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Original Research

Enhancing Knowledge and Compliance in Anemia Treatment Through a WhatsApp Group at SMPN 1 Karangrejo, Magetan, Indonesia

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ABSTRACT

Background: The prevalence of anemia in adolescents in East Java in 2018 was 50-60%. Anemia can be caused by various factors, including iron deficiency, vitamin B12 deficiency, folate deficiency, infectious diseases, congenital factors, and bleeding. The Indonesian government has intensified the anemia prevention and control program in adolescent girls and women of childbearing age by prioritizing the provision of iron tablets, one tablet per week, to reduce the prevalence of anemia in this group by 2025. In the millennial era, many adolescents and the community use WhatsApp as a means of communication. For promotional media, researchers chose WhatsApp media and it is hoped that health promotion efforts and the movement to drink TTD (iron supplement) together through WhatsApp media can increase the knowledge and compliance of rheumatology specialist doctors in consuming TTD. **Method:** This study is included in pre-experimental research using one group pretest and posttest by conducting a pretest before being given treatment and then conducting a posttest after being given treatment. The sample in this study was adolescent girls at Junior High School 1 Karangrejo Magetan Indonesia as many as 92 respondents. The independent variables are health promotion and the movement to drink TTD together through Whatsapp Group. The deeper variable in this study is knowledge about anemia. **Results:** The results showed a significant difference between knowledge about anemia and compliance in taking iron tablets before and after the intervention, with a p-value of 0.000 (≤ 0.05). This shows that health promotion and the movement to drink iron tablets together through WhatsApp Group are effective in increasing knowledge and compliance. **Conclusion:** Health promotion and the movement to drink blood tablets together through WhatsApp Group are effective in increasing knowledge and compliance and there is an increase in knowledge and compliance scores after health promotion.

Keywords: Anemia; adolescent girl; blood supplement tablets

1. INTRODUCTION

Increased nutrient needs due to rapid physical growth and development and changes in lifestyle and dietary habits affect nutrient intake needs. Adolescence is a vulnerable period from a nutritional perspective. Anemia is one of the nutritional and health problems in female adolescents. Anemia is a lack of red blood cell mass or hemoglobin (Hb)

concentration which results in a decrease in the blood's ability to carry oxygen. The reason why young girls do not consume iron tablets is because they are not interested in consuming iron tablets because they do not feel any changes in themselves and the iron tablets have a fishy taste. There are factors that have a correlation with the consumption of iron supplements, namely the taste of iron supplements is not acceptable, which is one of the factors that can influence the adherence to iron supplements. According to the World Health Organization (WHO), the prevalence of anemia in elderly women in the world is around 29.9% in the 15-49 year age group.[1,3] In Southeast Asian countries, anemia is a major public health problem, with a prevalence of 46.6% in elderly women.[2]

Based on data from the 2018 Basic Health Research, it is known that the prevalence of anemia in women nationally reached 23.7% of all women aged 15-24 years who suffer from anemia. According to some estimates, around 32% of adolescents, or around three to four out of every five adolescents, suffer from anemia.[4-6] Based on the 2018 health profile data for East Java Province, the prevalence of anemia in the area was as follows: 50-60% in adolescents. Based on the report on the provision of signatures to adolescent girls carried out by the Magetan Regency Health Service and Karangreejo Health Center in 2022, the provision of signatures to adolescent girls in schools in the work area of the Magetan Regency Health Service and Karangreejo Health Center has reached 100%.[5,20] Based on the initial study, the report on the results of anemia screening carried out by the Magetan Regency Health Service, data was obtained on the prevalence of anemia in adolescent girls still reaching 40% and in the Karangreejo Health Center area the prevalence of anemia in adolescent girls was 20%.[7-8] Anemia can be caused by various conditions, such as inadequate intake of iron, vitamin B12, or folic acid, infection, or factors related to a person's family history, or even just bleeding.[6] The most common cause of anemia is nutritional deficiencies, especially iron in food.[2] Due to the fact that female adolescents menstruate every month, they are more likely to suffer from anemia than male adolescents.[5] Female adolescents who menstruate every month have a higher iron requirement than male adolescents.[9]

If a young woman already has anemia, she is more likely to have anemia during pregnancy. This can have a negative impact on the development of the fetus in the womb. In addition, anemia during pregnancy can increase the risk of various other important problems, including a high risk of maternal and child mortality, as well as problems during the delivery process. Therefore, it is very important for young women to maintain their health and prevent and treat anemia before or during pregnancy. Inadequate nutrition Some micronutrients can be a problem during adolescence in the development and maturation of reproductive organs. During menstruation, women lose some iron through the blood that comes out. The average estimated loss of iron during menstruation is around 1.3 mg per day. Eemilia's research, 2020 showed a correlation between iron intake and anemia status in female students at the Hidayatuessalikin Air Itam Pangkal Pinang Islamic Boarding School with chi-square statistical results p-value = 0.001. To achieve the target of reducing the prevalence of anemia in adolescent girls and the elderly by 2025, the Indonesian Government prioritizes the implementation of a program to provide iron tablets (TTD) to adolescent girls and elderly patients as much as one tablet per week to prevent and treat anemia. In the millennial era, one of the most popular media is the smartphone which is currently the main communication tool.[11,12]

In this study, the WhatsApp Group media was used as a health promotion media for the consumption of blood-enriched tablets to prevent anemia in adolescent girls. And this study was conducted on female students of SMPN 1 (Sekolah Menengah Pertama Negeri or Public Junior High School) Karangrejo, Magetan. This study aims to determine the level of effectiveness of WhatsApp media as a health promotion media, and to determine the differences in the level of compliance and knowledge of female students before and after being given health promotion.

2. METHODS

2.1 Study Design

The type of research used is an experimental study. The aim of experimental research is to investigate the possibility of mutual causality by conducting an intervention or conducting a treatment on one or more experimental groups, then the results or consequences of the intervention (on other groups).[16] The research design used is pre-experimental. This approach is used to find cause and effect with the intervention or treatment.[17] This research uses one group pre-test and

post-test by conducting a pre-test before giving the treatment and then conducting a post-test after giving the treatment. This research design has one experimental group without comparison and non-random sample determination.[24]

2.3 Sample

The sampling method in this study is total population sampling. Total population sampling is a sampling technique where the number of samples is the same as the population. In this study, a sample of all 7th grade female students at SMPN 1 Karangreejo Mageetan was taken. The sample size (n) was 92 people.

2.4 Variable

The independent variable in this study is the implementation of health promotion and the coordinated movement to drink TTD (iron supplement tablets) together through a WhatsApp Group. The dependent variable is the level of knowledge about anemia and the adherence to taking iron supplement tablets among the participants.[19]

2.5 Data Analysis

The statistical test used to determine the influence of the deep-end variables is the result of the assessment of knowledge about anemia and TTD drinking compliance by conducting a normality test. If the results show that the data is normally distributed, a Paired Samples T-Test statistical test is continued with a significance value of <0.05, then it is concluded that there is a significant difference between before and after being given health promotion and TTD drinking movement together through the Whatsapp Group. If the data obtained is not normally distributed, then the difference analysis is carried out using the Wilcoxon test.

This research has passed the ethical test by the Health Research Ethics Commission (KEPK) of Politeknik Kesehatan Kementrian Kesehatan Surabaya. No.EA/2354/KEPK-Poltekkes_Sby/V/2024.

3. RESULTS

3.1 Knowledge Level About Anemia Before and After Being Given Health Promotion

Based on Table 1, the average knowledge score before being given health promotion about anemia through WhatsApp Group for young women is 67.50 with a standard deviation of 6.05. After being given health promotion about anemia through WhatsApp Group for young women, it is 85.27 with a standard deviation of 7.92 from 92 respondents. This means that there is an increase in the average knowledge score of 17.77.

Table 1. Level of knowledge about anemia before and after and after being given health promotion and a joint TTD drinking movement via WhatsApp Group

Variable	Mean	Standard Deviation	N
Knowledge			
Before	67.50	6.05	92
After	85.27	7.92	92

3.2 Level of Compliance in Taking Iron Supplements Before and After Health Promotion

Based on Table 2, the average compliance score before being given health promotion and the movement to drink iron tablets together through WhatsApp Group is 1.83 with a standard deviation of 1.22. After being given health promotion about anemia and the movement to drink iron tablets together through WhatsApp Group, it is 5.67 with a standard deviation of 3.04 from 92 respondents. This means that there is an increase in the average compliance score of 3.84.

Table 2. The level of compliance in taking iron tablets before and after being given health promotion and a movement to take iron tablets together via WhatsApp Group

Variabel	Mean	Standard Deviation	N
Compliance			
Before	1.83	1.22	92
After	5.67	3.04	92

3.3 Effectiveness of Health Promotion and Iron Tablet Movement

This analysis was conducted to determine the effectiveness of health promotion and the movement of drinking iron tablets together through the WhatsApp Group to determine the increase in knowledge about anemia and the compliance of drinking iron tablets in female adolescents at SMPN 1 Karangreejo before and after being given an intervention. Before that, data normality analysis was conducted using the

Kolmogorov Smirnov test. The results of the analysis showed that all data were not normally distributed, the p-value <0.05, so the difference analysis was continued using the Wilcoxon test.

Table 3. Results of normality test with Kolmogorov Smirnov

Variable		N P	Conclusion
Knowledge	Before	0.000	Abnormal
	After	0.000	Abnormal
Obedience	Before	0.000	Abnormal
	After	0.004	Abnormal

Based on Table 4, the p-value is 0.000 (≤ 0.05), so it is concluded that there is a difference in the level of knowledge about anemia between before and after being given health promotion and the movement of drinking iron tablets together through the WhatsApp Group, which means that health promotion and the movement of drinking iron tablets together through the WhatsApp Group are effective in increasing knowledge about anemia in female adolescents at SMPN 1 Karangrejo.

Table 4. The effectiveness of health promotion and the movement to drink iron tablets together through WhatsApp Group to increase knowledge about anemia in female adolescents at SMPN 1 Karangrejo.

		N	Mean Rank	Sum of Rank	Z	Asymp. Sig (2-tailed)
Knowledge-Before-After	Negative Ranks	92	46.50	4278.00	-8.36	0.000
	Positive Ranks	0	NaN	0.00		
	Ties	0				
	Total	92				

Based on Table 5, the p-value is 0.000 (≤ 0.05), so it is concluded that there is a difference in the level of adherence to taking iron tablets before and after being given health promotion and the movement of taking iron tablets together through the WhatsApp Group, which means that health promotion and the movement of taking iron tablets together through the WhatsApp Group are effective in increasing the adherence to taking iron tablets in female adolescents at SMPN 1 Karangrejo.

Table 5. The effectiveness of health promotion and the movement to drink iron tablets together through WhatsApp Group to increase compliance in drinking iron tablets among female adolescents at SMPN 1 Karangrejo

		N	Mean Rank	Sum of Rank	Z	Asymp.Sig (2-tailed)
Obedience-before after	Negative Ranks	88	44.50	3916.00	-8.17	0.000
	Positive Ranks	0		0.00		
	Test	4				
	Total	92				

4. DISCUSSION

4.1 Knowledge of Anemia in Adolescent Girls of SMPN 1 Karangrejo

The results of the analysis showed that the knowledge score after being given health promotion about anemia and the movement to drink iron tablets together through the WhatsApp Group for young girls was higher than before being given health promotion about anemia and the movement to drink iron tablets together through the WhatsApp Group for young girls at SMPN 1 Karangreejo.[13,23] Health promotion and the movement to drink iron tablets together through the WhatsApp Group were effective in increasing the knowledge of young girls about anemia, where students became aware and understood so that they had the awareness, willingness and ability to prevent anemia early on.[24,25]

Knowledge can be obtained in various ways. In line with[7] who stated that knowledge can be obtained from other people, in relation to this are teachers, family, friends and health workers.[16] Knowledge is often obtained from personal experience or experience

obtained from other people, good knowledge will encourage someone to display attitudes and actions that are in accordance with the knowledge that has been obtained.[17,18] Arikuento (2010) states that knowledge acquisition can be done through interviews or questionnaires that ask about the contents of the material to be obtained from research subjects or respondents in the knowledge to be obtained and adjusted to their level.[9] Anjarwati's (2020) study of young women's knowledge about how to drink TTD is related to their level of compliance in consuming iron supplements.[10]

4.2 Compliance in Taking Iron Supplements Among Female Adolescents at SMPN 1 Karangrejo

The results of the analysis showed that the compliance score after being given health promotion and the movement to drink iron tablets together through the WhatsApp Group was higher than before being given health promotion and the movement to drink iron tablets together through the WhatsApp Group. Health promotion and the movement to drink iron tablets together through the WhatsApp Group were effective in increasing the compliance of young women in drinking iron tablets. This increase in compliance was influenced by the interest of female students, where female students were motivated to drink iron tablets regularly to prevent anemia.[25,26] Compliance is acting in accordance with direct orders or regulations. People are more likely to comply with ethical rules when they have confidence that they will be treated fairly, have confidence in the leader's intentions, and consider themselves members of the organization.

According to the Indonesian Ministry of Health (2016), one of the measurements of the effectiveness of anemia prevention and treatment programs in adolescent girls and women of childbearing age is the compliance of iron pill consumption by the target population of adolescent girls and women of childbearing age.[27] The efficacy of iron (Fe) supplementation is reduced when patients do not comply with the prescribed dosage. It is recommended and recommended to take iron tablets according to the instructions.[28] It is possible that the non-compliance of young women who take iron tablets is caused by emotions of boredom or laziness, as well as the unpleasant taste and smell of iron tablets. The use of iron tablets is associated with a number of unpleasant side effects, including nausea and vomiting, discomfort or burning in the abdomen, and black colored stools.[28]

4.3 The Level of Effectiveness of Knowledge and Compliance with the Consumption of Iron Supplements After Health Promotion in Female Adolescents at SMPN 1 Karangrejo

The results of the research analysis showed that health promotion and joint iron supplementation movement through WhatsApp Group were effective in increasing knowledge about anemia and compliance with iron supplementation in female adolescents at SMPN 1 Karangrejo. The use of WhatsApp Group as a communication medium for adolescents can be concluded that WhatsApp is a simpler and more efficient medium for adolescents to exchange information. The use of WhatsApp currently makes it easier to provide education and notifications considering that most adolescents are never separated from their smartphones. In addition, teenagers can also get education through WhatsApp anytime and anywhere, they can learn more comfortably even by relaxing using a smartphone. Through WhatsApp media, it is easy for health officers, teachers and teenagers themselves to spread health promotions and blood-boosting tablet drinking movements with other schools and the community. WhatsApp is a smartphone-based messaging application that allows us to exchange messages in the form of text, voice or video without SMS costs, because WhatsApp uses the same internet data package for email, web browsing, and others so that most Indonesian people are very dependent on this application.

Based on research[12] it can be concluded that providing intervention via WhatsApp is able to increase knowledge and is effective in providing education in research.[11] Health promotion media or teaching aids can be interpreted as health promotion tools that can be seen, heard, touched, felt or smelled to facilitate communication and dissemination of information. Health promotion media are all ways or efforts to present messages or information that will be conveyed by communicators through communication media, whether through print media, electronics (television, computers, radio, etc.) or outdoor media, so that the knowledge of the target group can increase, which in the end is expected to also change their behavior in a positive way towards their health.[2]

This study is a study that only uses one group without a comparison group. This study is a pre-experimental study, so it has not been able to fully ensure the effectiveness of the intervention given to changes in knowledge and compliance, This study does not analyze the influencing factors so that the factors that influence and inhibit factors in increasing knowledge about anemia and compliance with taking iron tablets are not known.

5. CONCLUSION

Based on the research objectives and research results on increasing knowledge about anemia and the compliance of taking iron tablets using health promotion and the movement of taking iron tablets together through WhatsApp Groups among female adolescents at SMPN 1 Karangrejo, it is concluded that There is an increase in the knowledge score about anemia after being given health promotion and the movement of taking iron tablets together through WhatsApp Groups among female adolescents at SMPN 1 Karangreejo in 2024, There is an increase in the compliance score of taking iron tablets after being given health promotion and the movement of taking iron tablets together through WhatsApp Groups among female adolescents at SMPN 1 Karangreejo year 2024, Health promotion and the movement of taking iron tablets together through WhatsApp Group is effective in increasing knowledge about anemia and the compliance of taking iron tablets among female teenagers at SMPN 1 Karangreejo.

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Conflict of Interest

The authors declare no conflict of interest.

REFERENCES

1. Norris SA, Frongillo EA, Black MM, Dong Y, Fall C, Lampl M, et al. Nutrition in adolescent growth and development. The Lancet. 2022;399(10320):172–84. http://dx.doi.org/10.1016/s0140-6736(21)01590-7
2. Moore Heslin A, McNulty B. Adolescent nutrition and health: characteristics, risk factors and opportunities of an overlooked life stage. Proceedings of the Nutrition Society. 2023;82(2):142-156. http://dx.doi.org/10.1017/S0029665123002689
3. Soliman AT, Alaaraj N, Noor Hamed, Alyafei F, Ahmed S, Shaat M, Itani M, Elalaily R, Soliman N. Review Nutritional interventions during adolescence and their possible effects. Acta Biomed. 2022;93(1):e2022087. http://dx.doi.org/10.23750/abm.v93i1.12789
4. Hustrini NM, Susalit E, Rotmans JI. Prevalence and risk factors for chronic kidney disease in Indonesia: An analysis of the National Basic Health Survey 2018. Journal of Global Health. 2022;12. http://dx.doi.org/10.7189/jogh.12.04074
5. Arifin H, Chou KR, Ibrahim K, Fitri SUR, Pradipta RO, Rias YA, et al. Analysis of Modifiable, Non-Modifiable, and Physiological Risk Factors of Non-Communicable Diseases in Indonesia: Evidence from the 2018 Indonesian Basic Health Research. Journal of Multidisciplinary Healthcare. 2022;15:2203–21. http://dx.doi.org/10.2147/jmdh.s382191
6. Agency of Health Research and Development (Indonesia). Indonesia Basic Health Research 2018.
7. Karami M, Chaleshgar M, Salari N, Akbari H, Mohammadi M. Global Prevalence of Anemia in Pregnant Women: A Comprehensive Systematic Review and Meta-Analysis. Matern Child Health J. 2022;26(7):1473-1487. http://dx.doi.org/10.1007/s10995-022-03450-1
8. Abdilahi MM, Kiruja J, Farah BO, Abdirahman FM, Mohamed AI, Mohamed J, et al. Prevalence of anemia and associated factors among pregnant women at Hargeisa Group Hospital, Somaliland. BMC Pregnancy and Childbirth. 2024;24(1). http://dx.doi.org/10.1186/s12884-024-06539-3
9. Brittenham GM, Moir-Meyer G, Abuga KM, Datta-Mitra A, Cerami C, Green R, et al. Biology of Anemia: A Public Health Perspective. The Journal of Nutrition. 2023;153:S7–28. http://dx.doi.org/10.1016/j.tjnut.2023.07.018
10. Sauder KA, Harte RN, Ringham BM, Guenther PM, Bailey RL, Alshawabkeh A, et al. Disparities in Risks of Inadequate and Excessive Intake of Micronutrients during Pregnancy. The Journal of Nutrition. 2021;151(11):3555–69. http://dx.doi.org/10.1093/jn/nxab273
11. Wong A, Ho S, Olusanya O, Antonini MV, Lyness D. The use of social media and online communications in times of pandemic COVID-19. Journal of the Intensive Care Society. 2021;22(3):255-260. http://dx.doi.org/10.1177/1751143720966280
12. Allcott H, Gentzkow M, Yu C. Trends in the diffusion of misinformation on social media. Research & Politics. 2019;6(2):205316801984855. http://dx.doi.org/10.1177/2053168019848554
13. Alsabi RNS, Zaimi AF, Sivalingam T, Ishak NN, Alimuddin AS, Dasrilsyah RA, et al. Improving knowledge, attitudes and beliefs: a cross-sectional study of postpartum depression awareness among social support networks during COVID-19 pandemic in Malaysia. BMC Women's Health. 2022;22(1). http://dx.doi.org/10.1186/s12905-022-01795-x
14. Oeberst A, Kimmerle J, Cress U. What Is Knowledge? Who Creates It? Who Possesses It? The Need for Novel

Answers to Old Questions. Mass Collaboration and Education. 2016;105–24. http://dx.doi.org/10.1007/978-3-319-13536-6_6
15. Blume S. In search of experiential knowledge. Innovation: The European Journal of Social Science Research. 2016;30(1):91–103. https://doi.org/10.1080/13511610.2016.1210505
16. Fortier AM. The use of personal experiences as sources of knowledge. Critique of Anthropology. 1996:16(3), 303-323. https://doi.org/10.1177/0308275X9601600305
17. Ministry of Health of the Republic of Indonesia. Prevention and Management of Anemia in Adolescent Girls and Women of Childbearing Age (WUS). Ministry of Health of the Republic of Indonesia. 2018.
18. Karangrejo Health Center. Annual Report. 2022.
19. Stevens GA, Finucane MM, De-Regil LM, et al. Global, regional, and national trends in haemoglobin concentration and prevalence of total and severe anaemia in children and pregnant and non-pregnant women for 1995-2011: a systematic analysis of population-representative data. Lancet Glob Health. 2013;1:e16-e25. https://doi.org/10.1016/S2214-109X(13)70001-9
20. Jayasinghe C, Polson R, van Woerden HC, Wilson P. The effect of universal maternal antenatal iron supplementation on neurodevelopment in offspring: a systematic review and meta-analysis. BMC Pediatr. 2018;18(1):150. https://doi.org/10.1186/s12887-018-1118-7.
21. Bukhari IA, Alzahrani NM, Alanazi GA, Al-Taleb MA, AlOtaibi HS. Anemia in Pregnancy: Effects on Maternal and Neonatal Outcomes at a University Hospital in Riyadh. Cureus. 2022;14(7):e27238. https://doi.org/10.7759/cureus.27238
22. Alessandri G, Zuffianò A, Perinelli E. Evaluating Intervention Programs with a Pretest-Posttest Design: A Structural Equation Modeling Approach. Front Psychol. 2017;8:223. https://doi.org/10.3389/fpsyg.2017.00223
23. Khani Jeihooni, A., Hoshyar, S., Afzali Harsini, P. et al. The effect of nutrition education based on PRECEDE model on iron deficiency anemia among female students. BMC Women's Health. 2021;21:256. https://doi.org/10.1186/s12905-021-01394-2
24. Andrade C, Menon V, Ameen S, Kumar Praharaj S. Designing and Conducting Knowledge, Attitude, and Practice Surveys in Psychiatry: Practical Guidance. Indian Journal of Psychological Medicine. 2020;42(5):478-481. https://doi.org/10.1177/0253717620946111
25. Skolmowska D, Głąbska D, Kołota A, Guzek D. Effectiveness of Dietary Interventions to Treat Iron-Deficiency Anemia in Women: A Systematic Review of Randomized Controlled Trials. Nutrients. 2022;14(13):2724. https://doi.org/10.3390/nu14132724
26. Charlebois E, Pantopoulos K. Nutritional Aspects of Iron in Health and Disease. Nutrients. 2023;15(11):2441. https://doi.org/10.3390/nu15112441
27. Sari P, Judistiani RTD, Herawati DMD, Dhamayanti M, Hilmanto D. Iron Deficiency Anemia and Associated Factors Among Adolescent Girls and Women in a Rural Area of Jatinangor, Indonesia. Int J Womens Health. 2022;14:1137-1147. https://doi.org/10.2147/IJWH.S376023
28. van Zutphen KG, Kraemer K, Melse-Boonstra A. Knowledge Gaps in Understanding the Etiology of Anemia in Indonesian Adolescents. Food and Nutrition Bulletin. 2021;42(1_suppl):S39-S58. https://doi.org/10.1177/0379572120979241