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Effect of Health Education and Monitoring of Iron Supplementation on Knowledge, Hemoglobin Levels and Incidence of Dysmenorrhea in Adolescents

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Abstract

Background: Anemia is a health and nutrition problem in Indonesia during the First 1000 Days of Life period which is the focus of attention because it does not only have an impact on morbidity and mortality in mothers and children, but also has permanent consequences for the quality of life of individuals into adult. **Aims:** The aims of this research is to see the influence between health education and monitoring of Iron supplementation on knowledge, hemoglobin levels and the incidence of dysmenorrhoea in adolescents. **Methods:** The research method used is pre-experimental quantitative research with a One-Group Pretest-Posttest design. Sampling using cluster random sampling. The sample size in this study was 133 respondents. Data collection used knowledge questionnaires, observation sheets for examination of hemoglobin
levels and the incidence of dysmenorrha. Data were analyzed using the Wilcoxon matched pairs test at the confidence level (0.05) and Regresi Logistic. **Results:** The results showed the low hemoglobin level (Hb <12g/dl) before intervention 25.2% and decreased to 20.4% after 1 month of intervention. The results of logistic regression analysis show that factors affecting the increase in Hb levels, namely initial Hb status ($p<0.05$; OR=2.72; CI95%=2.60-7.35). **Conclusion:** Knowledge and Hemoglobin levels in adolescents have increased after being given the intervention. The incidence of dysmenorrhea as measured by the level of pain also
decreased more than before the treatment.

Keywords:*health education, iron supplementation, knowledge, hemoglobin level, dysmenorrhea*

1. Introduction

Health and nutrition problems in Indonesia in the First 1000 Days period Life (HPK) is the focus of attention because it does not only have an impact on morbidity and mortality in mothers and children, but also has consequences for the quality of life of individuals that are permanent until adulthood. The emergence of nutritional problems in children under two years of age is closely related to the health and nutrition preparation of a woman to become a prospective mother, including rematri. Rematri who suffer from anemia when they become pregnant women are at risk of giving birth to Low Birth Weight (LBW) and stunting. Iron nutritional anemia is one of the main causes of anemia, including due to insufficient intake of food sources of iron (Kemenkes RI, 2018).

Anemia is a health problem that causes sufferers to experience fatigue, fatigue and lethargy so that it will have an impact on their creativity and productivity. Not only that, anemia also increases disease susceptibility as adults and gives birth to a generation with nutritional problems. The incidence of anemia in Indonesia is still quite high. Based on the 2018 Riskesdas data, the prevalence of anemia in adolescents is 32%, meaning that 3-4 out of 10 adolescents suffer from anemia. This is influenced by the habit of nutritional intake that is not optimal and lack of physical activity. Female adolescents during puberty are very at risk of developing iron nutritional anemia. This is due to the large amount of iron lost during menstruation. In addition, it is exacerbated by a lack of iron intake, where iron in female adolescents is needed by the body to accelerate growth and development. During pregnancy, the need for iron increases threefold because there is an increase in the number of maternal red blood cells to meet the needs of the formation of the placenta and fetal growth. Iron supplementation is significantly associated with a reduced risk of anemia (WHO, 2011; 2016).

Anemia is still a problem the world's greatest health invading women of childbearing age, pregnant women, early childhood as well as teenagers. World Health Organization (WHO) estimates that 42% of children under 5 years and 40% of pregnant women worldwide have anemia. In 2013, there were 2 adolescents with anemia 37.1%, whereas in 2018 it happened increased to 48.9% in the age range of 15-24 years and 23-34 years (Waluyo, 2022)

Minister of Health Ir. Budi Gunadi Sadikin said that healthy youth is an investment in the nation's future. The younger generation has an important role to continue the development and development of the nation. Teenagers will really determine whether Indonesia can move up to the world class in the future, that's why countries that have a large population of young people will become big countries in the future. For this reason, the health and nutritional status of adolescents must be prepared early on, so that Indonesia's prediction of getting a demographic bonus in the next 2030 can produce productive, creative and competitive next generations of the nation. One of the health problems that has become the focus of the government is the prevention of anemia in adolescents (RI Ministry of Health, 2021).

WHO recommendations at the 65th World Health Assembly (WHA) agreed on action plans and global targets for maternal, infant and child nutrition, with a commitment to halve (50%) the prevalence of anemia in WUS by 2025. The Ministry of Health has carried out specific interventions by administering Blood Supplement Tablets (TTD) to teenage girls and pregnant women. In addition, the Ministry of Health is also carrying out prevention of anemia through education and promotion of balanced nutrition, fortification of iron in food ingredients and implementing clean and healthy living. Following up on these recommendations, the Indonesian government intensified the prevention and management of anemia in rookies and WUS by prioritizing the provision of iron supplements through school institutions. Giving iron tablets at the right dose can prevent anemia and increase iron reserves in the body. TTD is given to young women ranging from 12-18 years old at educational institutions (junior high school and high school or equivalent) through UKS/M. The preventive dose is by giving one

blood supplement tablet every week for 52 (fifty two) weeks (RI Ministry of Health, 2020).

Therefore, the authors are interested in conducting research on female students at the Tartilul Qur'an Al Munawwaroh Islamic Boarding School with the title "Effect of Health Education and Monitoring of Iron Supplementation on Knowledge, Hemoglobin Levels and Incidence of Dysmenorrhea in Adolescents".

2. Materials and methods

2.1 Materials

This research was conducted on female students aged 13-19 years at the Tartilul Qur'an Al Munawwaroh Gresik Islamic Boarding School as many as 133 people. The independent variables in this study were health education and monitoring of iron consumption, while the dependent variables were knowledge, hemoglobin levels and incidence of dysmenorrhea. The question of this research is how the effect of health education and monitoring of iron supplementation on knowledge, hemoglobin levels and the incidence of dysmenorrhea.

2.2 Data collection procedures

The research was conducted using a quasi-experimental pre-post intervention design on study effectiveness. Respondents were taken using cluster random sampling technique. Respondents received knowledge questionnaires and observation sheets for examining hemoglobin levels and dysmenorrhea before and after being given health education and monitoring iron supplementation.

Briefly, the data collection procedure is as follows. The first is socialization to the population about the data collection process. second, the process of filtering the population is carried out so that the number of samples according to the calculation is obtained. after the number of samples was fulfilled, the respondents were given questionnaires about knowledge and were examined for hemoglobin levels and conducted interviews about the incidence of dysmenorrhea. These interventions were carried out before and after being given health education and monitoring of iron supplementation. The intervention was in the form of giving iron supplements in tablet form (300 mg Fe Fumarate and 2 mg folic acid). Subjects were given iron supplementation at a dose of once a day during the menstrual period.

2.3 Research Ethics

This research has passed the ethical test and has received an ethical approval letter from the health research ethics committee of the Nahdlatul Ulama University in Surabaya with a decree number: 0248/EC/KEPK/UNUSA/2023.

2.4 Data analysis

Univariate analysis is used to determine the characteristics of respondents, data which can be obtained from the questionnaire is processed and presented in the form of a frequency distribution table and the percentage of each variable. The research data is described in the form of tables, graphs and narratives to evaluate the proportion of each. Multivariate analysis was used in this study to analyze the effect of health education and monitoring of iron supplementation on Knowledge, Hemoglobin Levels and Incidence of Dysmenorrhea. The data that has been collected is processed using a binary logistic regression test in SPSS version 24

3. Results and discussion

3.1 Distribution of respondent characteristics

Table 1. The distribution of the frequency of respondents based on the age of the respondents at the Tartilul Qur'an Al Munawwaroh Islamic Boarding School

No	Age	Frequency	Percentage (%)
1.	Early adolescents (11-13 years old)	41	30,9
2.	middle adolescents (14-16 years old)	53	39,8
3.	late adolescents (17-20 years old)	39	29,3
	Total	133	100,0

Based on table 1 it shows that out of 133 respondents, most of the respondents (38.9%) fall into the category of middle adolescents.

Table 2. Distribution of the frequency of respondents based on the education of the respondents at the Tartilul Qur'an Al Munawwaroh Islamic Boarding School

No	Education	Frequency (n)	Percentage (%)
1.	Basic	80	60,2
2.	Middle	53	39,8
	Total	133	100

Table 2 shows that out of 133 respondents, the majority (60.2%) took basic education.

3.2 Effect of Health Education and Monitoring of Iron Supplementation on knowledge

Table 3. Frequency distribution of respondents based on knowledge before and after health education intervention and iron supplementation

Knowledge	Before	After	p
Average ± SD	4.25 ± 2.21	8.36 ± 3.87	0,00*
Minimum-maximum Knowldege	2.00-6.00	6.00-10.00	0,00*
Good	20 (15.1)	84 (63.2)	0.01*
Enough	49 (36.8)	33 (24.8)	0.01*
Less	64 (48.1)	16 (12)	0.01*

Prior knowledge of health education interventions and iron supplementation, most of the 48.1% of 133 subjects had less knowledge. whereas after being given health education and iron supplementation the knowledge of the respondents increased to 63.2% with good knowledge

Results of the study that there has been a change in knowledge as expected from health education where from not knowing to knowing and expected this knowledge can change students' attitudes towards free sex. As for health education (counseling health) is an educational activity carried out by spreading messages, instill belief so that people are not only aware, know, and understand, but also willing and able to carry out a recommendation that has to do with health. Enhancement This knowledge is due to the provision of information, in which there is a learning process. The learning process according to Pakpahan et al., (2021) can be interpreted as a process of adding knowledge, understanding, and skills that can be acquired through experience or conducting studies (teaching and learning process). By learning, individuals are expected to be able explore what is hidden in him by encouraging him to think and develop his personality by freeing himself from his ignorance. This matter in line with the purpose of conducting health education put forward by namely increasing public knowledge in the field of health, achieving behavior change individuals, families, and communities as the main target of health education in fostering healthy behavior and a healthy environment and play an active role in efforts to increase the degree optimal health in accordance with the concept of healthy living so as to reduce the number pain and death. This can be applied by respondents and families efficiently and efficiently by avoiding replaceable aspects (Suprapto et al., 2021).

This shows that health education is very influential on knowledge where there is a change in knowledge as expected from education health, from not knowing to knowing. This result is also supported by research by Hidayati et al., (2020) that there is a significant effect of health education on knowledge, and it is hoped that later this knowledge can change the attitude of adolescents towards iron supplementation because one's motivation is influenced by the high

knowledge obtained from education health that has a positive impact on behavior change as a result of the learning process because of learning is the process of changing from not knowing to knowing. There is an increase in knowledge Respondents regarding iron supplementation in this study were also influenced by individual factors, where Respondents are teenagers who have a sense of curiosity high so that they are still eager to learn to answer their curiosity the. According to Erikson quoted by (Zaini, 2018) that self-identity is what teenagers are looking for in the form of an attempt to explain who he is and what is his role in society with have the will, enthusiasm and motivation to learn high in accordance with the stage development, namely formal operations where adolescents already have a frame of mind and good reception so that it allows teenagers to easily receive information. Change community behavior so that they always live according to health norms are carried out through strategies for providing information/lectures and discussion and participation (Suprapto, 2021).

This is in line with the stated aim of conducting health education by (Suliha & Resnayati, 2019) that increases skills both knowledge, attitude as well as skills in individuals, groups and communities to achieve a healthy life optimally Health education is a learning process in individuals, groups or society from not knowing about the value of health to knowing, and from not being able to cope health problems become independent. This result is also supported by research (Suprapto, 2022) that the provision of health education can improve the attitudes of respondents such as increasing knowledge. This is because in health education contained elements of communication and especially in efforts to change individual attitudes, strategies that can be used is a persuasive strategy. Persuasive is an effort to change individual attitudes by incorporating new ideas, thoughts, opinions and even facts through communicative messages (Susanti & Widyoningsih, 2019).

3.3 Effect of Health Education and Monitoring of Iron Supplementation on Hemoglobin Levels

Table 4. Frequency distribution of respondents based on hemoglobin levels before and after health education intervention and iron supplementation

Hemoglobin Level	Before	After	p
Average ± SD	13.25 ± 1.24	13.75 ± 1.63	0,00*
Minimum-maximum hemoglobin level	10.70-15.40	11.30-16.20	0,00*
< 12 gr/dl	25,2	20,4	0,00*
³ 12 gr/dl	74,8	79,6	0,00*

Low hemoglobin levels before the supplementation intervention was given by 25.2% of 133 subjects. The prevalence of low hemoglobin levels decreased to 20.4% after the iron supplementation program, which decreased by 4.8%. There was a significant difference in hemoglobin levels before and after the intervention ($p<0.05$). In addition, 59.7% of subjects experienced an increase in Hb levels with an average increase of ± 1.24 g/dl, the average Hb level after supplementation was 13.75 ± 1.63 g/dl. The results of the average hemoglobin levels before and after there was a significant difference ($p <0.05$) (Table 4).

The iron supplementation program for female adolescents is one of the efforts made by the Government to reduce the prevalence of anemia which is still high in female adolescents which in turn is expected to reduce the prevalence of anemia in pregnant women. This iron supplementation program for young women is carried out by administering iron supplements during the menstrual period. In addition, the coverage of Fe administration to young women at junior high and high school levels was 20% of the total youth. This program is still not running effectively and many young women do not know about iron supplementation to prevent

anemia. This iron supplementation program for young women runs concurrently with a stunting reduction program.

An indicator that can be used to assess the success of this program is an increase in Hb levels. Anemia in young women will affect many things related to reproductive health in the future. Research conducted by Susanti in Tasikmalaya Regency with a program of giving iron tablets weekly and 10 tablets during menstruation experienced an increase in Hb levels of 0.48 ± 1.04 g/dl. 8 A similar program conducted on women of childbearing age in Vietnam experienced an increase in Hb levels during the 3 months of intervention, namely an average increase of 9.6 g/dl. Unlike the case with the iron supplementation program conducted in Bekasi City for junior and senior high school students, there was no increase in Hb levels after being given supplementation.

3.4 *The Effect of Health Education and Monitoring of Iron Supplementation on the Incidence of Dysmenorrhea*

Table 5. Frequency distribution of respondents based on incidence of dysmenorrhea before and after health education intervention and iron supplementation

Incidence of Dysmenorrhea	Before	After	p
Average ± SD	4.25 ± 2.21	8.36 ± 3.87	0,00*
Minimum-maximum hemoglobin level	0.00-10.00	0.00-10.00	0,00*
No Pain	17 (12.8)	36 (27.1)	0.00*
Mild	58 (43.6)	79 (59,3)	0.00*
Moderate	42 (31.6)	12 (9.1)	0.00*
Severe	16 (12)	6 (4.5)	0.00*

The incidence of dysmenorrhea before the health education intervention and iron supplementation was given was 43.6% of 133 subjects experiencing mild dysmenorrhea pain. Whereas after the intervention of health education and iron supplementation, the level of dysmenorrhea pain decreased.

This is in line with the research that carried out by Athiyatul Maula (2017), namely all respondents with category Fe (Iron) less 93% experienced primary dysmenorrhea. In addition to research Hidayati (2016) also stated that There is a relationship between iron intake and the incidence of dysmenorrhea in female students at Batik Vocational Schools Surakarta. Respondents who have intake of Fe (Iron) is less, the greater the chance experience dysmenorrhea than the respondents who have normal Fe (Iron) intake. Fe (Iron) has a role in hemoglobin formation. Insufficient intake Fe (Iron) can cause disturbances formation of hemoglobin, so the amount hemoglobin in red blood cells will reduce. Low hemoglobin condition on red blood cells will cause anemia. In addition, according to Handayani (2011) hemoglobin It also functions to bind oxygen will be distributed throughout the body. If less hemoglobin, then oxygen is bound and distributed throughout the body only a little, As a result, oxygen cannot be delivered to blood vessels in the reproductive organs experiencing vasoconstriction so it will cause pain.

4. Conclusion

Knowledge and Hemoglobin levels in adolescents have increased after being given the intervention. The Program for Prevention and Management of Iron Nutrition Anemia is considered still not yet effective, because of knowledge and adherence rates from iron supplementation still low. Suggestions for the program, namely the next iron supplementation

program can be done by routinely during menstruation in order to reduce the reasons for teenagers to forget to consume. The incidence of dysmenorrhea as measured by the level of pain also decreased more than before the treatment

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Conflict of interest

There is no conflict of interest for this article manuscript.

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