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The effect of giving blood supplement tablets to adolescent girls on increasing haemoglobin levels in Cirebon District to prevent stunting and develop a quality generation in Cirebon District

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ABSTRAK

Latar Belakang : *Beberapa kondisi yang mempengaruhi kesehatan remaja, termasuk kesehatan reproduksi remaja adalah masalah gizi. Masalah gizi yang terjadi pada remaja antara lain anemia dan kekurangan energi kronis. Tantangan anemia pada remaja putri dari 37,1% pada Riskedas 2013 yang justru meningkat menjadi 48,9% pada Riskesdas 2018, dengan proporsi anemia pada kelompok umur 15-24 tahun dan 25-34 tahun. Hal-hal tersebut jelas mempertegas bahwa kesehatan remaja akan menentukan keberhasilan pembangunan kesehatan, terutama dalam upaya mencetak kualitas generasi penerus bangsa di masa depan. Anemia pada remaja dapat disebabkan oleh kurangnya asupan zat gizi makro dan zat gizi mikro. Kekurangan zat gizi mikro dalam tubuh dapat menyebabkan anemia. Anemia memiliki beberapa jenis, salah satunya adalah anemia gizi. Salah satu penyebab anemia gizi adalah kekurangan zat besi. Berdasarkan Permenkes RI No. 88 Tahun 2014, pemberian tablet suplemen darah merupakan salah satu upaya penting dalam pencegahan dan pengendalian anemia karena merupakan cara yang efektif untuk mencegah anemia akibat kekurangan zat besi dan kekurangan asam folat.*

Tujuan : *Untuk mengetahui pengaruh pemberian tablet suplemen darah pada remaja putri terhadap peningkatan kadar hemoglobin sehingga dapat diketahui apakah remaja putri mengalami anemia atau tidak.*

Metode : *Penelitian ini menggunakan desain eksperimen semu, dimana terdapat perlakuan pemberian tablet suplemen darah selama 3 bulan kepada siswa SMP yang pernah mengalami menstruasi yang kadar hemoglobinnya sudah diperiksa terlebih dahulu. Setelah pemberian tablet darah selama 3 bulan, dilakukan pengecekan ulang kadar hemoglobin yang melibatkan 20 siswi SMP Kabupaten Cirebon.*

Hasil : *Rata-rata kadar hemoglobin sebelum diberikan perlakuan adalah 11,40 gram% dengan standar deviasi 1,7634. Sedangkan rata-rata kadar hemoglobin setelah diberikan perlakuan meningkat 2,67 gram% menjadi 14,07 gram% dengan standar deviasi 1,3719. Hasil uji statistik dengan uji Dependent T, p=0,000, berarti pada alpha 5% hipotesis akhir diterima. Terdapat perbedaan kadar hemoglobin yang bermakna sebelum dan diberikan perlakuan (pemberian tablet suplemen darah). Artinya ada pengaruh pemberian tablet suplemen darah pada remaja putri terhadap peningkatan kadar hemoglobin.*

Kesimpulan : *Ada pengaruh pemberian tablet suplemen darah pada remaja putri terhadap peningkatan kadar hemoglobin.*

KATA KUNCI : *remaja; anemia; stunting; tablet suplemen darah; kadar hemoglobin*

ABSTARCT

Background : *Several conditions that affect adolescent health, including adolescent reproductive health are nutritional problems. Nutritional problems that occur in adolescents include anemia and chronic lack of energy. The challenge of anemia in young women from*

37.1% in Riskedas 2013 which actually increased to 48.9% in Riskesdas 2018, with the proportion of anemia in the age group 15-24 years and 25-34 years. These things clearly reinforce that adolescent health will determine the success of health development, especially in an effort to print the quality of the nation's next generation in the future. Anemia among adolescents can be caused by a lack of macronutrient and micronutrient intake. Anemia has several types, one of which is nutritional anemia. One of the causes of nutritional anemia is iron deficiency. Based on Permenkes, RI No. 88, 2014, giving blood supplement tablets is one of the important efforts in the prevention and control of anemia because it is an effective way to prevent anemia due to iron deficiency and folic acid deficiency. Blood supplement tablets are tablets that are given to the fertile and pregnant women.

Objectives : *To determine the effect of giving blood supplement tablets to adolescent girls to increase hemoglobin levels, so, it can be seen whether female adolescents are anemic or not.*

Methods*: This study uses a quasi-experimental design, where there is a treatment of giving blood supplement tablets for 3 months to junior high school students who have experienced menstruation whose hemoglobin levels were previously checked. After giving blood tablets for 3 months, the hemoglobin level was rechecked which involved 20 female students at Cirebon district.*

Results *: The average of haemoglobin levels before given the treatment was 11.40 grams% with a standard deviation of 1.7634. Meanwhile the average of haemoglobin levels after given the treatment was increased 2.67 grams% to 14.07 grams% with a standard deviation of 1.3719. The result of statistical tests using the Dependent T test, p=0,000, means at 5% alpha, the final hypothesis accepted. There is a significant difference in haemoglobin levels before and given the treatment (giving the blood supplement tablet). This means there is an effect of giving the blood supplement tablets to adolescent girls on increasing haemoglobin levels.*

Conclusions *: There is an effect of giving blood supplement tablets to adolescent girls on increasing haemoglobin levels.*

KEYWORD : *adolescents; anemia; stunting; blood supplement tablets; hemoglobin levels*

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INTRODUCTION

Adolescents according to the Indonesia Child Protection Law are individuals between the ages of 10-18 years, and one of large population of Indonesians (almost 20% of the total population). Adolescents are future leaders and the drivers of development (1). The adolescence's well being is one of the important aspects in the life cycle of individuals and the initial formation of healthy behaviour (2).

Several conditions that affect adolescent health, including adolescent reproductive health are nutritional problems. Nutritional problems that occur in adolescents include anemia and chronic lack of energy. Anemia is a decreasing quantity of red blood cells in the circulation or the amount of haemoglobin under normal limits (3). The challenge of anemia in young women from 37.1% in Riskedas 2013 which actually increased to 48.9% in Riskesdas 2018, with the proportion of anemia in the age group 15-24 years and 25-34 years. These things clearly reinforce that adolescent health will determine the success of health development, especially in an effort to print the quality of the nation's next generation in the future (4).

Anemia among adolescents can be caused by a lack of macronutrient and micronutrient intake. The micronutrients are needed by the body, especially by teenagers. Insufficiency of micronutrients in the body can cause anemia. Anemia has several types, one of which is nutritional anemia. One of the causes of nutritional anemia is iron deficiency (5).

In Indonesia, it is estimated that most of the anemia occurs due to iron deficiency as a result of the lack of intake of food sources of iron, especially animal food sources (heme iron). The main sources of iron are animal foods (heme iron), such as liver, meat (beef and goat), poultry (chicken, duck, birds), and fish. Iron in animal food sources (heme iron) can be absorbed by the body between 20-30%. Vegetable foods (plants) also contain iron (nonheme iron) but the amount of iron that can be absorbed by the intestines is much less than iron from animal foods. Non-heme iron (plant foods) that can be absorbed by the body is 1-10%. Examples of plant foods that are a source of iron are dark green vegetables (spinach, cassava, kale) and legumes (tempe, tofu, red beans). Indonesian people are more dominant in consuming sources of iron that come from plants. The results of the Individual Food Consumption Survey show that 97.7% of the Indonesian population consumes rice (in 100 grams of rice it only contains 1.8 mg of iron). Therefore, in general, Indonesian people are vulnerable to the risk of suffering from Iron Nutrient Anemia (AGB) (6).

Factors that cause the high incidence of anemia in adolescents include low intake of iron and other nutrients such as vitamin A, vitamin C, folate, riboflavin and B12, errors in iron consumption such as iron consumption along with other substances that can interfere with iron absorption those (7).

Adolescent girls are prospective mothers, with conditions before pregnancy, adolescent nutrition is one of the factors that influence the occurrence of stunting. Stunting occurs from pre-conception when a teenager becomes a malnourished and anemic mother. In 2017, the percentage of young women with short and very short conditions increased from the previous year, 7.9% very short conditions and 27.6% short conditions. If the nutrition of adolescent girls is not improved, in the future there will be more and more prospective mothers who have body-short conditions, lack of energy and anemia (8).

In general, the baby is independent of the mother's diet during pregnancy. What happens is, the baby takes nutrients from the mother's stores, and changes protein and fat in the tissues, which is related to the mother's body composition. Therefore, the state of nutritional status during life before pregnancy becomes very important to ensure the availability of stored nutrients that will be utilized by the baby. In addition to maternal nutrient stores, the shape and size of the placental surface will also affect the smooth transportation of nutrients from the mother to the fetus. A baby will be born with all the eggs it will have during its lifetime. Therefore, the quality of the eggs reflects the nutritional status of the mother. Or in other words, the quality of eggs (ovum) that will become a grandson, is determined by the nutritional status of his grandmother (9).

The impact of anemia on adolescent girls will carry over until she becomes an anemic pregnant mother which can lead to an increase in the risk of Inhibited Fetal Growth (IPM), prematurity, low birth weight, and child development disorders including stunting and neurocognitive disorders, causing babies to be born with iron (Fe) reserves. low children will continue to suffer from anemia in infancy and at an early age and increase the risk of neonatal and infant morbidity and mortality which will also inhibit child growth (6).

Stunting can be caused by genetic factors, poor sanitation, stunting also occurs in mothers

who lack nutrition during their teenage years, pregnant do not consume food according to balanced nutrition, such as not eating a variety of foods, lack of consumption of carbohydrates, proteins, fats, vitamins, minerals and water (8). The health condition of the baby born is strongly influenced by the nutritional state of the mother during pregnancy. If the nutrients received from the mother are not sufficient, then the fetus will have unfavorable consequences in the next life (10). Adolescent girls are prospective mothers who will give birth to the next generation so that young women become a priority in efforts to prevent stunting by making iron-deficient anemia-free adolescents. This will have an impact on increasing the prevalence of stunting in Indonesia.

Based on Permenkes RI No. 88, 2014, giving blood supplement tablets is one of the important efforts in the prevention and control of anemia because it is an effective way to prevent anemia due to iron deficiency and folic acid deficiency. Blood supplement tablets are tablets that are given to the fertile and pregnant women. For fertile women, it is given once in a week and one tablet during period (11). Ministry of Health, at 2016, recommended all health offices regarding giving blood supplement tablets to adolescent girls once a week throughout the year (12).The purpose of giving blood supplement tablets to adolescent girls is to improve the nutritional status and reduce the incident of anemia among adolescent girls (13).

The program has been running throughout Indonesia, but its implementation has not been optimal. Riskesdas 2018 West Java explained that the majority of teenagers received iron tablets from the school, amounting to 76.15 percent which were distributed by the puskesmas in 12 months.who received 52 tablets only 4.70 percent and <52 tablets 95.30 percent (14).

In Cirebon district, the provision of iron tablets to adolescent girls reached 2.4% in 2017, it increaseed 1.2% from 2016. This is still far from the target, which set at 15%. This is related to the problem of limited funds for tablet availability. The program for giving supplement tablets to adolescent girls in Cirebon district in 2018 was 61.27%. This is increasing from 2017 which only reached 2.4%. The expected target in 2018 is 85% (15).

The coverage of giving iron tablet at the district and provincial level categorized as low if the availability of drugs is less-defficient, difficulty of accesing and unequally distribution of the drugs, poor record validity, unsupported interpersonal communication and education, unsupported allocation and also lack of cross-program coordination between school agencies and health workers (16)

Listyaningrum (2019), factors that influence the implementation of giving suplement tablets is packaging of the tablets that are easily damaged before they are used up (17).

The study based on data from the Cirebon district health office in 2019, the majority of adolescents were anemic. It was becase there were problems in drug availability, drug distribution, limited procurement of drug control cards and the students who refused to take medication (18).

This study will conduct a study on the effect of giving blood supplement tablets to adolescent girls on increasing haemoglobin levels, so, it can be seen whether young women are anemic or not. If there are many adolescents with anemia, it is expected that health workers and the community should pay more attention to the importance of anemia-free of adolescents to prevent stunting. Therefore, there many healthy generations born in Cirebon .

MATERIALS AND METHODS

This study used a quasi-experimental one group design. The independent variable in this study was the administration of Fe tablets,

the dependent variable was Hb levels before and after. The population in this research is young women in Cirebon Regency. The sample size was calculated based on the proportion and prevalence formula, and the number of respondents was 20 plus the drop out calculation was 10%, so that the number of respondents was 22. The research sample used purposive sampling technique, namely the technique of determining respondents to be sampled based on certain criteria.

Data collection is carried out through the stages of the preparation, implementation, and evaluation process. The preparation stage consists of obtaining permits, research instruments, and division of tasks. The implementation phase begins with measuring Hb levels before the intervention is given, the samples obtained based on the criteria are 26 respondents. then given the intervention of Fe tablets and information related to how to take and control cards for taking Fe tablets. After 3 months, the respondents were re-measured Hb levels after consuming Fe tablets, the number of respondents who met the inclusion criteria were 20 respondents. The evaluation stage is carried out by processing and analyzing data. The criteria for the sample in the study are as follows: Inclusion: Willing to be a respondent, Already menstruating, Grades 7 and 8, Students who are present, who consume a minimum of 10 fe tablets. Exclusion: Not willing to be a respondent, Not yet menstruating, Student who is not present, Class 9. Data analysis is written in univariate and bivariate data, statistical test using dependent t test and calculated using computerized technique using SPSS

RESULTS AND DISCUSSION

RESULTS

The results obtained were data on the respondent's hemoglobin level before giving the added tablet, data on the respondent's hemoglobin level after giving the blood-added tablet and the dependent t-test data for the two variables to see is the difference between the hemoglobin level that has not taken blood-added tablet and after taking the added tablet every week for 3 months

Table 1. Descriptive distribution of haemoglobin levels before giving blood supplement tablets

Variable	Mean Median	Median	Standar Deviation	Min-Max Result
Haemoglobin Levels Before Giving Blood Supplement Tablets	11,40	11,85	1,7364	7,6 – 14,4

Table 1 shows the mean results of haemoglobin levels before treatment are 11.40 grams%, median 11.85 grams%, median 11.85 grams%, standard deviation 1.7364, lowest haemoglobin level was 7.6 grams% and highest haemoglobin level was 14.4 grams%. This result shows that there are still teenagers who have anemia.

Table 2. Descriptive Distribution of Haemoglobin Levels After Giving Blood Supplement Tablets

Variable	Mean	Median	Standar Deviation	Min-Max Result
Haemoglobin Levels After Giving Blood Supplement Tablets	14,07	14,25	1,3719	11,1-16,1

Table 2 shows the mean of haemoglobin level after treatment was 14.07 grams%, median 14.25 grams%, standard deviation 1.3719, lowest haemoglobin level was 11.1 grams% and highest haemoglobin level was 16.1 grams%.

Table 3. Distribution of differences in hb levels in adolescents before and after giving fe tablets treatment

Variabel	Mean	SD	P Value	N
Haemoglobin Level			0,001	
Before giving Fe Tablets	11, 40	1,7364		20
After giving Fe Tablets	14, 07	1,3719		20

Based on **Table 3**, the final hypothesis is accepted, meaning that there is a significant difference in haemoglobin levels before and after giving the blood suplement treatment.

DISCUSSION

The results of the study shows that there are adolescent girls who still have anemia before consuming blood suplement tablets.This results is accordance with the results of the 2018 Riskesdas. One of the health problems that often occurs at this age, especially teenager, is anemia. The incidence of anemia in adolescent girls is still quite high. The prevalence rate of anemia in Indonesia in 2018 was 26.50 for adolescents girl. Anemia that caused by iron deficiency occurs in adolescent girls and it causes various negative impacts, such as low concentration and learning difficulties,fatigue and lack of energy, enervate, sleepy head and lowering the body's resistance so that it makes it easy to get sick. And this anemia has the long-term impact to pregnant young women. Because of anemia, young woman will not be able to fulfil the nutrients for herself and the fetus in the womb, thus causing complications in pregnancy and childbirth. This also increases the risk for low birth weight (LBW) and perinatal mortality (19). Adolescent girls are more prone to IDA (Iron Deficiency Anemia) because they are menstruating. There is a need for additional iron for adolescent girls beyond growth requirements due to the amount of iron lost during menstruation. The need for additional iron to balance menstrual blood loss is about 2.1 mg/day more than the daily requirement (20).

Most pregnant women are in the age of the late teens category, this is also explained by the results of research by Padila et al., (2021) which shows that a young age with a low level of education will also affect the knowledge of pregnant women about pregnancy, such as nutritional needs and iron needs by the fetus for growth during pregnancy (21).

Iron is a group of trace minerals that function for fetal growth and development. The condition of pregnancy causes an increase in the need for iron in the body, so, pregnant women will have anemia (22).

Maternal nutrition during pregnancy is very important for the growth of the fetus. In general, pregnant women with good health conditions who don't have nutritional disorders during pre-pregnancy or during pregnancy, will produce larger and healthier babies than pregnant women whose conditions have nutritional disorders. Pregnant women do not have adequate reserves of nutrients to provide the physiological needs of pregnancy, namely hormonal changes and increased blood volume for fetal growth, so that the supply of nutrients to the fetus is reduced as a result of stunted fetal growth and development and low birth weight which is often associated with height. underprivileged or stunting (23).

Teenagers as the next generation experience anemia it will have a tremendous effect in the future. Starting from these young women, they will produce the next generation which is expected to be the next generation that is healthy, intelligent and productive. This anemia will have a big impact when these young women become mothers and give birth to children. In addition, there is the fact that anemia causes a decrease in the work productivity of Indonesian women by 20 percent or about 6.5 hours per week. This condition can certainly be a big obstacle to the development of quality resources in Indonesia. That is why anemia in adolescents is a concern for the country (24).

Adolescents who have taken suplement tablets for 3 months have shown an increase in hemoglobin levels that were previously low to normal or even exceed normal limits.This is in accordance with Hariyati (2020), the results of his research show that the average hemoglobin before being given to students in the intervention and control groups is the same, namely 11.29 g/dl. And after being given to the intervention

group, the average increased to 13.69 g/dl and was also supported by the results of Yuanti's study (2020), which stated that the average Hb level of anemic adolescent girls increased by 1.550 after being given Fe tablets (25,26).

In Hermiaty (2021), iron nutritional anemia is anemia that arises due to empty iron reserves in the body so that the formation of hemoglobin is disrupted. Hemoglobin is the part of red blood cells that is used to determine anemia status. The normal value of hemoglobin levels in women is 12-16 g/dl, iron is the main element needed for the formation of hemoglobin, decreased iron intake can reduce hemoglobin levels in the body (27). Giving blood supplement tablets with the right dose can prevent anemia and increase iron reserves in the body (13). Blood supplement tablets given by the government already have the right dose, which contains iron compounds equivalent to 60 mg of elemental iron and 400 mcg of folic acid. Therefore, the consumption of blood-added tablets is one of the efforts to increase hemoglobin levels apart from food substances (16).

Susanti's results explained that in anemia subjects, iron deficiency conditions can accelerate iron absorption. Absorbed iron is first used to normalize plasma hemoglobin concentration, so it can play an important role in oxygen supply to tissues/cells (28).

The results of the test of the effect of giving blood-added tablets with an increase in hemoglobin levels, obtained p value = 0.000 means at 5% alpha, the final hypothesis is accepted, meaning that there is a significant difference in haemoglobin levels before and after giving treatment. The results of this study are in accordance with the statement of the Ministry of Health (2016) which states that blood-added tablets (Fe) are supplements to overcome iron deficiency anemia. The composition of the blood-added tablet (Fe) that is distributed contains Ferrous sulfate and folic acid (29). This is in accordance with the results of Hartati's (2021) study entitled The Effect of Giving Iron (Fe) Tablets to the Anemia Status of Adolescent Girls (30). Besides, it is also supported by the results of research by Haryanti, et al (2021), which states that there is a difference between the results of the paired t test before and after giving iron tablets (p value = 0.001) (31). The results of the study are in line with research by Permatasari (2018) that the consumption of Fe tablets can affect adolescent haemoglobin levels (32). It is also similar to the research by Tonasih (2019) which stated that the hemoglobin level in respondents before giving Fe tablets obtained an average haemoglobin level of 12.7 g/dl. whereas after consuming Fe tablets the average Hb level was 12.9 g/dl with a P value of 0.022, there was an effect of giving blood-added tablets to adolescents on the increase in Hb at Muhammadiyah Cirebon High School Of Health Sciences in 2019 (33). It is also strengthened by the results of research by Mutmainah, et al (2018), which has an effect of giving Fe tablets on changes in haemogobin levels in adolescent girls aged 14-20 years at Miftahul Khoer Islamic Boarding School Tasikmalaya (34). Similarly, the results of Ningsih's research (2020) which states that the results of the contingency coefficient test obtained a value of C = 0.685 with p = 0.000 <0.05 meaning significant. The value of C = 0.685 is compared with the value of Cmax = 0.707, because the value of C is close to the value of Cmax = 0.707, the category is a strong relationship, so that the consumption of Fe tablets greatly affects the normality of Hb levels in adolescents. girls in grades VII and VIII at SMPN 19 Bengkulu City (35). This is also approved by Sulaiman's statement in the results of his research, namely iron supplementation or administration of Fe tablets is one of the important efforts in preventing and overcoming anemia, increasing hemoglobin levels in the blood, especially iron deficiency anemia and iron supplementation is an effective way because the iron content is supplemented with acid. folate which can prevent anemia due to folic acid deficiency (36).

CONCLUSION AND RECOMMENDATION

The final hypothesis accepted. It also has a meaning that there is a significant difference in haemoglobin levels before and after giving the treatment. It is expected for the future research to conduct the research with real experimental design which is involving adolescent girls including early, middle and late adolescents to see the difference in the effect of giving blood supplement tablets to adolescents for 52 weeks in accordance with the guidelines for giving blood-added tablets for adolescent in 2021.

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