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The Difference in Effectiveness of Mung Bean Drink and Red Guava Juice on Hemoglobin Level Increase

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Abstract: Iron deficiency anemia is the biggest health problem in the world, especially for young women. The prevalence of anemia in adolescents is 27% in developing countries and 6% in developed countries. In Indonesia, the prevalence of anemia is quite high, namely 21.7% with a proportion of 22.8% in rural areas and 20.6% in urban areas and 23.9% in women and 18.4% in men. This study aimed to determine the difference in the effectiveness of mung bean drink and red guava juice on increasing Hb level. This research applied a Quasy-Experimental research design. The research sample consisted of 90 female students who were divided into 2 groups. Before giving the intervention, a pre-test was carried out by measuring the Hb level, and then the samples were given treatment for 7 days and Post-test on the last day. The results showed that mung bean drink affected hemoglobin increase with a value of p = 0.000 and guava juice also affected hemoglobin increase with a value of p = 0.004. There was a difference in giving mung bean drink with red guava juice on the increase in Hb levels with a value of p = 0.045. It is expected that the results of this study could provide additional information regarding the difference in the effectiveness of giving mung bean drink and guava juice on increasing Hb levels and providing input for clinicians to manage anemia, especially in adolescent girls.

Keywords: Anemia, Mung Beans Drink, Red Guava Juice

Introduction

Anemia is a condition in which the number of red blood cells is insufficient to meet physiological needs. This is caused by many conditions such as infectious diseases, blood loss, and iron deficiency [1] Iron deficiency anemia is a decrease in hemoglobin level (<12 mg/dl) due to reduced iron supply so that the formation of red blood cells (erythrocytes) is disrupted [2]. Iron deficiency anemia is the biggest health problem in the world, especially for women. Women have the highest risk of suffering from anemia, especially adolescent girls [3].

Adolescent girls are one of the groups that are prone to suffering from anemia. The prevalence of anemia in adolescents is 27% in developing countries and 6% in developed countries [4]. In Indonesia, the prevalence of anemia is 21.7% with a proportion of 22.8% in rural areas and 20.6% in urban areas, and 23.9% in women and 18.4% in men [3]. Based on a preliminary survey conducted at the Muhammadiyah University of Lamongan it was found that 14 out of 24 female students or 58% of them suffered from anemia. From these data, it can be perceived that the incidence of iron deficiency anemia in adolescents is still high.

According to [5] iron deficiency anemia is caused by physiological needs increase, menstruation, insufficient absorption of iron, iron malabsorption, bleeding, fetal transfusion, hemoglobinuria, idiopathic pulmonary hemosiderosis, and excessive exercise. Anemia causes the blood to not properly bind and transport oxygen from the lungs to the rest of the body. If the oxygen needed is not enough, it will cause difficulty concentrating which results in learning achievement decrease, low physical endurance, fatigue, physical activity decrease and to be sickly. Then, the students will rarely attend school or work [1]. In general, young women have characteristics of unhealthy eating habits such as skipping breakfast, an unhealthy diet (ignoring sources of carbohydrates, fats, protein, vitamins, and minerals), and regularly eating fast food. This makes adolescents unable to meet the nutrients of their bodies especially for the process of forming hemoglobin (Hb). If this situation occurs for a long time, it will lead to a Hb level decrease and anemia [6].For personal preference, you may import styles into your own manuscript.

One way of overcoming anemia is food fortification. The fortification of widely consumed and centrally processed foods is the main key to anemia control in many countries. Food fortification is one of the most effective ways to prevent iron deficiency [7]. Some foods that can prevent iron deficiency include mung beans and guava. Mung beans are one of the food ingredients that contain substances needed for the formation of blood cells so that they can overcome the effects of Hb decrease [8]. Mung beans can play a role in the formation of red blood cells and prevent anemia because the phytochemical content in mung beans is very complete so that it can help the process of hematopoiesis [9]. On the other hand, red guava contains high vitamin C. In 100 grams of red guava, it contains 87 mg of vitamin C. Besides vitamin C,

red guava also contains potassium and iron which can help increase Hb level [10].

Material and Methods

This research is a quantitative analytic Quasy-Experimental with a two-group pretest-posttest design. The sample in this study was 90 female students of the Muhammadiyah University of Lamongan. Furthermore, a pre-test was carried out on the sample by measuring the Hb level, and then the sample was divided into 2 groups. Group 1 consisted of 45 female students who were given 100 grams of mung bean drink intervention once a day for 7 days while group 2 consisted of 45 female students who were given 100 grams of red guava juice for 7 days. After that, the post-test was carried out in both groups by re-measuring the Hb level. The type of data collected is primary data obtained from respondents by conducting Hb checks. The instruments used in this study were the observation sheet, digital haemometer, hand scoon, lancet, and alcohol swab. The data were analyzed by statistical tests, namely paired t-test and t-test with $\alpha < 0.05$.

Result and Discussion

Result

Research data on hemoglobin (Hb) level before and after the intervention can be perceived in the following tables.

Hemoglobin Level	Mean	Standard Deviation (SD)	*p-value*	N
Before drinking mung bean	10,58	1,103	0,000	45
After drinking mung bean	11,52	1,227		

Table 1. Differences in the Mean of Hemoglobin Level before and after Being Given Mung Bean Drink

Based on table 1, it can be perceived that the mean of Hb level before being given mung bean drink was 10.58 gr/dl with a standard deviation of 1.103 gr/dl. Meanwhile, the Hb level after being given mung bean drink was 11.52 gr/dl with a standard deviation of 1.227 gr/dl. The statistical test results obtained a p-value 0.000 <0.05, which means that there were differences in Hb level before and after being given mung bean drink.

Hemoglobin Level	Mean	Standard Deviation (SD)	*p-value*	N
Before being given red guava juice	10,53	1.164	0,004	45
After being given red guava juice	11,05	1.029		

Table 2. Differences in the Mean of Hemoglobin Level before and after Being Given Red Guava Juice

Based on table 2, it is known that the mean of Hb level before being given red guava juice was 10.53 gr/dl with a standard deviation of 1.164 gr/dl. Meanwhile, the mean of Hb level after being given red guava juice was 11.05 gr/dl with a standard deviation of 1.029 gr/dl. The statistical test results obtained a p-value 0.004 <0.05, which means that there were differences in Hb levels before and after being given red guava juice.

Hemoglobin Level	Mean	Standard Deviation (SD)	*t*	*p-value*	N
After being given mung bean drink	11,52	1,227	1,955	0,045	90
After being given red guava juice	11,05	1.029			

Table 3. Differences in the Mean of Hb Level after Being Given Mung Bean Drink and Red Guava Juice

Based on table 3, it can be perceived that the results of the SPSS test using the Independent Sample Test in the treatment after being given mung bean drink and red guava juice obtained the t count = 1.955 and the t table value 1.662. The p-value = 0.045 ($p < \alpha$) means that H0 was rejected and H1 was accepted. This means that there were differences in the Hb level after being given a mung bean drink and red guava juice

Discussion

The Differences in Hb Level after and before Giving Mung Bean Drink

Based on table 1, it is known that the hemoglobin level of 45 female students before being given mung bean drink had the mean value of 10.58 gr/dl. The hemoglobin level after being given mung bean drink had the mean value of 11.52 g/dl. It can be concluded that the average increase in hemoglobin level before and after giving mung bean drink was 0.94 gr

/dl.

Before being given mung bean drink, the mean hemoglobin level of female students was 10.58 gr/dl with the lowest hemoglobin level of 9.96 g/dl or in moderate anemia. Moderate anemia is a state of hemoglobin level in the blood of 8-10 gr/dl [11]. The hemoglobin level at the beginning of the examination was moderate. If anemia occurs, it is advisable to consume foods that contain lots of iron [12].

From the results of the SPSS test using the Paired Sample Test, the results obtained p-value = 0.000 ($p < \alpha$), which means that H0 was rejected and H1 was accepted. It has been proven that green bean drinks have an effect on increasing hemoglobin levels.

The results of this study are in line with the research of [13] which out of 16 female students who were given mung bean experienced a significant effect on the hemoglobin level. According to [14], hemoglobin levels could be increased by giving drinks or foods made from mung beans. This is because mung beans contain lots of iron, vitamin A, zinc, and vitamin C which the body needs for the growth and differentiation of progenitorerythrocyte cells, body immunity, and iron reserves throughout the body's tissues. Besides, according to [8] mung bean contains a lot of iron. 100 grams of green beans contain 6.7 mg of iron, 6 mg of Vitamin C, 157 mg of Vitamin A. Iron administration can increase hemoglobin levels in cases of anemia with an iron deficit. Vitamin C and vitamin A prevent anemia by increasing iron absorption. Also, vitamin A is needed for the production of red blood cells in the spinal cord [12].

Based on the explanation above, it can be concluded that mung bean drink can be used as an alternative to increasing hemoglobin levels in cases of iron deficiency anemia.

Differences in Hb Level before and after Giving Red Guava Juice

Based on table 2, it can be perceived that the hemoglobin levels of 45 female students who were given red guava juice had the mean value of 10.53 gr/dl. The hemoglobin level after giving mung bean drink had a mean value of 11.05 g/dl. It can be concluded that the average increase in hemoglobin levels before and after giving a mung bean drink was 0.52 gr/dl.

From the results of the SPSS test using the Paired Sample Test, the results obtained p-value = 0.004 ($p < \alpha$). This means that H0 was rejected and H1 was accepted. Thus, it has been proven that guava juice affects hemoglobin level increase.

The results of this study are in line with the research by [15] which stated that there was a significant effect on hemoglobin level after giving red guava juice. Red guava is a Vitamin C rich fruit. 100 grams of red guava contains 87 mg of vitamin C. Vitamin C plays a role in the absorption of iron in the intestine. Vitamin C supplementation also increases the absorption of iron from plant (non-heme) foods. The effectiveness of absorption of natural iron and vitamin C in the form of fruits is better than the absorption of iron together with high doses of vitamin C tablets [2].
Likewise, Ningtyastuti's research concluded that there was an effect of consuming red guava on increasing hemoglobin levels in pregnant women. [16]. Based on the explanation above, it can be concluded that red guava juice drinks can be used as an alternative to increasing hemoglobin levels in cases of iron deficiency anemia.

The Difference in the Effectiveness of Mung Bean Drink and Red Guava Juice on Hemoglobin Level Increase

Based on table 3, it can be perceived that the results of the SPSS test using the Independent Sample Test in the treatment after giving mung bean drink and red guava juice obtained the t count = 1.955 and the t table value 1.662. The p-value = 0.045 ($p < \alpha$) means that H0 was rejected and H1 was accepted. This showed that there was a significant difference in the provision of mung bean drink and guava juice to increase hemoglobin levels.

The results above show that there is a difference between mung bean drinks and guava juice in increasing hemoglobin levels. There is a significant difference between mung bean and red guava juice in terms of iron content. The iron content in mung beans in 100 grams is 6.7 mg [8]. While the iron content in red guava in 100 grams is 0.26 mg [10].

Giving mung bean drink is more appropriate for female students with iron deficiency anemia because the iron content is higher than red guava juice. Mung bean also contains iron, vitamin C, and zinc which play a role in treating iron-deficiency anemia. Mung bean also contains vitamin A of 7 mcg in half a cup. Vitamin A deficiency can worsen iron deficiency anemia [8]. According to [12] Vitamin A, folic acid, vitamin B12, Riboflavin, and vitamin B6 are needed for the production of red blood cells in the bone marrow. Besides, vitamin A can also increase iron absorption or help mobilize iron from deposits.

From the explanation above, it can be concluded that anemia can be prevented and treated with a program of continuous improvement in nutritional status. Iron supplementation can be an alternative to increase hemoglobin levels. However, the fortification program is a strategic program to improve iron status; one of which is by consuming mung bean drinks.

Conclusion

Mung bean and red guava are foods that can increase hemoglobin levels due to the presence of iron and vitamin C. It is hoped that the results of this study can provide the development of a care plan for adolescents regarding the management of anemia..

Conflict of interest
The author states that there is no conflict of interest.

REFERENCES

[1] Suryani, D., Hafiani, R. and Junita, R. (2017) 'Analisis Pola Makan Dan Anemia Gizi Besi Pada Remaja Putri Kota Bengkulu', Jurnal Kesehatan Masyarakat Andalas, 10(1), p. 11. doi: 10.24893/jkma.v10i1.157
[2] Marlina, H. and Putriyana, W. (2015) 'Pemberian Tablet Fe dan Jus Jambu Biji pada Remaja Putri yang Anemia Defisiensi Besi', Jurnal Ilmu Kebidanan, III(1), pp. 7–12.
[3] Rista Andaruni, N. Q. and Nurbaety, B. (2018) 'Efektivitas Pemberian Tablet Zat Besi (Fe), Vitamin C Dan Jus Buah Jambu Biji Terhadap Peningkatan Kadar Hemoglobin (Hb) Remaja Putri Di Universitas Muhammadiyah Mataram', Midwifery Journal: Jurnal Kebidanan UM. Mataram, 3(2), p. 104. doi: 10.31764/mj.v3i2.509.
[4] Ramzi, M. et al. (2011) 'Anemia and iron deficiency in adolescent school girls in Kavar Urban area, Southern Iran', Iranian Red Crescent Medical Journal, 13(2), pp. 128–133.
[5] Fitriany, J. and Saputri, A. I. (2018) 'Anemia Defisiensi Besi. Jurnal', Kesehatan Masyarakat, 4(1202005126), pp. 1–30.
[6] Brown, J. E. (2011) Dietary Reference Intakes (DRIs): Recommended Intakes for Individuals, Vitamins Food and Nutrition Board, Institute of Medicine, National Academies, Fluoride. Available at: www.nap.edu.%0Awww.cengage.com/wadswortth.
[7] Arisman, M. . (2009) Buku Ajar Ilmu Gizi Dalam Daur Kehidupan. Jakarta: EGC.
[8] Astawan, M. (2009) Sehat Dengan Hidangan Kacang Dan Biji-Bijian. Jakarta: Swadaya.
[9] Ganesan, K. and Xu, B. (2018) 'A critical review on phytochemical profile and health promoting effects of mung bean (Vigna radiata)', Food Science and Human Wellness. Beijing Academy of Food Sciences., 7(1), pp. 11–33.doi 10.1016/j.fshw.2017.11.002.
[10] Juaria, H. (2014) 'Perbedaan efektifitas buah jambu merah dan buah belimbing manis terhadap kadar haemoglobin pada ibu hamil', Jurnal Akbid Griya Husada, 1(1), pp. 25–34.
[11] Bakta, I. M. (2006) Hematologi Klinik Ringkas. Jakarta: EGC. Jakarta: EGC.
[12] Dodik, B. (2013) Masalah Gizi Pada Remaja Wanita. Jakarta: EGC.
[13] Cahyanto, E. B. et al. (2019) 'Pengaruh Vigna Radiata Terhadap Anemia', PLACENTUM: Jurnal Ilmiah Kesehatan dan Aplikasinya, 7(2), p. 42. doi: 10.20961/placentum.v7i2.29126.
[14] Amalia, A. (2016) 'Efektifitas Minuman Kacang Hijau Terhadap Peningkatan Kadar Hb', Rakernas Aipkema, 6, pp. 13–18. Available at: https://media.neliti.com/.
[15] Rusdi, P. H. N., Oenzil, F. and Chundrayetti, E. (2018) 'Pengaruh Pemberian Jus Jambu Biji Merah (Psidium Guajava.L) Terhadap Kadar Hemoglobin dan Ferritin Serum Penderita Anemia Remaja Putri', Jurnal Kesehatan Andalas, 7(1), p. 74. doi: 10.25077/jka.v7i1.782.
[16] Ningtyastuti, Y. E. and Suryani, E. (2007) 'Pengaruh Mengkonsumsi Jambu Biji Merah Terhadap Peningkatan Kadar Hemoglobin Ibu Hamil (Yeri Esty Ningtyastuti, Emy Suryani) 61', Jurnal Kesehatan Masyarakat, pp. 61–68.