

## COMBINATION OF MUNG BEAN JUICE AND RED GUAVA JUICE CONSUMPTION IN TREATING ANEMIA IN ADOLESCENT

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### ABSTRAK KOMBINASI KONSUMSI JUS KACANG HIJAU DAN JUS JAMBU MERAH MENANGGULANGI ANEMIA REMAJA

Latar belakang :Prevalansi anemia remaja putri di Indonesia adalah 57,1%, Remaja merupakan salah satu kelompok rentan gizi. Angka kejadian anemia di Lampung pada tahun 2013 mencapai 57,1%. usia sekolah sebesar 26,5%, Dikarenakan pada masa ini adalah masa yang pertumbuhan yang sangat pesat.

Tujuan : mengetahui efek pemberian konsumsi jus kacang hijau dan jus jambu biji terhadap peningkatan kadar Hb pada remaja putri dengan anemia di Yayasan Pondok Pesantren Al-Ishlah Sukadamai Kecamatan Natar Kabupaten Lampung Selatan Tahun 2020

Metode :Jenis penelitian kuantitatif dengan rancangan penelitian *Quasi Eksperimen*. Populasi penelitian seluruh remaja di Yayasan Pondok Pesantren Al-Ishlah Sukadamai Kecamatan Natar sebanyak dengan sampel sebanyak 40 orang teknik sampling *purposive sampling*. yang dibagi menjadi dua kelompok, terdiri dari 20 orang kelompok intervensi (diberikan jus kacang hijau dan jus jambu biji) dan 20 orang kelompok kontrol (hanya diberikan tablet Fe 200 mg ferro sulfat) yang dilakukan pengukuran Hb pre dan post intervensi. pengumpulan data dengan lembar observasi. Analisa data univariat dan bivariat *uji t (t-test)*.

Hasil: Hasil penelitian Rata-rata Hb pada kelompok sebelum intervensi adalah 10,4 gr/dl, setelah intervensi 11,1 gr/dl peningkatan sebesar 0,70 gr/dl. Rata-rata-rata Hb pada kelompok kontrol adalah 10,4 gr/dl, pengukuran kedua sebesar 10,7 gr/dl peningkatan sebesar 0,33 gr/dl.

Kesimpulan: Ada pengaruh pemberian konsumsi jus kacang hijau dan jus jambu biji terhadap peningkatan kadar Hb pada remaja putri dengan anemia di Yayasan Pondok Pesantren Al-Ishlah Sukadamai Kecamatan Natar Kabupaten Lampung Selatan (*p-value < 0,05*).

Saran: mengkonsumsi jus kacang hijau dan jambu merah dapat menghindarkan remaja dari kejadian anemia

Kata kunci: Kadar Hb, Konsumsi jus kacang hijau dan jus jambu biji merah, Remaja

### ABSTRACT

Background: The prevalence of anemia in adolescent girls in Indonesia is 57.1%. Adolescents are one of the nutritionally vulnerable groups. In Lampung, the incidence of anemia in 2013 reached 57.1%, with 26.5% school age because this period is a period of very rapid growth.

Purpose: This study aims to know the effect of consuming mung bean juice and guava juice on increasing Hb levels in adolescent girls with anemia at the Al-Ishlah Sukadamai Islamic Boarding School Foundation, Natar Sub-district, South Lampung Regency in 2020.

Methods: This quantitative research used a quasi-experimental research design. The research population was all adolescents in the Al-Ishlah Sukadamai Islamic Boarding School Foundation, Natar Sub-district, with a sample of 40 people using the purposive sampling technique. They were divided into two groups, 20 people in the intervention group (given mung bean juice and guava juice) and 20 people in the control group (only given Fe tablets), measured the Hb in pre-and post-intervention. Data collection employed observation sheets. Then, data analysis was carried out by univariate, bivariate, and t-test analyses.

Results: The mean Hb in the group before the intervention was 10.4 gr/dl, and after the intervention was 11.1 g/dl, with an increase of 0.70 g/dl. Meanwhile, the mean Hb in the control group was 10.4 gr/dl in the first measurement and was 10.7 gr/dl in the second measurement, with an increase of 0.33 gr/dl.

Conclusion: There is an effect of the consumption of mung bean juice and guava juice in increasing Hb levels in adolescent girls with anemia at the Al-Ishlah Sukadamai Islamic Boarding School Foundation, Natar Sub-district, South Lampung Regency (*p-value <0.05*).

Suggestion: Mung bean dan guava combination can increase hemoglobin level, and this food consumption routinely will avoid anemia.

Keywords: Consumption of mung bean juice and guava juice, Hb levels, adolescents

## INTRODUCTION

Anemia is a condition in which the circulating erythrocyte mass and/or Hb mass cannot fulfill their function of providing oxygen for body tissues. Decreased Hb can cause lethargy, fatigue, palpitations, tachycardia, shortness of breath, and angina pectoris (Bakta, 2014). The prevalence of anemia is estimated at 9% in developed countries while 43% in developing countries. Children and women of childbearing age (WUS) are most at risk, with an estimated prevalence of anemia of 47% in children under five, 42% in pregnant women, and 30% in non-pregnant women aged 15-49 years. In addition, the World Health Organization (WHO) has targeted a reduction in the prevalence of anemia in WUS by 50% by 2025 (WHO, 2014).

In adolescents, anemia can cause delays in physical growth and behavioral and emotional disorders. It can affect the growth and development of brain cells, leading to decreased body resistance, weakness, and hunger. It also causes disturbed learning concentration, decreased learning achievement, and reduced work productivity (Notoadmodjo, 2015).

Data from the 2012 Household Health Survey (SKRT) disclosed that the prevalence of anemia was 40.5% in under-fives, 50.5% in pregnant women, 45.1% in postpartum mothers, 42.1% in adolescent girls aged 10-18 years, and 39.5% at the age of 19-45 years. Women have the highest risk of developing anemia, especially pregnant women (SKRT, 2012). According to basic health research data (2018), the prevalence of anemia in Indonesia was 23.7%. Meanwhile, the prevalence of anemia in Indonesia based on the characteristics of the age of 5-14 years was 26.8%, the age of 15-24 years was 32.0%, the age of 25-34 years was 15.1%, and the age of 35-44 years was 16.7% (Risksedas, 2018).

In general, anemia is more common in women and young women than men. What is very unfortunate is that most sufferers do not know or do not realize it. Even when they know, they still think of anemia as a trivial problem. In this case, adolescent girls are one of the groups that are prone to anemia. In Indonesia, the prevalence of anemia is still quite high. There are 26.50% of anemia sufferers in adolescent girls, 26.9% in women of childbearing age (WUS), 40.1% in pregnant women, and 47.0% in children under five (Aryani, 2012).

According to Notoadmodjo (2015), adolescents are one of the nutritionally vulnerable groups. It is because this time is a period of very rapid growth. In addition, women of childbearing age tend to suffer from anemia because they experience

menstruation every month, and it will be exacerbated if iron intake from daily food is low. Women of childbearing age who experience iron deficiency anemia will easily get sick because of low body resistance, making low work productivity (Permenkes, 2014).

According to Proverawati (2011), the causes of anemia are excessive destruction of red blood cells, blood loss, and decreased production of red blood cells. People with anemia feel lethargic, weak, tired, limp, and often complain of dizziness, and dizzy eyes, especially when standing or getting up from sitting (Arisman, 2010).

The loss of iron needed by women amounts to the same, which is about 0.8 mg per day. However, adult women experience an additional loss due to menstruation, and it increases the average daily requirement so that the iron that must be absorbed is 1.4 mg per day, which meets 90% of the needs of menstruating women. To meet the needs of the other 10%, a daily absorption of at least 2.4 mg of iron is needed to compensate for the very high loss during menstruation (Gibney, 2009 in Sulistiyawati, 2015).

According to Aryani (2012), efforts to prevent anemia can be done by consuming lots of foods that contain iron from animal ingredients (meat, fish, chicken, liver, and eggs), from vegetable ingredients (dark green vegetables, beans, and tempeh), eating lots of foods rich in vitamin C, which is useful for increasing iron absorption, such as guava, oranges, tomatoes, and pineapples, and taking one blood-boosting tablet every day when menstruating. Blood supplement tablets are given to women of childbearing age once a week to prevent anemia.

Increasing hemoglobin in the body can be carried out by providing nutrition by supplementing the intake of an important micronutrient, namely iron (NCCN 2010). However, the problem is that iron from plant-based foods has a low absorption rate, so efforts to overcome this problem accompany consuming foods containing vitamin C (Islamiyah, 2006 in Huda, 2016). It is also in line with the opinion of the National Journal of Public Health (2018), which stated that the consumption of mung bean and guava fruit as much as 250 ml/day as a source of iron and a source of vitamin C can help increase iron and iron absorption. However, if the intake of vitamin C is low, it can have implications for the hemoglobin levels of adolescents.

According to Sulistyowati (2015), pharmacological iron can be replaced with natural ingredients, one of which comes from red guava, which contains iron and is rich in vitamin C. Guava has several advantages, including the fruit that can

be eaten as fresh fruit and can be processed into various forms of food and drink. As a food ingredient, guava contains complete nutrition, and every 100 grams of guava contains iron of 1.10 mg, fat of 0.30 grams, vitamin C of 87.00 mg, protein of 0.90 mg, and calcium of 14.00 grams and fulfills nutritional standards to meet the nutritional needs that the body needs for health (Cahyono, 2010).

Guava fruit is also one of the fruits that can increase hemoglobin levels. The chemical content in guava is amino acids (tryptophan, lysine), calcium, phosphorus, iron, sulfur, vitamin A, vitamin B1, and vitamin C. The mineral content in guava fruit can treat people with anemia (lack of red blood). It is because red guava fruit also contains mineral substances that can facilitate forming of red blood cell hemoglobin. Meanwhile, the mineral contents are magnesium, copper, and manganese. Manganese is used by the body as a co-factor for the antioxidant enzyme superoxide dismutase, while copper is needed to produce red blood cells (Lestari, 2018).

Based on the research results on the effect of giving red guava juice (*Psidium guajava L.*) on hemoglobin and serum ferritin levels of adolescent girls with anemia, the results revealed that giving red guava juice could increase hemoglobin and serum ferritin levels of adolescent girls with anemia. It is also recommended to regularly consume foods high in iron with red guava juice (Pagdya, 2017).

In Lampung, the incidence of anemia in 2013 reached 57.1%. Anemia in adolescent girls is still a public health problem because its prevalence is more than 15%. The incidence of anemia in children aged 0-5 years was 40.5%, school-age was 26.5%, women of childbearing age (WUS) were 39.5%, and pregnant women were 43.5% (Dinkes Lampung, 2015).

Overall, the prevalence among adolescents in Lampung Province is 10.9%, which is below the national prevalence (13.6%). Five regencies are above the provincial prevalence rate: South Lampung, East Lampung, Central Lampung, Metro City, and North Lampung. Also, three sub-districts/cities have a prevalence higher than the national prevalence: South Lampung with 21.9%, Lampung Utara with 21.8%, and Metro City with 15.1% (Risksdas, 2013).

Preferably, adolescents consume a balanced diet with needs adjusted by age. Adolescents should also pay attention to the frequency of eating and the number of servings of carbohydrates, animal protein, vegetable protein, and fruits, especially those containing lots of iron. However, it may not happen in Islamic boarding schools, so it becomes one of the

factors causing anemia in Islamic boarding schools. It is because the nutritional fulfillment of adolescent girls in the dormitory has been adjusted to the rules that apply in Islamic boarding schools, without exception, including the food menu consumed by adolescent girls (Ginting, 2016).

Based on the interview results with dormitory administrators at the Al-Ishlah Sukadamai Islamic Boarding School Foundation, it was found that the students' daily diet consisted of vegetables, such as kale, bitter melon, spinach, and other green vegetables, with carbohydrates, eggs, and sometimes chicken; the meat was not necessarily there in once a month. Complaints often experienced by students in the last year were being tired, weak, lethargic, and dizzy. Based on the pre-survey results conducted at the Al-Ishlah Sukadamai Islamic Boarding School Foundation, Natar Sub-district, South Lampung Regency, of the 13 teenagers surveyed for hemoglobin levels, 11 of them had mild anemia.

## RESEARCH METHODOLOGY

This research was conducted with a quantitative approach. Data collection was done using observation sheets. The research design was a true experiment with two groups pretest-post-test with control. The study subjects were 40 adolescent girls at the AL-Ishlah Islamic Boarding School Foundation, divided into 20 people in the control group and 20 people in the experimental group. The sampling technique was purposive sampling by considering the sample criteria, such as adolescents with Hb levels < 12 g/dl, willing to be respondents and students of Al-Ishlah Islamic Boarding School.

## RESEARCH RESULTS

### Univariate Analysis

Meanwhile, the exclusion criteria were adolescents who were menstruating and had genetic blood disorders.

The research was conducted in South Lampung. The study was carried out from February to July 2020. The study was conducted by giving the experimental group a combination of guava juice and mung bean juice, as much as 100 grams, which was given at breakfast and lunch, and Fe tablets at night for seven days. Meanwhile, only Fe tablets were given for seven days in the control group. This research has gone through ethical feasibility testing by the ethics committee of Malahayati University.

**Table 1**  
**Adolescents' Mean Hb**

Variabel	N	Mean	Beda mean	Min	Max	SD
Hb of the experimental group						
Before giving	20	10.4	.7050	9.0	11.6	0.749
After giving		11.1		10.0	12.8	0.733
Hb of the control group						
Before giving	20	10.4	.330	8.4	12.2	0.999
After giving		10.7		8.8	12.8	1.019

### Bivariate Analysis

**Table 2**  
**Discrimination Test of Adolescents' Mean Hb**

Group	Difference of Mean	SD	Std. Error Mean	P-Value
Experiment	.7050	.3236	.0724	.000
Control	.330	.2830	.0633	.000

Based on the bivariate test analysis results in Table 2 above, the statistical test results obtained p-value = 0.000 (p-value <= 0.05). It means that there was an effect of consuming mung bean juice and

guava juice in increasing Hb levels in adolescent girls with anemia at the Al-Ishlah Sukadamai Islamic Boarding School Foundation, Natar Sub-district, South Lampung Regency in 2020.

**Table 3**  
**Differences in the results of the intervention group with the control group**

Variabel	Mean	p-value	95%
Increased HB in the intervention group	.7050	0.000	.3750
Increased HB in the control group	.3300		(0.1804-0.5696)

In the table, it is also seen that the mean difference in the control group was 0.33 g/dl, and the experimental group had a greater increase of 0.7 g/dl compared to the control group.

Based on Table 3, the results showed a difference in the mean before and after treatment in the experimental group of 0.70 gr/dl, while in the control group, it was 0.33 gr/dl. Statistical results found a p-value of 0.000, meaning that consuming mung bean juice and guava juice increased Hb levels in adolescent girls with anemia (p-value  $\alpha$  0.05). In addition, the mean difference between the intervention and control groups was 0.37gr/dl.

### DISCUSSION

Statistical test results obtained a p-value = 0.000 (p-value <= 0.05), indicating that there was an effect of consuming mung bean juice and guava juice on increasing Hb levels in adolescent girls with anemia at the Al-Ishlah Sukadamai Islamic Boarding School Foundation, Natar Sub-district, South Lampung Regency in 2020. With a mean value before treatment of 10.4 and a mean after treatment of 10.859, there was an increase in Hb levels of 0.637

points.

According to Aryanti (2011), the way to increase Hb levels in the body is to increase the consumption of nutritious foods, namely foods containing lots of iron from animal foods (meat, fish, chicken, liver, eggs) and plant foods (dark green vegetables, beans, tempeh). Sources of iron are red meat (beef, goat, lamb), beans, green vegetables, eggs, beans, and seafood. Meanwhile, sources of folate are fresh fruit, green vegetables, cauliflower, liver, kidneys, and dairy products. Preferably, vegetables are consumed raw or undercooked. Then, sources of vitamin B12 are meat, liver, kidneys, oysters, cheese, and eggs. In addition, eating fruits containing lots of vitamin C (tomatoes, oranges, pineapples) is beneficial for increasing iron absorption in the intestines. Also, if needed, blood-boosting tablets are taken once a week or daily during menstruation.

It is consistent with Astawan's (2009) opinion that in addition to containing iron, vitamin C, and zinc, which play a role in treating iron deficiency anemia, mung beans also contain vitamin A of 7 mcg in half a cup. Vitamin A deficiency can worsen iron deficiency

anemia. Vitamin A supplementation has a beneficial effect on iron deficiency anemia. Also, vitamin A has many roles in the body, including growth and differentiation of erythrocyte progenitor cells, immunity against infection, and mobilization of iron reserves throughout the tissues. In this regard, the interaction of vitamin A with iron is synergistic. Based on the amount, protein is the second main composition after carbohydrates. Here, mung beans contain 20-25% protein. Protein in raw mung beans has a digestibility of about 77%. Digestibility that is not too high is caused by anti-nutritional substances, such as anti-trypsin and tannins (polyphenols). To increase the digestibility of the protein, mung beans must be processed first through a cooking process, such as boiling, steaming, and roasting (Astawan M, 2009).

Mung beans are also a source of food that contains a source of protein, rich in fiber, low in carbohydrates, healthy fats, and rich in vitamins, such as other B vitamins, such as riboflavin, B6, pantothenic acid, and niacin. The vitamins help increase the body's energy and metabolism and are rich in minerals and active enzymes. After studying the description above about the factors influencing the increase in Hb levels in the blood, the researchers only focused on the nutritional needs of adolescents by giving mung bean juice to students because they contain iron, which can increase Hb levels in the blood.

On the other hand, guava as a food ingredient contains complete nutrition and meets nutritional standards to fulfill the body's nutritional needs for health. Guava is a high source of vitamin C compared to other fruits. As is known, vitamin C is very good for antioxidants. The nutritional content or chemical composition of guava is also complete (Cahyono, 2010).

The study results of all respondents were obtained between the ages of 15 as many as 16 (40%) respondents and 16 years as many as 24 (60%). It aligns with Indartanti's (2014) research that the age of 12-18 is included in the transition period from early adolescence to late adolescence, which is a period of searching for identity, and adolescents are quickly influenced by the environment. Anxiety about body shape makes adolescents intentionally not eat or choose to eat out. This habit can cause adolescents to experience food insecurity related to low nutrient intake and risks to their health, including anemia.

The study results revealed that most adolescents weighed <50 kg, as many as 23 (57.5%). Bodyweight will be related to nutritional status. Nutritional status is a state of the body due to

the consumption, absorption, and use of nutrients or physiological conditions resulting from the availability of nutrients in the body. Energy intake less than the need for a certain period will cause a decrease in nutritional status. If energy intake is balanced, it will help maintain normal nutritional status, and if energy intake is excessive or energy expenditure is reduced, the potential is obesity. Micronutrient intake does not affect nutritional status based on BMI/U because it has little energy content, and if there is a deficiency, it may have lasted quite a while (Sari, 2017).

According to Proverawati (2011), the causes of anemia are excessive destruction of red blood cells, blood loss, and decreased production of red blood cells. People with anemia feel lethargic, weak, tired, limp, and often complain of dizziness and dizzy eyes, especially when standing or getting up from sitting (Arisman, 2010). Adolescent girls must pay attention to their iron needs because the need for iron will continue to increase with the arrival of menarche (Rangen, 1997 in Aryani, 2012). The loss of iron needed by women amounts to the same, which is about 0.8 mg per day. However, adult women experience an additional loss due to menstruation, and it increases the average daily requirement so that the iron that must be absorbed is 1.4 mg per day; the amount meets 90% of the needs of menstruating women. To meet the needs of the other 10%, a daily absorption of at least 2.4 mg of iron is needed to compensate for the very high loss during menstruation (Gibney, 2009 in Sulistiyawati, 2015).

According to Aryani (2012), efforts to prevent anemia are consuming many foods containing iron from animal ingredients (meat, fish, chicken, liver, and eggs), vegetable ingredients (dark green vegetables, beans, and tempeh), eating lots of food sources of vitamin C that are useful for increasing iron absorption, such as guava, oranges, tomatoes, and pineapples, and taking one blood-boosting tablet every day when experiencing menstruation. Blood supplement tablets are given to women of childbearing age once a week to prevent anemia (Permenkes, 2014).

One of the foods that can prevent iron deficiency is mung beans. Mung beans are one of the food ingredients that contain substances needed for the formation of blood cells so that they can overcome the effect of decreasing Hb. Mung beans can play a role in the formation of red blood cells and prevent anemia because the phytochemical content in mung beans is complete to help the process of hematopoiesis. Mung beans also contain vitamins and minerals. Minerals such as calcium, phosphorus, iron, sodium, and potassium are abundant in mung beans (Astawan, 2009).

Mung beans (*Vigna radiata*) are very popular with the public. Mung bean belongs to the legume tribe and contains many benefits in human life, both for daily consumption processed in various forms of food and drink and health. Mung bean is easy to find in Indonesia because it is one of the typical tropical plants (Akbar, 2015 in Farida, 2017).

According to Sulistyowati (2015), pharmacological iron can be replaced with natural ingredients, one of which comes from red guava, which contains iron and is rich in vitamin C. Guava has several advantages, including the fruit which can be eaten as fresh fruit and can be processed into various forms of food and drink. Guava as a food ingredient contains complete nutrition, and every 100 grams of guava contains 1.10 mg of iron, 0.30 grams of fat, 87.00 mg of Vitamin C, 0.90 mg of protein, and 14.00 grams of calcium and meets nutritional standards to fulfill the nutritional needs that the body needs for health (Cahyono, 2010).

As stated before, one of the fruits that can increase hemoglobin levels is guava fruit. The chemical content in guava is amino acids (tryptophan, lysine), calcium, phosphorus, iron, sulfur, vitamin A, vitamin B1, and vitamin C. The mineral content in guava fruit can overcome anemia sufferers (lack of red blood). It is because red guava fruit also contains mineral substances that can facilitate forming of red blood cell hemoglobin. The mineral content is magnesium, copper, and manganese. The body uses manganese as a co-factor for the antioxidant enzyme superoxide dismutase. Meanwhile, copper is needed to produce red blood cells (Lestari, 2018).

According to researchers, mung bean juice and guava juice consumption were given once a day for seven days in one glass. The measurement of Hb levels in adolescent girls was on the first day before consuming and the eighth day after consuming. It was found that adolescent girls who consumed juice saw changes in hemoglobin levels before and after treatment. The treatment results showed that adolescent girls who consumed experienced a significant increase in Hb levels, seen from the higher mean value and the mean difference after treatment.

Overall, based on the study results, respondents experienced an increase in Hb levels. The lowest was 0.2gr/dl, and the highest was 1.5 gr/dl. This non-uniformity of results might be due to other factors influencing the condition of adolescent girls, such as food intake. Adolescent girls might have experienced an increase in high Hb levels because, in addition to young women consuming mung bean juice and guava juice, they also consumed other foods containing high iron that the

researchers could not control.

In the control group, it was seen that one person experienced a decrease of 0.2gr/dl, two people did not experience an increase in Hb, and the highest increase was 0.8 gr/dl. According to the researchers, the decreased Hb levels of adolescents could be caused by several factors, including low intake of iron and other nutrients, such as vitamins A, C, folate, riboflavin, and B12, which the researchers did not control because, in the control group, the researchers only provided education related to with the consumption that should be eaten. However, the researchers did not observe the intake eaten by the respondents.

Based on the researchers' opinion, the nutritional needs of adolescents are required because adolescents are still in the process of growth. If adolescents are iron deficient or anemic, it can interfere with the growth process and learning concentration. Thus, adolescents should be more concerned about their health to follow health education provided by health workers and be advised to take one tablet of Fe every week to prevent anemia. Because adolescent girls experience menstruation every month, it is the biggest cause of anemia. In this case, health workers can reduce the incidence of adolescent anemia by providing counseling in the form of proper nutritional intake for adolescents so that adolescents do not experience anemia and by increasing adolescent knowledge of foods containing high iron, especially mung bean juice and guava.

According to researchers, the factors that cause anemia in adolescents are many, starting from adolescents' habits or eating patterns every day. Adolescents' restricted eating patterns because they want to appear thin or on a diet will become anemic over time. Diet is a benchmark for anemia in normal adolescents or adolescents who do not have blood disorders or infections.

An improved diet with balanced nutrition for adolescents, consuming Fe tablets as recommended by health workers, consuming guava juice and mung beans regularly, exercising regularly, not following a strict diet, good sleep patterns, and adequate rest according to activities will keep adolescents from anemia.

## CONCLUSION

There is an effect of giving mung bean and guava juice in increasing Hb in adolescents.

## SUGGESTION

Food sources derived from beans and fruits can be used as an alternative in increasing Hb in

adolescents, especially those who usually have irregular eating patterns and like to choose food. It can also be a source of information for health workers to provide nutrition health education to adolescents.

## REFERENCES

- Almatsier, S. (2005). Prinsip dasar ilmu Gizi, Jakarta: PT. Gramedia pustaka utama.
- Amalia, A. (2016). efektifitas minuman kacang hijau terhadap peningkatan kadar HB. In *Prosiding Seminar Nasional & Internasional* (Vol. 1, No. 1).
- Arikunto, S. (2010). Edisi Revisi: Manajemen Penelitian. Jakarta: PT. Rineka Cipta.
- Arisman, M. B. (2004). Gizi dalam daur kehidupan. Jakarta: EGC, 76-87.
- Aryani,. (2012). Kesehatan Remaja Problem dan Solusinya. Jakarta: Salemba Medika.
- Astawan, I. M. (2009). Sehat dengan hidangan kacang dan biji-bijian. Niaga Swadaya.
- Proverawati, A. (2011). Anemia dan Anemia kehamilan. Yogyakarta: Nuha Medika, 136-137.
- Bakta, I Made. (2007). Hematologi Klinik Ringkas. Penerbit Buku Kedokteran. EGC
- Cahyono, B. (2010). Sukses budidaya Jambu biji di pekarangan dan perkebunan. Yogyakarta: Lily Publisher.
- Dinas Kesehatan Provinsi Lampung. (2016). Profil Kesehatan Lampung 2015. Lampung
- Hardimarta, F. P., Yuniarti, C. A., & Annisa, N. (2017). Pengaruh Jus Jambu Biji Merah Dalam Meningkatkan Kadar Hemoglobin. *Media Farmasi Indonesia*, 12(1).
- Hastono, S. P. (2019). Analisis data pada bidang kesehatan.
- Maulina, N., & Sitepu, I. P. (2015). Pengaruh Pemberian Kacang Hijau (Phaseolus radiatus) Terhadap Peningkatan Kadar Hemoglobin Tikus Putih (Rattus norvegicus) Jantan Galur Wistar. *Jurnal Pendidikan Kimia*, 7(2), 57-60.
- Huda, N., & Erwin, E. F. (2016). Campuran Jus Kacang Hijau Dan Jambu Biji Terhadap Peningkatan Kadar Hemoglobin (Hb) Pada Pasien Kanker Yang Menjalani Kemoterapi. *Jurnal INJEC Vol*, 1(1), 55-60.
- Kementerian Kesehatan RI (2013). Riset kesehatan dasar 2013. Jakarta.
- Kementerian Kesehatan RI (2016). Profil Kesehatan Indonesia 2015. Jakarta.
- PW, L. (2008). Penyakit-penyakit pada kehamilan: peran seorang internis. Jakarta: Internal Publishing, 477-79.
- Lestari, I. P., Lipoeto, N. I., & Almurdi, A. (2018). Hubungan konsumsi zat besi dengan kejadian anemia pada murid SMP Negeri 27 Padang. *Jurnal Kesehatan Andalas*, 6(3), 507-511.
- Manuaba, I. A. C. (2009). Memahami Kesehatan reproduksi wanita ed 2. EGC.
- Mariyona, K. (2019). Pengaruh Pemberian Jus Kacang Hijau (Phaseolus Radiatus L) terhadap Peningkatan Kadar Hemoglobin Serum pada Penderita Anemia Remaja Putri. *Menara Medika*, 2(1).
- Maulina, N., & Sitepu, I. P. (2015). Pengaruh Pemberian Kacang Hijau (Phaseolus radiatus) Terhadap Peningkatan Kadar Hemoglobin Tikus Putih (Rattus norvegicus) Jantan Galur Wistar. *Jurnal Pendidikan Kimia*, 7(2), 57-60.
- Notoatmodjo, S. (2010). Metode Penelitian Kesehatan. Jakarta: Rineka Cipta.. 2012. Promosi Kesehatan dan Perilaku Kesehatan.
- Retnorini, D. L., Widatiningsih, S., & Masini, M. (2017). Pengaruh pemberian tablet fe dan sari kacang hijau terhadap kadar hemoglobin pada ibu hamil. *Jurnal kebidanan*, 6(12), 8-16.
- Riyanto, (2011). Aplikasi Metodologi Penelitian Kesehatan. Jakarta: Nuha Medika.
- Sarwono. (2013). Ilmu Kebidanan. Jakarta: Bina Pustaka.
- Supardi, R. (2013). Metodologi riset keperawatan. Jakarta: Trans Info Media.
- Sugiyono. (2016). Metode Penelitian Kuantitatif, Kualitatif dan R&D. Bandung: PT Alfabet.
- Sulistiyowati, S. (2015). PENGARUH JAMBU BIJI MERAH TERHADAP KADAR Hb SAAT MENSTRUASI PADA MAHASISWI DIII KEBIDANAN STIKES MUHAMMADIYAH LAMONGAN. *Jurnal Kebidanan dan Keperawatan*, 11(2), 135-142.
- Susanti, D., Bd, F., Doni, A. W., & Amalia, Y. (2019). The Effect of Giving Boiled Chicken Eggs And Papaya Fruit On The Improvement Of Hemoglobin Levels In Anemia Students. *SANITAS: Jurnal Teknologi dan Seni Kesehatan*, 10(2), 151-166.
- World Health Organization. (2014). *Global Nutrition Targets 2025: Anaemia policy brief*. WHO reference number: WHO/NMH/NHD/14.4. [https://www.who.int/nutrition/publications/globaltargets2025\\_policybrief\\_anaemia/en/](https://www.who.int/nutrition/publications/globaltargets2025_policybrief_anaemia/en/)