Adolescent Knowledge of Anemia and Iron Supplement Consumption Before and After Health Education

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Abstract

The purpose of this study was to describe adolescent knowledge of iron supplement anemia and consumption before and after health education. This research was quantitative with a quasi-experimental design using pre-posttest without control. The material presented in the form of lectures and videos on 119 students at 16 senior high school in Pekanbaru. Pre and Post-test to evaluate the level of knowledge of adolescents. The results showed that before counseling 35.5% of adolescents had never consumed iron supplements. After the intervention, the increase in correct answers ranged from 0.8 to 21.9 percent, with the highest rating being on vitamins that help with iron absorption, beverages that inhibit iron absorption and cause anemia. The average score for adolescent knowledge before intervention is 6.46. The average score after intervention increased to 7.27. T-Test results showed significant differences in knowledge scores before and after the intervention. Teenage Health Care Services need to be established as adolescent health counselors so that they can motivate other students in adolescent reproductive health, especially in consuming iron supplements.

Keywords: *Anemia, Adolescent, Knowledge, Iron Supplement.*

A.   INTRODUCTION

Anemia is a nutritional problem that exists when red blood cells lack iron (hemoglobin) (Kementerian Kesehatan Republik Indonesia, 2016). The prevalence of anemia is very high (ranging between 80-90%) in preschool children, adolescent girls, pregnant and lactating women (National Nutrition Monitoring Bureau (NNMB), 2006; Park, 2007). Based on the results of basic Health Research (Riskesdas 2013 and 2018) the prevalence of anemia in Indonesia increased from 37.1% in 2013 (Balitbangkes Kemenkes RI, 2013) to 48.7% in 2018 (Balitbangkes Kemenkes RI, 2018). Based on Riskesdas 2018, the prevalence of anemia in Riau province is 21.1%. This figure exceeds 20 % as a moderate public health problem (WHO, 2011).

Adolescence is a transitional phrase, with fast growth and strong nutritional needs fulfilled (Singh et al., 2019). Anemia among adolescent girls occurs due to the increased need for iron to compensate for iron loss caused by menstruation(Angrainy et al., 2019), coupled with poor food intake, high infection rates and worm infestations (Kamat & Sengupta, 2019).

The approach taken to prevent anemia is by giving Iron supplement tablets to junior and high school students. Based on WHO recommendations in 2011, efforts to combat anemia in adolescent girls and adult women concentrate on promotional and

preventive measures, including iron supplementation, iron-rich food intake, and iron and folic acid fortification of foods (Kementerian Kesehatan Republik Indonesia, 2016). One of the government's programs is to provide iron supplements for teenage girls. Based on the result of Riskesdas (2018), teenage girls who receive an iron supplement are 76.2% composed of 80.9% who receive iron supplements at school and 19.1% who do not receive iron supplements from school. Students who did not obtain any iron supplements were 23.8%. The coverage of iron tablets for young women in the province of Riau is 23.86%, it has not reached the 2018 Strategic Plan goal of 15% (Dinas Kesehatan Provinsi Riau, 2018).

Although the government has carried out various programs by providing supplements to meet the iron requirements, the Recommended Dietary Allowances (RDA) for micronutrients are not only met by diet or supplements. Adequate and sustainable improvements in diet and behavior are needed to reduce micronutrient malnutrition (Singh et al., 2019). It is important to determine the level of awareness of adolescents in order to improve intervention strategies so that the interventions being implemented can be sustainable. The prevalence of anemia depends on the knowledge of adolescents about anemia prevention (Kakkar et al., 2010). Therefore, the purpose of this study was to find out the description of adolescent knowledge about anemia and the consumption of iron supplements before and after health education at 16 high school students in Pekanbaru City.

B.   METHOD

This research was a quantitative study with a quasi-experimental design (The One Group Pretest-posttest Design) without control. The treatment given was giving the material in the form of lectures using PowerPoint slides, presenting health posters and playing videos. The data were obtained in January 2020. The sample consists of 119 senior high school students 16 who attended health education. To determine the extent of adolescent knowledge of the information received, questionaires were distributed before and after the information was supplied. The questions on the pre-test questionaire are the same as the questions on the post-test questionnaire. The variables collected were student characteristics and adolescent knowledge. Adolescent knowledge includes causes of anemia, symptoms of anemia, iron-absorbing supplements, iron-inhibiting beverages, and the benefits of blood supplement tablets. The knowledge score is obtained by adding all answered correctly divided by the number of questions on the questionnaire. Univariate and bivariate data analysis was conducted with the T-Test (Paired Samples T-Test) to determine variations in the scores of knowledge before and after the intervention. The T-Test is used for normally distributed data. The Marginal Homogeneity Test was used to determine the differences in each item before and after the education was given.

C. RESULT AND DISCUSSION

1. Adolescent Characteristics

Most of the students are female (78.2%) and most father's education is Senior high school (53.8%). Likewise with maternal education where the senior high school is the highest percentage (45.4 percent). The father's occupation with the highest percentage is labor (28.6%), self-employed (22.7%), and private employees (19.3%). In general, the work of mothers is housewives (89.1%). Sociodemographic characteristics of adolescents are presented in Table 1.

Table 1 Sociodemographic Characteristics of Adolescents at 16 Senior High School in Rumbai Pekanbaru in 2020

Characteristics	Category	n (119)	%
Gender	Female	93	78.2
	Male	26	21.8
Father's Education	Elementary school	20	16.8
	Junior High	24	20.2
	High school	64	53.8
	University/College	11	9.2
Mother's Education	Elementary school	24	20.2
	Junior High	28	23.5
	High school	54	45.4
	University/College	13	10.9
Father's occupation	Government employees	5	4.2
	Private employees	23	19.3
	entrepreneur	27	22.7
	Farmers / Fishermen	22	18.5
	Retired	8	6,7
	Labor	34	28.6
Mother's job	PNS / TNI / POL Government	5	4.2
	employees RI	2	1.7
	Private employees	6	5,0
	entrepreneur	106	89.1
	Housewife		

2. Take Iron Supplements

The iron supplement behavior in female students is shown in Figure 1. The female students who have never taken iron tablets are 35.5%.
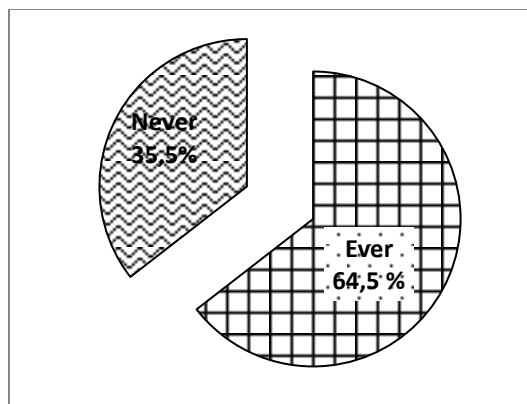
Figure 1 Consumption of Iron Tablets in Female Student at 16 Senior High School Rumbai Pekanbaru in 2020

3. Adolescent Knowledge

The results showed that before the intervention, adolescents incorrectly answered certain questions more than 50% induced anemia (57.1%), symptoms of anemia which included dizzy eyes (79.0%), cold hands and feet (68.1%), rapid heart palpitations (80.7%), and nausea (88.2%). Similarly, the question of vitamins assisting with iron absorption (79.0%) and beverages inhibiting iron absorption (63.0%). After the intervention, the percentage of correct answer ranged from 0.8 to 21.9% increased. The vitamin that improves iron absorption was the highest percentage increase in the correct answer. The results of the Marginal Homogeneity Test showed that there was a significant difference in adolescent knowledge before and after the intervention (p < 0.05), with the exception of questions regarding symptoms of anemia, including dizzy eyes (p= 0.083), exhausted and lethargic (p= 0.083) and dizziness (0.317) (Table 2).

Table 2 Pretest and Posttest Results for Anemia Prevention in Adolescents at 16 Senior High School in Rumbai, Pekanbaru City in 2020

Question	Category	Pretest		Posttest		Difference (%)	Pvalue (Marginal Homogenity)
		n (119)	%	n (119)	%		
Causes of anemia	False	68	57.1	49	41.2	15.9	<0.001
	Right	51	42.9	70	58.8		
symptoms of Anemia							
Dizzy eyes	False	25	21.0	22	18.5	2.5	0.083
	Right	94	79.0	97	81.5		
Cold hands and feet	False	81	68.1	76	63.9	4.2	0.025
	Right	38	31.9	43	36.1		
Heart beats fast	False	96	80.7	81	68.1	12.6	<0.001
	Right	23	19.3	38	31.9		
Exhausted and Lethargic	False	17	14.3	14	11.8	2.5	0.083

	Right	102	85.7	104	88.2		
Pale eyelids	False	53	44.5	44	37.0	7.5	0.003
	Right	66	55.5	75	63.0		
Dizzy	False	40	33.6	39	32.8	0.8	0.317
	Right	79	66.4	80	67.2		
Nausea	False	105	88.2	90	75.6	12.6	<0.001
	Right	14	11.8	28	24.4		
Vitamins that help absorption of Iron	False	94	79.0	68	57.1	21.9	<0.001
	Right	25	21.0	51	42.9		
Beverages which inhibit the absorption of iron	False	75	63.0	56	47.1	15.9	<0.001
	Right	44	37.0	63	52.9		
Iron supplements are given to adolescents to prevent anemia	False	23	19.3	17	14.3	5,0	0.014
	Right	96	80.7	102	85.7		

4. The Difference in Knowledge Score before and After the Health Education

Table 3 shows that there is a significant difference in the knowledge scores of adolescents before and after the intervention (pvalue < 0.001). The difference in score is 1.36 points with a standard deviation of 1.12 points.

Table 3 Adolescent Knowledge Differences Score Before and After of Health Education

Health Education	Knowledge Score	delta	Pvalue (Paired Samples T Test)
	Mean (SD)	Mean (SD)	
Before	7,80 (2,56)	1.36 (1.12)	<0.001
After	6.44 (2.67)		

Based on the study results, it was found that 35.5% of teenage girls never even had iron supplements consumed. Iron supplementation is one of the programs of the government to resolve anemia. The granting of iron tablets is an implementation of the circular letter from the Director General of Public Health, Ministry of Health of the Republic of Indonesia Number HK.03.03 / V/0595/2016 concerning the provision of iron tablets (Kementerian Kesehatan Republik Indonesia, 2016). Global recommendations recommend that for areas with a prevalence of anemia ≥ 40%, giving iron tablets to adolescent girls and women of childbearing age consists of 30-60 mg of elemental iron given every day for 3 consecutive months in 1 year (WHO, 2016). For areas with a prevalence of 20% anemia, iron supplementation consisting of 60 mg elemental iron and 2.800 mcg folic acid was given for 3 months once a week and the next 3 months were not given (WHO, 2011).

The iron supplement program has been routinely given to female students to consume iron tablets simultaneously. However, the awareness to consume iron tablets

is still low. This was caused by the discomfort of the students over the effects of iron tablets, which induced nausea. A qualitative study stated that the effects of adolescent girls after consuming iron tablets are nausea, vomiting, and dizziness (Fitriana & Pramardika, 2019).

Based on the study results, it was found that 18.6% of adolescents did not know the iron supplements benefits. Adolescent knowledge will create an understanding of the importance of iron supplements being consumed. A number of teenagers also have poor knowlegde of anemia. More than 50% of adolescents have poor knowledge of anemia (Angadi & Ranjitha, 2016; Premaletha & Safeena, 2019). Research Singh et al., found that iron supplements are provided weekly and intensive interventions in health education have an effect on the young women 's knowledge, attitudes, activities and health-seeking behaviors (Singh et al., 2019). Anemia prevention intervention strategies include increasing knowledge among adolescents through health education and iron supplementation programs (Mengistu et al., 2019)

Adolescent knowledge is also still poor about symptoms of anemia. Of the seven signs of anemia identified, the majority of adolescents answered that they were exhausted, exhausted and lethargic. More than 50% of adolescents lack knowledge of symptoms of anemia (Angadi & Ranjitha, 2016; Mengistu et al., 2019). Adolescents need to know about the symptoms of anemia in order to predict themselves and take further measures to prevent and treat anemia when anemia occurs.

Adolescent knowledge about vitamins that can help absorb iron is still weak. There was an improvement in knowledge by 21.9% after the intervention. Research conducted by Kaimudin et al found that 47.2% of adolescents consumed less Vitamin C. In that study, 55.3% of adolescents who did not consume Vitamin C had anemia (Kaimudin et al., 2017). Through offering health education in the form of counseling, it is hoped that it will improve understanding and boost adolescent awareness of high-vitamin C and iron adolescent diets. Research states that 46% of adolescents do not know the relationship between vitamin C and iron absorption (Kamat & Sengupta, 2019).

In addition to the vitamins that help absorb iron, beverages that inhibit iron absorption, namely coffee and tea, have also been questioned. The polyphenols in coffee and tea are the main inhibitors of iron absorption (Marina et al., 2015). Adolescent low knowledge is supported by Kamat and Sengupta research, which states that 46% of adolescents do not know the relationship between coffee and tea drinking habits that inhibits iron absorption (Kamat & Sengupta, 2019). Adolescents who usually drink tea are at twice the risk of anemia compared to adolescents who do not drink tea (Fitrianti & Miko, 2019). Adolescent habits need to be modified, especially younger women who consume tea along with meal times. If adolescents want to consume foods and drinks that inhibit iron absorption, they should consume these foods or drinks two hours

before or after consuming iron supplements (Kementerian Kesehatan Republik Indonesia, 2016)

Iron supplements to prevent anemia will be successful if adolescents have knowledge of the benefits of iron supplement and the impact it will have if anemia occurs. Knowledge of an object involves two aspects, namely positive and negative. Those two factors will decide the attitude of a person, the more positive aspects of the object that are identified, the more positive the attitude towards a specific object will be (Notoatmodjo, 2014). Iron supplements consumption awareness cannot be separated from the provision of educational and communication information conducted by teachers, health workers and friends. Research conducted by Yusoff et al shows that three-month health education in high school will improve knowledge, attitudes and hemoglobin levels (Yusoff et al., 2012). Likewise, Pardosi's research, by providing booklets on anemia to adolescent girls was effective in increasing knowledge, attitudes and hemoglobin levels (Pardosi, 2019). Health education initiatives are required to raise awareness among young females and to disseminate information about anemia prevention and control (Pareek & Hafiz, 2015). Intensive health education interventions have an impact on increasing the knowledge, attitudes, practices and health-seeking behavior of adolescents. Schools can be relevant, effective and efficient places to implement comprehensive health educational programs, making it easier to reduce the burden of diseases (Singh et al., 2019).

The results showed that there were significant differences in the knowledge scores of adolescents before and after intervention (pvalue < 0.001). Health education in the form of counseling should be carried out periodically and consistently to further increase student knowledge scores. Research in India found that consumption of iron tablets and health education interventions for school students intensively had an impact on increasing the knowledge, attitudes, practices and behavior of adolescents in health-seeking, especially anemia (Singh et al., 2019).

Health education through counseling can be carried out by empowering adolescents to understand the importance of preventive measures and the steps taken to prevent anemia in adulthood. Training programs should be organized to make adolescents aware of the importance of iron-rich dietary sources for adolescents, and specific issues and information about anemia such as the adverse effects of drinking tea and coffee on reducing iron absorption (Pareek & Hafiz, 2015). Further research is needed to determine adolescent adherence to the consumption of iron tablets which are routinely given every week by the health center and its effect on preventing anemia in adolescent girls.

D. CONCLUSION

Adolescent knowledge on anemia has improved after following health education. A Teenage Health Care Service needs to be set up as a youth health

counselor so that it can empower other students in adolescent reproductive health, particularly in iron tablet consumption. Further studies are required to determine the adherence level of iron tablets consumed by adolescent girls and their effect on the incidence of anemia in adolescent girls.

ACKNOWLEDGMENT

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