

The Effect of Consumption of Boiled Red Beans (*Phaseolus Vulgaris L*) on Hemoglobin Levels in Adolescent in Institute Of Health Science (STRADA) Indonesia

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Abstract--- *Anemia in general is a condition where hemoglobin and erythrocyte levels are lower than normal. Anemia that is occurred by many adolescents due to Fe deficiency and can be called Fe deficiency anemia (Tarwoto, 2014). The purpose of this study was to determine the effect of consumption of boiled red beans (Phaseolus Vulgaris L) on hemoglobin levels in adolescents in Institute of Health Science (STRADA), Kediri. The research design used was pre-experiment with one group pre-posttest design. The population in this study was all third semester students in Institute of Health Science (STRADA) who experienced anemia with a sample of 18 respondents. The sampling technique used was purposive sampling. The results showed that all (100%) had mild anemia before treatment, after the treatment, the results of all respondents (100%) experienced a change to non-anemia. Based on the statistical results using Wilcoxon test, the obtained p value = 0.005 < α 0.05, then H₀ is rejected and H₁ accepted, which means there is an effect of boiled red beans (PhaseolusvulgarisL) on hemoglobin levels in adolescents in the Institute of Health Science (STRADA), Kediri. It can be concluded that boiled red beans (Phaseolus Vulgaris L) contain iron, which is useful for increasing hemoglobin levels in the blood. It is recommended for respondents to use boiled red beans as food to prevent anemia.*

Keywords--- Red Beans; Hemoglobin Levels; Adolescent

I. INTRODUCTION

Adolescent anemia is more common in children than adults, especially for adolescent girls. This is because teenage girls experience menstruation, low food intake, and increased iron requirements due to the process of *growth spurt* and by limiting what they eat the body has nutritional deficiencies such as iron [1][2]. Anemia, in general condition, is where hemoglobin and erythrocyte levels are lower than normal. Iron deficiency anemia itself is a state of decreased iron concentration in the body, both in storage, circulation and in the form of bonds with heme so that it can cause a decrease in red blood cell concentration. Iron deficiency anemia is a stage of severe iron deficiency [3][4].

Based on WHO data (2014), anemia affects 1.62 million people in the world (24.8%) according to Basic Health Research [5]. It is known that the prevalence of anemia in adolescents aged 15-24 years is 18.4% and in the fertile age group of women is 16.9%, so it can also be categorized as moderate health problems [6]. Data from the East Java Provincial Health Office in 2017 states that 50-60% of young women in East Java suffer from anemia or red blood

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deficiency. From Riskesdas, the prevalence of national nutritional anemia among adolescents 13-18 years was 22.7% [7]. Based on the results of a preliminary study conducted on March 29, 2019, at the Institute of Health Science (STRADA), on midwifery study program students, it was found that seven (70%) of 10 female students were anemic, four (40%) were due to sleep patterns and three (30%) because of unhealthy eating patterns.

The prevalence of anemia in 2017 is caused by various factors, such as economic and socio-cultural with the direct cause being an imbalance between food intake and nutritional needs. Anemia can be caused by a lack of food sources that contain iron, because iron is an important compound as a constituent of hemoglobin, and this occurs because of poor dietary care, irregularity and not balancing the nutritional adequacy needed [3]. The symptoms that often arise include dizziness, weakness, fatigue, fatigue and lethargy. Sometimes anemia does not cause obvious symptoms, such as fatigue when exercising, difficulty concentrating and easily forgetting [8] [9]. The unfortunate situation is that most sufferers do not know and do not realize it. In general, someone begins to suspect anemia if the condition is getting worse, so that the symptoms are more obvious, such as pale skin, palpitations, dizziness, easy to run out of breath when climbing stairs and exercise [10]. With the occurrence of anemia in adolescents it can have an impact on decreased work productivity or academic ability in school, due to the lack of enthusiasm for learning and concentration. Anemia can disturb growth, whereby height and weight become imperfect. In addition, the immune system will decrease, so it is susceptible to disease [11] [12].

Anemia can be overcome by means of pharmacological therapy and non-pharmacological therapy. Pharmacological therapy to overcome anemia is by consuming blood booster tablets or Fe tablets [13], while non-pharmacological therapy to overcome anemia is to consume foods that are high in iron content. Foods that contain lots of iron are chicken, dried fruits, egg yolks, lean meat, spinach, liver, and beans. Nuts that contain lots of iron include soybeans, green beans and red beans. Red beans have a content that can overcome anemia, namely iron (Fe). The iron content in red beans can help control the amount of hemoglobin in the blood [14] [15].

AI. METHODS

This study included a *pre-experiment* with *one group pre-posttest control group with design* approach; subjects were assessed before being treated and after being treated. The population in this study was 37 students of the midwifery program. Technique sampling used was "*purposive sampling*". The sample in this study was 18 students in the third semester of the midwifery program who experience anemia. The instrument used in this study was observation sheet, all respondents' hemoglobin levels were observed before and after treatment. Hemoglobin levels of anemia were checked with HB elektrik / Haemometer.

The research procedures were by measuring hemoglobin level before giving red beans, then giving boiled kidney beans of 450 grams per day for three days and then again measuring hemoglobin level [4]. Before commencing the study, researchers followed ethical clearance procedures of KEPK Institut Ilmu Kesehatan Strada Indonesia and obtained a certificate, number 1925/KEPK/IV/2019. Before the study, the researchers explained the research procedure to prospective respondents and they filled out the informed consent form. Statistical test results were obtained using *Wilcoxon test* [16].

BI. RESULTS

- Univariate Analysis

Table 1. Frequency distribution characteristics of respondents by age at in Institute of Health Science (STRADA)

Age	n	%
Early Adolescents	0	0
Mid Adolescents	0	0
Late Adolescents	18	100
Total	18	100

Based on Table 1, it can be interpreted that all of the respondents are late adolescence (19-21 years old)

• Bivariate Analysis

Table 2. Frequency distribution based on hemoglobin levels before and after giving boiled red beans (*Phaseolus Vulgaris L*) in adolescent girls in the Institute of Health Science (STRADA)

Anemia	Pre Test		Post Test		p-value
	n	%	n	%	
Severe Anemia	0	0	0	0	P= 0.005
Moderate Anemia	0	0	0	0	
Mild Anemia	18	100	0	0	
No Anemia	0	0	18	100	
Total	18	100	18	100	

Based T 2 above, it can be interpreted that, before intervention, all of the respondents have mild anemia, 18 respondents (100%). After intervention increased, all of the respondents have no anemia, 18 respondents (100%).

Based on the statistical test results using Wilcoxon test, it can interpreted that the p-value< α is 0.005, <0.05, so that H0 is rejected and H1 is accepted, meaning that there is an effect of giving Boiled red beans (*Phaseolus Vulgaris L*) on hemoglobin levels in adolescents in the Institute of Health Science (STRADA) Indonesia.

IV. DISCUSSION

All of the respondents experienced a change from mild anemia to not anemia, as many as 18 respondents. The result above is suitable with the results of research conducted by Faridah and Indraswari [17] which states that consuming nuts can help increase hemoglobin levels in adolescent girls. Anemia that occurs in adolescents can occur due to consumption patterns of Indonesian people who are still dominated by vegetables as a source of iron (non-heme iron) [18]. In addition, the cause of iron deficiency anemia is influenced by increased body needs, due to suffering from chronic disease, blood loss due to menstruation and parasitic infections [19].

Boiled red beans have a variety of ingredients that are beneficial to health, one of which is the content of iron or Fe [20] [21]. The content of iron in boiled red beans can help increase hemoglobin levels in the body. The mechanism of iron can help increase hemoglobin levels in the body by means of biochemical reactions in the body; from the biochemical process, iron is able to produce hemoglobin [22]. Biochemical reactions in the form of inorganic complexes Fe³⁺ are broken down during digestion and some are converted from Fe³⁺ to Fe²⁺ which is more readily absorbed. The conversion of Fe³⁺ to Fe²⁺ is facilitated by the presence of endogenous factors such as HCl in gastric secretory fluids, components of nutrients derived from food such as vitamin C or meat and fish. This mechanism plays a role in increasing hemoglobin in the body [19].

Lack of protein intake will result in obstructed transportation so that iron deficiency will occur. Absorption of substances that occur in the small intestine is carried out by means of protein transport, namely transferrin and ferritin. Iron-containing transfer functions to transport iron into the bone marrow to form hemoglobin [23]. Many protein sources are found in spinach, liver, fruit, and nuts. Protein is important for DNA synthesis. A deficiency can increase cellular regeneration and cause anemia, wherein the size of red blood cells is larger than normal [24] [25].

Based on the results of the research, researchers believe that the majority of respondents experienced a change from mild anemia to not anemia. Changes in hemoglobin levels occur because of the iron content in boiled red beans. The content of iron in boiled red beans can help increase hemoglobin levels in the body. The mechanism of iron can help increase hemoglobin levels in the body by means of biochemical reactions in the body.

V. CONCLUSION

The conclusion of this research is that boiled red beans (*Phaseolus Vulgaris L*) can increase hemoglobin levels in young women because one of the contents is iron or Fe. Hemoglobin levels are also influenced by many factors, nutrition status, activity, stressors, illness, etc.

CONFLICT OF INTEREST

No conflicts of interest have been declared.

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APPENDIX

Table 4. Standard operational procedures consumption of red beans boiled

Item of SOP		
Ingredient	Red Beans	150 gr
	Water	500 ml
Process	Boil red beans in boiling water until softer or about 15 - 20 minutes Take 150 gr red beans boiled, repeat tree times in a-24 hours.	
Dosage	Giving red beans boiled for three days	