EFFECTIVENESS OF GIVING MUNG BEAN JUICE ON HEMOGLOBIN LEVELS OF FEMALE ADOLESCENTS AT STATE SENIOR HIGH SCHOOL 2 PEKANBARU

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Abstract
Adolescent girls are prone to anemia because they experience menstruation every month and there are still many who do not regularly consume Fe tablets, where menstruation is the cause of a decrease in hemoglobin levels so that they need iron. The effort made is to consume mung bean juice because it contains iron and vitamin c which can help increase hemoglobin levels so that it becomes an alternative treatment for anemia. The purpose of this study is to determine the effect of mung bean juice on increasing hemoglobin levels of adolescent girls at SMAN 2 Pekanbaru. This type of research is quantitative using a Quasi Experimental design with a one group pre-test-post-test design approach conducted on December 9-16 at SMA Negeri 2 Pekanbaru with a total of 15 respondents. The research instrument consists of a digital measuring device to measure hemoglobin levels and an observation sheet. The administration of mung bean juice is given 1 time in a day as much as 250 ml in the morning for 7 days. The results of the study showed that the hemoglobin levels of the respondents before and after consuming mung bean juice increased, which can be seen from the mean pre-test results of 11.04 gr/dl and post-test which was 11.79 gr/dl gr/dl. The results of the t-test obtained a p-value of 0.000, meaning that there was an effect of mung bean juice on hemoglobin levels. The results of this study are expected to be a source of reference and one of the inspirations in conducting further research and it is hoped that future researchers will be able to use the time more appropriately so as to get more optimal results and respondents in the research who have Hb levels that have a similar range.
Keywords : Anemia, Hemoglobin, Adolescent girls, Mung Bean Juice

INTRODUCTION

Adolescence is a crucial period for growth and development. Changes in lifestyle, diet, and the habit of trying new foods often lead to imbalances in energy and nutrient intake. Adolescents may be more likely to consume fast food or foods high in sugar and fat, which can lead to deficiencies in essential nutrients, such as vitamins, minerals, and especially iron. Iron is essential for hemoglobin formation and enzyme function. Adolescent girls, in particular, need to pay attention to their iron intake because blood loss during menstruation can increase the risk of anemia (Pratiwi, 2020).

Anemia is a decrease in hemoglobin levels due to impaired red blood cell formation due to a lack of iron in the blood. If adolescent girls suffer from anemia, it can have serious impacts on their health and daily lives. The most important impact is feeling tired quickly, which can disrupt their activities. Furthermore, anemia also causes decreased focus while studying, thus significantly affecting their productivity. Anemia can also weaken the immune system, making them susceptible to disease (Aulya & Nizmadila, 2022).

Data released by the World Health Organization (WHO) shows that anemia is a significant global health problem, particularly among adolescent girls. With an incidence of 29% worldwide and reaching 41.5% in developing countries, this demonstrates the need for serious attention to adolescent health, particularly in nutritional aspects. In Indonesia, data from the 2018 Basic Health Research (RISK Kesehatan Dasar) showed the incidence of anemia

among adolescents was 32%, far above the national standard of 20%. This figure indicates that many adolescents are still at risk of anemia, which can have a negative impact on their health.their health, development, and quality of life.

Data from the Riau Provincial Health Office shows that the incidence of anemia in adolescent girls in 2020 reached around 25.1%, with 19.4% among those aged 15-24 years. Although this figure is lower than the national figure, it still indicates that anemia remains a health problem that needs to be addressed (Saula et al., 2020). These data indicate that adolescent girls are a group vulnerable to anemia, which is often caused by suboptimal nutritional intake. Deficiencies in essential nutrients, such as iron, vitamin B12, and folic acid, can inhibit the production of hemoglobin, which is essential for oxygen transport in the body. If unhealthy eating habits persist, hemoglobin levels will decrease, potentially leading to anemia. Therefore, it is important to educate adolescents about the importance of a balanced diet and introduce iron-rich foods, such as meat, green vegetables, and nuts, thereby preventing anemia among adolescent girls (Oktachiriyah, 2020).

There are two types of anemia treatment, namely pharmacological by consuming 1 Fe tablet every day during menstruation, and non-pharmacological treatment by consuming mung bean juice. However, one of the main factors that affect the compliance of young women in consuming Fe tablets is the taste & side effects caused, so many teenagers avoid tablets because of the bitter taste and nausea after consumption, although there are some who consume Fe tablets, many experience obstacles, including discomfort and boredom with the tablets (Widiastuti, 2019). Mung bean juice drink can indeed be an attractive alternative to help overcome anemia, especially because of its iron content of 6.7 mg per 100 grams, consuming two cups of mung bean juice every day can meet about 50% of daily iron needs. Furthermore, the presence of vitamin C in mung bean juice is also important, as it can increase iron absorption in the body. This means that consuming mung bean juice not only helps meet iron needs but also has the potential to increase hemoglobin levels, which is crucial for the health of adolescent girls, especially in preventing and treating anemia. This approach could be a preferable solution to iron tablets, especially for those who dislike the taste of tablets (Rimawati et al., 2018).

A preliminary study at SMA Negeri 2 Pekanbaru City showed that this school has a large student population of 1,114, consisting of 514 boys and 600 girls. Data from the school's health care nurse indicated that 15% of female students, or approximately 52 students, were at risk of anemia. Although the iron tablet program was usually implemented routinely, it has not been implemented since July 2023. Given this situation, the authors felt the need to intervene with non-pharmacological therapy in the form of mung bean juice.

This intervention aims to increase hemoglobin levels in adolescent girls at risk of anemia, focusing on nutritional needs that can be met through the consumption of mung bean juice. Mung bean juice is known to contain iron, which can help increase hemoglobin levels, and is expected to have a positive impact on the health of adolescent girls at SMA Negeri 2 Pekanbaru City. One group pre-test-post-test design, which is a method to determine the effect of variables by comparing conditions before and after being given a certain treatment (Syahrizal & Jailani, 2023). Where all sample respondents had their Hb levels measured before consuming mung bean juice and after consuming mung bean juice, Hb levels were observed again to see changes after the intervention.

RESEARCH METHODS

The type of research used in this study is quantitative research with a Quasi-Experimental approach. The method used is a one-group pre-test-post-test design, which is a

method to determine the effect of variables by comparing conditions before and after being given a certain treatment (Syahrizal & Jailani, 2023). Where all sample respondents had their Hb levels measured before consuming mung bean juice and after consuming mung bean juice, Hb levels were observed again to see changes after the intervention.

This research was conducted at State Senior High School 2, Pekanbaru City, Payung Sekaki District, with the reason for selecting the location based on recommendations from the Pekanbaru City Education Office. The research period has started from August 2024 to January 2025.

The population in this study consisted of female adolescents at SMA Negeri 2 Pekanbaru City, who had certain characteristics relevant to this study. Based on data from the SMA Negeri 2 UKS nurse, there were 52 female students who showed symptoms of anemia risk, characterized by conditions such as weakness, fatigue, tiredness, lethargy, and limpness. In addition, a conjunctival examination showed signs of anemia, as well as a capillary refill time (CRT) examination of the nails and lips showed paleness. With a total of 52 female students, this study will focus on female students who experienced these symptoms of anemia. A sample is a portion of a population selected using sampling. The sample must accurately reflect the population, and the conclusions drawn by the researcher must reflect the population (Ahyar et al., 2020). The number of respondents was calculated using a formula based on the population of adolescent girls with moderate anemia in this study, which was 15 respondents.

RESEARCH RESULTS

Univariate Analysis

General Data

Univariate analysis data on respondent characteristics can be seen as follows

Table 1. Respondent Characteristics Based on Age of Adolescents at State Senior High School 2 Pekanbaru

Characteristics	frequency	Presentation(%)
Average age of tenagers	16-19	100%
Total	**15**	**100**

Source: Primary Data Analysis, 2025

Based on the data in Table 4.1, it can be seen that all female teenagers at SMA Negeri 2 Pekanbaru are aged 16-19 years with a percentage of 100%

Average hemoglobin level of adolescent girls

Table 2. The average hemoglobin levels of adolescent girls before and after intervention

		N	Mean	SD	SE
hb value measureme nt results	Pre Test	15	11,04	0,84	0,217
	Post test	15	11,79	0,83	0,215

Source: Primary Data Analysis, 2025

Based on the data in Table 4.2, It can be seen that before the green bean juice intervention was given, the average hemoglobin level was 11.04 gr/dl with a standard deviation of 0.84520 and after the green bean juice intervention, the average hemoglobin level was 11.79 gr/dl with a standard deviation of 0.83278.

Table 3. The effect of consumsing green bean juice on hemoglobin levels in female adolescents at state senior high school 2 Pekanbaru

	N	Mean	SD	Min	Max	p-value
Pre-Test	15	11,04	0,84520	9	12	0,000
Post-Test	15	11,79	0,83278	10	13	

Source: Primary Data Analysis, 2025

Based on the data in Table 4.4, the average hemoglobin level before the green bean juice intervention was 11.04 gr/dl with a standard deviation of 0.84250, a minimum value of 9 and a maximum of 12, while the average hemoglobin level after 7 days of consuming green bean juice was 11.79 gr/dl with a standard deviation of 0.83278, a minimum value of 10 and a maximum value of 13. The results of the statistical test obtained a p value = 0.001, which means there is a difference in the average value before and after the green bean juice intervention.

DISCUSSION

Univariate Analysis

Characteristics of Respondents

Characteristics Based on the research results, it shows that the majority of respondents are 17 years old with a percentage of 40.0%. At this age, adolescents experience accelerated growth and development of the body requiring more energy. In addition, at this age, there are changes in lifestyle and habits that like to experiment with food, resulting in a mismatch in energy and nutrient intake. According to Nancy et al., (2022), the 15-24 year old age group for adolescent girls is an age group that is vulnerable to nutritional problems, thus risking health. In adolescents, there are changes in lifestyle and habits that want to experiment with food, resulting in nutritional imbalances. At the age of 15-24, adolescent girls have a greater need for iron than adolescent boys, because adolescent girls experience menstruation every month and lose iron. Long-term iron deficiency can cause anemia.

One factor that influences anemia is age because during adolescence, there is accelerated growth that requires a lot of iron intake. Adolescent girls need more iron than adolescent boys, because adolescent girls menstruate every month. This is in line with research by Faghir-ganji et al., (2023) in their research, the prevalence of anemia was 80% at the age of 17 years compared to 13% at the age of 16 years. This is in line with research conducted by Mayangsari et al., (2021) there are many factors that influence anemia, one of which is age. In their study, the prevalence of anemia was 70% at the age of 18 years compared to 20% at the age of 16 years. Based on the results of the research and the theory above, the researchers assume that age is related to the incidence of anemia because age affects iron imbalance and the presence of a monthly menstrual cycle so that adolescent girls require a lot of iron. Based on the results of the study, the majority of adolescent girls who experience anemia are aged 17-18 years.

Bivariate Analysis

Average Hemoglobin Levels Before and After Intervention Based on the results of data analysis, it was found that the average hemoglobin level of female adolescents before being given mung bean juice was 11.0467 with a standard deviation of 0.84520 and a standard error of 0.21753, the lowest frequency was 9.2 and the highest frequency was 12.5. Then after being given mung bean juice intervention, the average hemoglobin level of female adolescents was 11.7933, with a standard deviation of 0.83278 and a standard error of 0.21502, the lowest frequency was 10.0 and the highest frequency was 13.0. T count was -11.825 and P- Value 0.000 (<0.05), thus H0 was rejected, meaning that there was an effect of giving mung bean juice on increasing hemoglobin levels of female adolescents at SMA Negeri 2 Pekanbaru with an average value of 0.74 gr / dl. Anemia in adolescent girls can be influenced by their age, which is very concerned about their body shape, so some girls limit their consumption of foods containing iron and protein. The blood and iron loss experienced by adolescent girls during menstruation increases the risk of anemia. Iron also experiences a biological basal loss during menstruation, which must be balanced with iron intake. (Sihotang, 2020). Mung bean juice is made from ground mung beans and the juice is extracted. It is a liquid, has a sweet taste, and contains nutrients Complete. Mung beans contain high-fiber protein and can provide sufficient energy. The iron content in mung beans is also quite high, at 0.90 mg. Iron in the body is carried by the blood to the bone marrow to form red blood cells, where iron is a building block of hemoglobin and helps the digestive system, especially by accelerating iron metabolism, which will increase hemoglobin levels (Suheti et al., 2020). Non- pharmacological treatment by consuming mung bean juice can play a role in red blood cell formation and prevent anemia because the phytochemical content in mung beans is very complete, so it can help the hematopoietic process. Mung beans also contain vitamins and minerals, such as calcium, phosphorus, sodium, and potassium, which are abundant in mung beans (Astawan, 2021). The results of this study are in line with those conducted by I'im Irmawatai et al., (2023) entitled "The Effectiveness of Green Beans on Increasing Hemoglobin Levels of Pregnant Women" with a quasi-experimental type of research, the results of the study were accepted and H0 was rejected with a p-value of 0.000 (<0.05), so it can be said that green bean drinks have an effect on increasing hemoglobin levels of pregnant women who experience mild anemia. Similarly, the study by Elvia et al., (2022) entitled "The Effect of Giving Green Bean Juice (Vigna Radiata L.) on Hemoglobin Levels of Female Students at SMA Negeri 1 Lombok" the study was conducted using a purposive sampling technique. Subjects taken from grades X and XI showed that the respondents' hemoglobin levels before the intervention were 12.29 gr / dl and the average hemoglobin level after being given 300 ml of green bean juice for 7 days was 13.57 gr / dl. There was an average increase of 1.28 gr/dl. A difference in Hb increase was found before and after the intervention with a p value of 0.000 (<0.005) so it can be said that there is an effect of consuming mung bean juice. This is supported by the research of Nancy et al., (2022) entitled "The Effectiveness of Giving Mung Bean Juice to Increase Hemoglobin at SMAN 1 Gedong Tataan" based on the results of data analysis, it was found that the average Hb level of female adolescents before giving mung bean juice was 10.67gr/dl. In measurements after giving mung bean juice, the average hemoglobin level was 14.04 gr/dl, resulting in an increase in hemoglobin levels of 3.36gr/dl. The mean difference between Hb level measurements before and after giving mung bean juice was 3.3667. The statistical test results obtained a p-value = 0.000, so it was concluded that there was an effect of giving green bean juice on increasing hemoglobin levels in female adolescents at SMAN 1 Gedong Tataan in 2022. A similar study conducted by Maulina et al., (2022) on "The Effect of Green Bean Juice

and FE Tablets on Hemoglobin Levels of Anemic Female Adolescents at MTs Ar Roudloh, Bandung Regency". Proving that green bean juice had an effect on increasing hemoglobin levels in anemia sufferers. The hemoglobin level of female adolescents before the intervention was 10.6 gr/dl and the Hb level after the intervention was 12.22 gr/dl. Then the statistical test results obtained a p-value of 0.000 (<0.005) which means Ho is rejected, so it can be said that green bean juice has an effect on increasing hemoglobin levels. Based on the results of the research and theory above, the researcher assumes that green bean juice has an effect on female adolescents at SMA Negeri 2 Pekanbaru in helping to increase hemoglobin levels.

CONCLUSION

Based on the results of research conducted on December 9-16, 2024 at SMA Negeri 2 Pekanbaru, it can be concluded that: The average value of hemoglobin levels before being given Mung Bean Juice was 11.04 gr / dl with a standard deviation of 0.8452. The average value of hemoglobin levels after being given Mung Bean Juice was 11.79 gr / dl with a standard deviation of 0.8327. There is a difference in the average value of hemoglobin levels of female adolescents before and after the mung bean juice intervention which obtained a p value of 0.000 (<0.05) so it can be concluded that there is an effect of consuming mung bean juice in increasing hemoglobin levels of female adolescents at SMA Negeri 2 Pekanbaru

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