Sumedang, 2024).

Anemia in teenagers can appear with various symptoms and cause serious health complications. Symptoms of anemia include tiredness, lack of energy, poor concentration, shortness of breath, weakness, tiredness, and dizziness (Rahmawati, 2023; Risna'im et al., 2022; Weckmann et al., 2023). These symptoms can affect school performance (through developmental delays and behavioral disorders such as decreased motor activity, social interaction, and attention to tasks), productivity in adulthood, and quality of life (WHO,

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2023). Anemia in teenage girls can also result in decreased immunity, concentration, appetite, and lack of energy (Rahmawati, 2023). Then, anemia can have long-term consequences, such as increasing the risk of anemia during pregnancy and potentially giving birth to babies with low birth weight or premature birth and maternal death. In addition to health impacts, anemia can also have important financial impacts on individuals, families, communities, and countries. It is estimated that for every US$ 1 invested in reducing anemia in women, economic benefits of US$ 12 can be generated. In addition, in the comprehensive implementation plan for maternal, infant, and child nutrition programs, reducing anemia is one of the six global nutrition goals determined by the World Health Assembly. One of the targets of the UN's 2030 sustainable development agenda is to reduce anemia in women aged 15 to 49 years (WHO, 2023). Therefore, efforts to prevent anemia in adolescent girls need to continue, including through family health education. Previous research shows that a family health education approach can be effective in increasing family health knowledge, attitudes and practices related to disease prevention (Bangun, 2022; Karadaş et al., 2023; Meilianingsih & Sari, 2023).

However, there is still little research that specifically develops digital-based family health education models to prevent anemia in Junior High School Students, especially in the school environment. This research aims to fill the research gap by conducting a preliminary study to develop a digital-based family health education model to prevent anemia in adolescent girls at SMPN 1 Cisitu, Sumedang. The outreach activities will involve the families of female students at SMPN 1 Cisitu as the main target, with the hope of increasing knowledge, attitudes and family health practices related to preventing anemia. The main objective of this preliminary study is to determine knowledge of anemia prevention, health education activities, and use of family digital media as well as knowledge of anemia and adherence to taking blood supplement tablets in young women. It is hoped that the results of this research can provide a significant contribution to the development of anemia prevention interventions for adolescent girls, especially in the school environment. By involving the family as the target unit, this model is expected to create sustainable behavioral changes and have a positive impact on the health of adolescent girls.

Research Method

This research used a descriptive method with a quantitative approach. The number of respondents who were willing to become subjects and fill out the quantitative data instrument was 100 family members of young women. SMPN 1 Cisitu was chosen because the incidence of anemia was high, and compliance with taking blood supplement tablets was low. Data collection was carried out from April to May 2024 by researchers assisted by homeroom teachers. The instrument used was in the form of a knowledge questionnaire for families with answers Yes (know) and No (Don't know). Instrument of knowledge and adherence to taking blood supplement tablets for female students. As well as instruments for using the WhatsApp application for families. The instrument was created by the researcher himself based on the literature Apriningsih et al. (2019), Ningtyas et al. (2021), Runiari & Hartati (2020), Umami et al. (2023) and had been tested for validity and reliability first.

The data collection process was carried out in the homes of young women's families. After the quantitative data was collected, the completeness of the data was then checked, then cleaning, data entry, data processing and analysis were carried out using the frequency distribution percentage formula. Interpretation of analysis results using the provisions of

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Arikunto Suharsimi (2010) namely as follows: 100% all, 76-99% almost all, 51-75% most, 50% half/part, 26-49% almost half, 1-25% a small part, 0% none.

Results and Discussion

The number of families who were willing to be respondents in the research was 100 families of teenage girls. More details will be provided in the explanation below. Description of Respondent Characteristics can be seen in table 1:

Table 1. Characteristics of Respondents

No	Respondent Characteristics	n	%
1	Respondent's Age (years)		
	17-25	9	9,0
	26-35	24	24,0
	36-45	47	47,0
	46-55	19	19,0
	56-65	1	1,0
2	Education		
	Didn't graduate from elementary school	1	1,0
	Elementary school	17	17,0
	SMP/MTs	42	42,0
	SMA/MA/SMK	36	36,0
	College	4	4,0
3	Work		
	State apparatus	2	2,0
	Self-employed	6	6,0
	Laborer	10	10,0
	Housewife	79	79,0
	Etc	3	3,0
4	Relationship with Young Women		
	Mother	79	79,0
	Father	9	9,0
	Uncle	1	1,0
	Older brother	11	11,0
5	Age of Adolescent Daughter (years)		
	12	19	19,0
	13	68	68,0
	14	11	11,0
	15	2	2,0
	Amount	100	100,0

Table 1 shows the characteristics of the 100 respondents who participated in this study. The data shows that almost half (47.0%) of the respondents were in the age range of 36-45 years, some (42.0%) of them had junior secondary education and some (36.0%) had senior secondary education. Then most of them have a family relationship with the adolescent daughter as a mother (79%). Most of the adolescent girls in this study (68.0%) were at the age of 13 years. An overview of knowledge about anemia and anemia education can be seen in table 2 below:

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Table 2. Description of Respondents' Knowledge about Anemia and

No	The aspect in question	Answer				Amount	
		Know/Yes		No		n	%
		n	%	n	%		
1	Signs of anemia in adolescent girls	41	41,0	59	59,0	100	100,0
2	Consequences of anemia in adolescent girls	42	42,0	58	58,0	100	100,0
3	Ways to prevent anemia in teenage girls	43	43,0	57	57,0	100	100,0
4	So far, there have been outreach activities to prevent anemia among young women	31	31,0	69	69,0	100	100,0
5	It is necessary/important to have family education activities to prevent anemia	92	92,0	8	8,0	100	100,0
6	Family support plays an important role in efforts to prevent anemia in adolescent girls	98	98,0	2	2,0	100	100,0

Based on table 2 above, it appears that most of the respondents' knowledge regarding signs (59.0%), consequences (58.0%), and how to prevent anemia (57.0%) are not yet known correctly. The majority (69.0%) of respondents stated that so far there had been no outreach activities on the prevention of anemia among adolescent girls. Almost all (92.0%) respondents stated that it was necessary/important to have family education activities to prevent anemia. And almost all (98.0%) respondents stated that family support plays an important role in efforts to prevent anemia in adolescent girls.

An overview of the characteristics of young women's knowledge about anemia and compliance with taking blood supplement tablets can be seen in table 3 below:

Table 3. Knowledge Characteristics of Young Women and Girls Compliance with Taking Blood Increasing Tablets

No	Question	n	%
1	What is anemia?		
	Lack of Hb levels in the blood	64	64,0
	Low blood pressure in the body	24	24,0
	Don't know	12	12,0
2	What causes anemia?		
	Eating less vegetables	19	19,0
	Lack of iron in the body	71	71,0
	Eating too much fatty foods.	10	10,0
3	What Hb level is a teenage girl said to be anemic?		
	If the Hb level is <12 gr/dl	59	59,0
	If the Hb level is ≥ 12 gr/dl	41	41,0
4	Can taking blood supplement tablets prevent anemia in teenage girls?		
	Can prevent anemia	90	90,0
	Cannot prevent anemia	1	1,0
	Don't know	9	9,0
5	How many blood supplement tablets do you take in one month?		
	1 tablet	45	45,0

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2 tablets	11	11,0
3 tablets	3	3,0
4 tablets	21	21,0
Don't take blood enhancing tablets	20	20,0
Amount	100	100,0

Based on table 3 above, it appears that the majority (64.0%) of young women know that anemia is a lack of Hb levels in the blood. However, almost half (24.0%) thought anemia was caused by low blood pressure in the body, and a small portion (12.0%) did not know what anemia was. Most (71.0%) young women know that anemia is caused by a lack of iron in the body. A small portion (19.0%) thought the cause was not eating enough vegetables, and a small portion (10.0%) thought that eating too much fatty food was the cause. Correct knowledge about the causes of anemia is quite high, but there are several misperceptions that need to be corrected. Most (59.0%) young women know that Hb levels of less than 12 gr/dl indicate anemia. However, almost half (41.0%) incorrectly thought that Hb ≥ 12 gr/dl also indicated anemia. Almost all (90.0%) young women are aware that taking blood supplement tablets can prevent anemia. Only a small percentage (1.0%) think otherwise, and a small portion (9.0%) don't know. Nearly half (45.0%) of young women only take 1 blood supplement tablet a month. A small portion (21.0%) took 4 tablets, a small portion (11.0%) took 2 tablets, and (3.0%) took 3 tablets. A small proportion (20.0%) did not take blood supplement tablets at all. Compliance with blood supplement tablet consumption is low, with most only consuming minimal amounts.

An overview of the characteristics of respondents' use of the WhatsApp application can be seen in table 4 below:

Table 4. Characteristics of Respondents' Use of the WhatsApp Application

No	Question	n	%
1	Do you use WhatsApp media to communicate?		
	Yes	86	86,0
	No	14	14,0
2	What form should the outreach media be in?		
	Book/written	40	40,0
	Digital media using the WhatsApp application	60	60,0
Amount		100	100,0

Based on table 4 above, it shows that almost all (86.0%) respondents used the WhatsApp application to communicate. Only a small portion (14.0%) of respondents do not use WhatsApp. Most (60.0%) respondents prefer digital outreach media using the WhatsApp application. Meanwhile, almost half (40.0%) of respondents preferred counseling media in book/written form.

Discussion

The research results in Table 2 above show that most of the respondents' knowledge regarding the signs, consequences, and ways to prevent anemia is not yet known correctly. This cannot be separated from the existence of several supporting characteristics, such as the respondent's educational background and age. Table 1 shows that almost half of the respondents were in the age range of 36-45 years, and almost half of them had junior secondary education and upper secondary education. Most of them have a family relationship with teenage girls as mothers (79%). Notoatmodjo (2018) states that the factor that has the greatest influence on knowledge is education because people with a higher level of education can respond more rationally to the information they receive and will think about how useful

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the benefits a person brings to the development of others in achieving certain goals (Damayanti & Sofyan, 2022).

A mother with a high level of education will pay more attention to her child's diet because she knows the amount of nutrition her child needs. The higher the mother's level of education, the better the mother's way of educating and caring for her child, because highly educated parents will not immediately accept what people say, they will think logically to determine every action they will take (Martini, 2015). According to researchers, mothers with a high level of education are more likely to receive and select information that is useful for themselves and their families, and can apply it in everyday life. Apart from that, education is an important factor in supporting the family economy. A mother's education is very helpful in preparing food for the family and caring for her children. The results of this study are in accordance with previous research which concluded that there is a significant relationship between educational attainment and level of knowledge (p=0.000), where the higher the level of education, the higher the level of knowledge possessed and vice versa (Damayanti & Sofyan, 2022).

Respondents' good knowledge cannot be separated from factors related to age and experience. Based on the research results in table 1, it shows that almost half (47.0%) of the respondents were between 36 and 45 years old, which is generally the age at which a person is at a maturity level and has sufficient life experience to understand the various things he or she has gone through. However, the majority (69.0%) of respondents stated that so far there had been no outreach activities on the prevention of anemia among adolescent girls. So this will affect respondents' knowledge about anemia. One source of knowledge is experience, which refers to the empiricist perspective. According to the empirical view, experience is the only source of knowledge whose truth can be accepted because it is the result of observation and processing of the five senses. The more experience a person has in life, the more knowledge he has in life and the better his behavior will be (Vera & Hambali, 2021; Wahana, 2016).

The research results in Table 3 show that young women's knowledge about anemia and its causes is generally good, but there are still several misconceptions that need to be corrected. Understanding of hemoglobin levels that indicate anemia still needs to be improved. Knowledge about the benefits of blood supplement tablets is very high, but compliance with the consumption of blood supplement tablets is still low. These results are similar to research (Pou et al., 2024), which found that the majority (88.3%) of young women did not comply with taking blood supplement tablets. Likewise, research (Putri & Kurnia, 2023), found that 73.7% of young women did not regularly consume blood supplement tablets. Studies by Runiari & Hartati (2020) also revealed that although blood supplement tablets were given free of charge, some young women did not finish them. The results of another study showed that of 60 female students in two junior high schools in Sumedang Regency, only a small portion (15%) of respondents regularly took blood supplement tablets, and the rest sometimes (45%), rarely (31.6%), and never. taking blood-enhancing tablets (8.4%). The reasons for not taking blood supplement tablets regularly are nausea, forgetfulness, and laziness (Septiani et al., 2023).

Based on the regulations of the Directorate General of Public Health, Ministry of Health of the Republic of Indonesia Number HK.03.03/V/0595/2016, blood supplement tablets are given to all teenagers aged 12–18 years with an elemental composition of 60 mg iron and 0.4 mg folic acid. Blood supplement tablets are given once a week throughout the year, carried out simultaneously at school according to the time determined by each

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institution. Based on 2018 Basic Health Research data, it shows that the high rate of TTD coverage (80.9%) is not accompanied by a high level of compliance with taking blood supplements among young women at school, only a small percentage (1.4%) of young women take blood supplements according to the requirements. The recommendation is 52 pills per year (Kementerian Kesehatan RI Badan Penelitian dan Pengembangan, 2018). Reporting from the West Java Provincial Health Service website, the coverage of young women who take blood supplement tablets as recommended in West Java has only reached a small percentage (16.7%) of young women in 2021 (Lestari, 2022). Based on data from the Sumedang District Health Service, of the 10 Community Health Centers that have the most anemic teenage girls, there are teenage girls whose percentage of drinking TTD is quite low, namely teenage girls in the Cisitu Community Health Center working area (Dinkes Sumedang, 2023).

Compliance in consuming blood supplement tablets is a form of behavior so the tendency of young women to comply or not in consuming TTD can be analyzed using behavioral theory. Obedient behavior is the result of the intention of young women to consume blood supplement tablets with the frequency recommended by health workers (Hevandari, 2023). The low compliance in consuming blood supplement tablets among school girls, apart from being influenced by intention, can also be related to the role or support of parents. Research results in Apriningsih et al. (2019) show that the role of parents is very important in increasing female students' compliance in consuming blood supplement tablets which are recommended for the prevention and treatment of anemia in adolescent girls. In this study, the role of parents in motivating, educating, and monitoring young women who consume blood supplement tablets is still minimal. Even though the implementation of blood supplementation tablets requires the support of all parties, including the family.

The research results in table 2 almost all (92.0%) respondents stated that it was necessary/important to have family education activities to prevent anemia. And almost all (98.0%) respondents stated that family support plays an important role in efforts to prevent anemia in adolescent girls. This is supported by research results Ningtyas et al (2021) which shows that there is a significant relationship between family support and adherence to taking blood supplement tablets. It is important for families to actively monitor and support their teen's iron supplement intake. It is also recommended to increase health education for young women and families about the importance of consuming blood supplement tablets. Family support includes emotional, instrumental, informational and assessment support. Family support includes reminding children about the schedule for taking blood supplement tablets and providing iron-rich foods at home. This family support is important in helping young women develop good eating habits and lifestyles. Therefore, to increase family knowledge and understanding regarding efforts to prevent anemia, it is necessary to develop family health education that can encourage anemia prevention behavior in adolescent girls in the family.

The research results in Table 4 show that almost all respondents have adopted WhatsApp as a communication tool, which is an effective platform for disseminating information. Health education using digital platforms such as WhatsApp has the potential to reach a wider audience and be more effective than traditional methods. A higher preference for digital media indicates a significant trend toward the use of technology in health education. Information is important and everyone is trying to access the information they need. With the rapid development of technology, information exchange can now take place in a matter of seconds. One of them is innovation in social interaction or social media. Today

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social media is not only used to communicate and build relationships but can also be used as a vehicle for information (Rathbone et al., 2020). WhatsApp is currently a popular communication media application that allows instant delivery of messages to the public. WhatsApp is usually used for private communication between two or more people who are not in the same location. WhatsApp is often used for social purposes. The application of this communication media is related to the business practices of health service organizations. WhatsApp can be used as a medium to exchange messages regarding patient conditions or ask clinical questions. WhatsApp media can also be used as a tool to provide health education to the public (Rathbone et al., 2020).

The following research illustrates that the use of WhatsApp media in carrying out education or health education is effective in increasing respondents' knowledge and healthy behavior. Research results in Ningrum & Sudiarti (2024) show that the promotion of 1000 HPK nutrition through the WhatsApp application significantly increases the knowledge of pregnant women. Research result Syafputri (2024) shows that there is an influence of education via WhatsApp on the compliance of pregnant women in consuming Fe tablets to prevent anemia. Research result Umami et al (2023) Nutrition education using nutrition counseling using PowerPoint and WhatsApp chatbot media can increase students' knowledge about preventing anemia in adolescents. The results of the research above illustrate the use of WhatsApp media for education for pregnant women and teenage girls, while the use of this media in families with teenage girls is still rarely done.

The results showed that most families had insufficient knowledge about anemia, its signs, consequences, and prevention. It has an impact on the family's lack of attention to anemia prevention. This finding is in line with previous studies by Gillespie et al. (2023), and Zulfajriani et al. (2023), which showed the importance of health education in improving family knowledge, attitudes, and practices related to anemia prevention. The finding that almost all families own smartphones and use WhatsApp is promising for developing a digital-based family health education model. Previous research has shown that WhatsApp can effectively deliver health education messages and interventions (Rathbone et al., 2020). The low adherence of junior high school girls to taking iron tablets highlights the need for effective strategies to improve adherence. Digital-based family health education programs can play an important role in this by providing families with the knowledge and motivation to support their daughters in preventing anemia. Digital-based family health education is likely to improve knowledge about anemia and adherence to taking blood supplement tablets in adolescent girls. Health counseling through media such as WhatsApp can facilitate more effective and efficient communication between health workers and families. By involving families in health education, it is expected that there will be sustainable behavior change in preventing anemia in adolescent girls.

Conclusion

The results of the research show that most families have insufficient knowledge about anemia in adolescent girls, efforts are needed to increase participation in outreach activities and develop more effective family health education programs to prevent anemia in adolescent girls. Research also shows the importance of ongoing health education to ensure adolescent girls have the correct knowledge and good adherence to anemia prevention. Using WhatsApp as a communication medium is very common among families, almost all respondents use it. Most respondents prefer outreach media using the WhatsApp application compared to written media. This shows that using WhatsApp as a health education medium will be more in line

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with the preferences of the majority of families, thereby increasing the effectiveness of health education and intervention programs.

Recommendation

Researchers suggest that there needs to be an effort to increase knowledge about anemia and its prevention efforts to school girls and families. So that families can support students to have positive behavior in preventing anemia. Teachers can act as educators who convey health messages to provide awareness to students and families about the importance of preventing anemia. Students need to realize that they are in an age range that is very at risk of developing anemia and if they get anemia the impact on health is very dangerous, so prevention efforts should be made. The results of this preliminary study can be used as a basis for further researchers to develop a digital-based counseling model using WhatsApp media to prevent anemia in junior high school students.

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