Comparison of the Effectiveness of Spinach and Tomato Smoothie Consumptions with Fe Tablets to Increase Hemoglobin in Pregnant Women

G. F. GustinaSiregar, Megawati Sinambela, Vitrilina Hutabarat, Stefany Anastasia, Friska Ernita Sitorus, Husna Sari
Health Institute of Deli Husada Deli Tua, Medan-Indonesia

Keywords: Anemia, Smoothie, Hemoglobin.

Abstract: This study aims to determine the effectiveness of giving spinach and tomato smoothies with Fe tablets to increase Hb in pregnant women. This type of research is quasi-experimental oquasi research with two pretest-posttest design groups. Paired T-Test Test results stated that the value (r) in the higher group was 0.837 which meant that it was stronger than by only providing Fe tablets, this group received a value (r) of 0.730 which meant it had strong strength. The results of this study indicate that spinach and tomato smoothies are effective against increasing levels of hemoglobin in pregnant women this is supported by the value of p-value, with a value of {p (0,000) <α (0.05)}. The case group obtained higher effectiveness than the control group, indicated by the results of the value (r). The correlation value in the case group was (r) = 0.837, meaning that the effectiveness of Fe tablets, spinach smoothie with tomatoes on hemoglobin levels in pregnant women was very strong while the correlation value in the control group was (r) = 0.730 meaning the effectiveness of Fe tablets on hemoglobin in pregnant womenare stronger.

1 INTRODUCTION

Anemia is a condition where the body has too little red blood cells (erythrocytes) or hemoglobin less than 11 gr / dL (Proverawati, 2013). According to the World HealthOrganization, 40% of maternal deaths in developing countries are related to anemia in pregnancy and most are caused by deficiency iron and acute bleeding, even not infrequently both of them interact with each other. Iron deficiency anemia in pregnant women is a health problem experienced by women all over the world especially in developing countries, for example Indonesia.

Anemia often occurs due to lack of iron content in food, absorption of iron from food which is very low, the presence of substances that inhibit iron absorption. Iron anemia in pregnancy is a condition where mothers with hemoglobin levels below 11 grams / dL in trimesters I and III and hemoglobin levels less than 10.5 grams / dL in trimester II pregnancies. Iron is very much needed to supply the growth of the fetus and placenta in the womb and to increase the number of red blood cells for pregnant women.

In North Sumatera one of the efforts made to reduce the prevalence of anemia is by administering 90 (Fe) iron tablets during pregnancy. The percentage of coverage of pregnant women who received 90 iron tablets in 2016 was 73.31%, this decreased compared to 2015 which amounted to 80.13% or there was a decrease of 6.82%. With the percentage of coverage, the coverage of iron tablets in 35 pregnancies has not been able to reach the national target set at 80% (Dinkes. 2016).

Spinach is a green plant that is rich in various nutrients, especially iron (Fe) which is quite high, which is as much as 6.43 mg / 180 grams. And also none of the substances contained in spinach can harm the body. Iron is a substance that is difficult to be absorbed by the body so that vitamin C is needed so that iron can be absorbed optimally.

This is consistent with the results of research that states that iron supplementation and vitamin C are more effective in increasing hemoglobin levels and red blood cell counts than the administration of iron alone or vitamin C alone. One of the fruits that

Siregar, G., Sinambel, M., Hutabarat, V., Anastasia, S., Sitorus, F. and Sari, H.
Comparison of the Effectiveness of Spinach and Tomato Smoothie Consumptions with Fe Tablets to Increase Hemoglobin in Pregnant Women.
DOI: 10.5220/0009975305660572
In *Proceedings of the International Conference on Health Informatics and Medical Application Technology (ICHIMAT 2019)*, pages 566-572
ISBN: 978-989-758-460-2

contain vitamin C and compounds for health is tomatoes. The content of tomatoes in 180 grams is 24.66 mg of vitamin C, 0.49 mg of iron and 27 mg of folic acid. Folic acid is needed by pregnant women because they need for folic acid during pregnancy will increase than usual. So that the combination of spinach and tomatoes is considered very effective can increase hemoglobin levels in pregnant women. This will also be greatly helped by eating patterns on mothers every day (Merinda, 2014).

According to research shows that in pregnant women in the control group who did not consume spinach juice and tomatoes, an average increase in hemoglobin of 0.01 gr / dL by 15 respondents and in the experimental group that consumed spinach juice and tomatoes had an average increase in hemoglobin of 0.47gr / dL. Based on research, the administration of spinach and tomato juice to increase hemoglobin in pregnant women with anemia can accelerate the increase in hemoglobin and be a very effective additional intervention.

The results showed that in pregnant women in the control group who did not consume spinach juice and tomatoes the average increase in hemoglobin was 0.01 gr / dL by 15 respondents and in the experimental group who consumed spinach juice and tomatoes had an average increase in hemoglobin of 0.47gr / dL.

The survey conducted by the author on pregnant women at the Berta Naibaho Clinic which is often carried out dizzy, limp, and pale, which is a sign of anemia, said that none of the mothers had ever taken a combination application of spinach juice and tomatoes.

The purpose of this study was to determine the effectiveness of spinach and tomato smoothies with Fe tablets on increasing hemoglobin in pregnant women.

Iron is an important nutrient for forming hemoglobin, which is a protein in red blood cells that carries oxygen to all tissues and organs of the body. During pregnancy, the amount of blood in your body increases to 50% more than the condition of the body under normal conditions, so you need a lot of iron that forms hemoglobin to compensate for the increase in blood volume. Also to meet the needs of iron for fetal and placental development.

To overcome anemia during pregnancy, you can increase your intake of iron, folic acid, and vitamin B12, both in the form of supplements given by your doctor and in the form of food that you consume daily. Examples of foods rich in iron, folic acid, and vitamin B12 are red meat, dark green leafy vegetables, eggs, beans, chicken, and fish.

The process of absorption of iron substance also requires vitamin C, vitamin C can helpthe process of absorption of iron substanceand help releaseing iron substance from its storage. Vitamin C can play a role in increasing the absorption of non-heme iron 4 times. Vitamin C and ironsubstanceform complex iron compound ascorbate which is easily soluble and easily absorbed.

This is in line with Argana's research, namely that there is an effect of giving vitamin C as a dominant factor on haemoglobin levels. Previous research conducted by Heltty 2008, proved that green beans are effective in treating anemia in cancer patients with chemotherapy, because consumption of 2 cups of green beans can meet 50% of daily iron needs and 80% meet the daily needs of vitamin C and other vitamins such as thiamine, riboflavin, and niacin.

One of the fruits that contain vitamin C and compounds for health is tomatoes. The content of tomatoes in 180 grams is 24.66 mg of vitamin C, 0.49 mg of iron and 27 mg of folic acid. Folic acid is needed by pregnant women because the need for folic acid during pregnancy will increase than usual. So that the combination of spinach and tomatoes is considered very effective can increase hemoglobin levels in pregnant women. It will also be greatly helped by eating patterns on mothers every day7.

2 RESEARCH METHODS

The research design (Figure 1) used was quasi-experiment without a control group using the two group pretest and posttest design approach. The population in this research was pregnant women in the Berta Naibaho's clinic with purposive sampling. Assisted by the Slovin formula for determining samples. The number of samples was 30 people. Divided into 15 case groups and 15 control groups. This study aims to determine the effectiveness of giving spinach and tomato smoothies with Fe tablets to increase Hb in pregnant women. In the experiment, spinach and tomatoes are blended until smooth. The juice is given to pregnant women every day for several weeks. Measurement of Hb in pregnant women was carried out before and after the juice treatment. The next measurement data was used t-test to see the correlation value between groups.

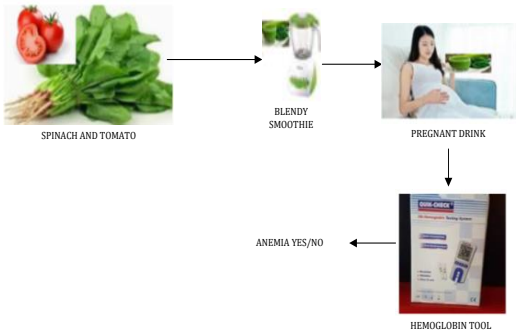

Figure 1: Mechanism for making smoothies Spinach and Tomato.

3 RESULTS

Table 1: Frecuency distribution of hemoglobinlevels of pregnant women before and after in the control group and casus group.

Identity	*Pretest*				*Post-test*				Total	
	Anemia		Not anemia		Anemia		Not anemia			
	N	%	N	%	N	%	n	%	n	%
Control Group	12	80	3	20	9	60	6	40	15	100
Case Group	14	93.3	1	6.7	-	-	15	100	15	100
Total									**30**	**100**

3.1 Bivariate Analysis

Based on the age characteristics in the control group the majority of pregnant women aged 20-35 years (46.7%), minorities aged <20 years and> 35 years each as many as 4 people (26.7%). 9 people (60%), 2 women (> 13.3%) in the minority case group aged> 35 years.

Based on the characteristics of maternal education in the control group the majority reached 6 junior high schools (40%), and the minority was at the tertiary level as many as 2 people (13.3%). In the case group, the majority of mothers with a high school education were 7 people (46.7%) and the minority with tertiary education was 2 people (13.3%). According to (4) education is a form of changing knowledge, income, concepts, changing attitudes, perceptions and changing behavior that still uses customs to play an active role in daily life into something new. The higher a person's education, the more the information obtained and insight.

Table 2: Comparasion of the effectiveness of giving Fe tablets with Spinach and Tomato smoothies in increasing hemoglobin in pregnant women.

Identity	*Pretest*				*Post-test*				Total		(r)	P *Value*
	Anemia		Not anemia		Anemia		Not anemia					
	N	%	N	%	n	%	n	%	N	%		
Control	12	80	3	20	9	60	6	40	15	100	0.730	0.000
Case	14	93.3	1	6.7	-	-	15	100	15	100	0.837	0.000
Total									**30**	**100**		

Based on the characteristics of work in the control group the majority of mothers work as entrepreneurs as many as 7 people (46.7%) and the minority work as civil servants and IRT where each number is 4 people (26.7%). In the case group, the majority of mothers worked as IRTs by 8 people (53.3%) and the minority worked as civil servants by 2 people (13.3%).

At a pregnancy interval> 2 years, the number of pregnant women with healthy reproduction is 13 people, while in the high-risk age group of 7 people, none is found in the early age group. The results of the above study indicate that anemia can occur in all age groups due to many other factors that influence.

Based on the research results of the mothers in the pretest control group the majority of anemia were 12 people (80%), and the minority were not anemic as many as 3 people (20%) as Shown In the Table 1. In the posttest control group, the majority of mothers were anemic with 9 people (60%) and the minority were not anemic with 6 people (40%). In the pretest case group, the majority of pregnant women were anemic with 14 people (93.3%) and the minority of mothers were not anemic with 1 person (6.7%). And after the experimental treatment was carried out posttest, where all pregnant women who were given treatment were not anemic with 15 people (100%).

Based on bivariate analysis (Table 2), it can be seen that pregnant women in the control and case groups experienced an increase in the number of women who were not anemic before and after the experimental treatment. This shows the influence of Fe tablets, smoothie spinach and tomatoes in pregnant women. Where the control group only consumed Fe tablets while the case group consumed Fe tablets and spinach and tomato smoothies.

This is strongly supported by conducting tests on research with paired sample T-Test. This test strongly supports the research analysis, especially in the pretest and posttest research groups. From the results of the table above it can be seen that there is an effect of giving Fe tablets with spinach and tomato

smoothies on hemoglobin levels in pregnant women. From the results of these tables, it can also be seen the effectiveness of giving spinach and tomato smoothies with Fe tablets on hemoglobin levels.

The control group can be seen as the value (r) = 0.730, meaning that there is a strong influence of giving Fe tablets to hemoglobin levels. And the p-value in the control group is 0.000 <0.05 meaning that there is an effect of giving Fe tablets to hemoglobin. Whereas in the case group the value (r) = 0.837, means that there is a very strong influence, with a p-value of 0.000 <0.05 meaning that there is an effect of giving Fe tablets, spinach smoothies and tomatoes to hemoglobin levels. From this description, it can be concluded that the effectiveness that is very supportive is the provision of Fe tablets, spinach smoothies and tomatoes on hemoglobin levels in pregnant women.

Among Southeast Asian countries, Indonesia is listed as one of the countries with quite a lot of anemia sufferers. According to data from the Basic Health Research (Riskesdas) in 2017, the number of anemia sufferers in Indonesia consists of 26.4 percent of children, 12.4 percent of men aged 13-18 years, 16.6 percent of men over 15 years, 22.7 percent of women ages 13-18, 22.7 percent of women aged 15-49, and 37.1 percent of pregnant women. The high number is quite alarming. The reason is anemia is a health problem that can reduce the quality of life.

In pregnant women are very susceptible to iron deficiency anemia, the etiology of iron deficiency anemia in pregnancy is hemodilution which causes blood thinning, blood gain is not proportional to plasma increase, lack of iron in the food and increased need for iron as well as digestive and absorption disorders5. Iron is not only needed for the formation of hemoglobin which plays a role in oxygen storage and transport, but it is also present in several enzymes that play a role in oxidative metabolism, neurotransmitters, and catabolism.

The results of this study stated that the greatest increase in hemoglobin was obtained from the third group who received iron supplementation, vitamin C and nutrition education with p <α (0.05) so that Ho was rejected. This is consistent with the theory that vitamin C has a variety of important roles for iron metabolism and one of them is as a factor for metal reduction reactions such as iron and copper, so that ferry ions are reduced to ferrous ions which are easily absorbed in higher pH in the duodenum and small intestine.

The results of this study also compare with the research conducted by Wijayanti entitled "Test Effectiveness of Spinach Juice in Increasing Blood Hemoglobin Levels in White Rat (RattusNorvegicus)". This type of research is a real experimental study (True Experimental Design) using a Completely Randomized Design (CRD) consisting of 6 training and 4 replications. The sample used is 24 white being front rats ± 2 months and with BB ± 200 grams. Based on the results of the analysis with the Anova test, one of the factors carried out by the Duncan test is to prove the effectiveness of spinach juice in increasing levels of hemoglobin, white blood.

Organic acids such as ascorbic acid (Vitamin C) can help the absorption of iron by reducing ferries to ferrous materials that are easily absorbed 3-6 times. Source of vitamin C is mostly derived from vegetables and fruit. Based on research conducted by Kailaku that tomato variety does not yet have a very high nutrient that is 24.66 mg per 180 grams. Therefore the combination of green spinach leaves with high iron content and tomatoes with vitamin content C which accelerates the absorption of iron in the body can increase the production of red blood cells so that hemoglobin levels also increase.

The process of absorption of iron also requires vitamin C, vitamin C helps in the process of absorption of iron and helps release iron from its storage. Vitamin C can play a role in increasing the absorption of non-heme iron 4 times. Vitamin C and iron form complex iron ascorbate compounds that are soluble and easily absorbed.

The results of previous studies by a team that found lutein in food will reduce inflammation in the immune cells of patients with coronary artery disease. Chronic low-level inflammation is associated with an increased risk of a heart attack. They also say lutein can be stored in immune cells which is meaningful but it builds up reserves of lutein in a person's body. And it is also recommended that when consuming spinach, you can add cream, milk or yogurt so that you will increase your lutein and water expenditure.

According to a study conducted by Nasyidah entitled "The Relationship of Anemia and Characteristics of Pregnant Women at Alianyang Pontianak Health Center", states anemia in pregnant women does not depend on age, but there are other factors that are more dominantly affecting, one of which is the distance of pregnancy, which is at a distance pregnancy <2 years, the highest number of pregnant women suffering from anemia is 20 unhealthy reproductive ages.

The results of preliminary studies conducted at Puskesmas Plus Perbaungan found various problems causing the high maternal mortality rate (MMR) especially in the Puskesmas Plus Perbaungan

working area as a contributor to maternal mortality rates with the highest maternal mortality rate and the most causes of maternal death due to bleeding (43, 3%), eclampsia (23.3%), obstetric embolism (22.2%) and other causes (11.1%).

Based on the 2015 MDG's target the health rate of pregnant women is 102 per 100,000 live births. Maternal mortality is still an indicator of the success of health development in SerdangBedagai Regency and nationally. The number of deaths in 2017 was 9 cases. The number of maternal deaths has increased from the 2016 mortality rate of 7 cases. The maternal mortality rate in SerdangBedagai Regency in 2015 was 8 per 100,000 live births. This number is indeed far from the national mortality rate but when compared with the MDG target it has already exceeded the target.

This is following new research in Europe has found raw spinach in the form of smoothies or juice is the best way to get the antioxidant lutein. Especially when healthy fat is added to help its absorption.

As reported in the Malay Mail, Lutein is a natural fat-soluble pigment found in plants. Dark green vegetables contain very high levels of lutein. But like many other nutrients, lutein levels decrease when cooked. Spinach is one of the vegetables most often used for research because spinach is one of the more popular dark vegetables.

The findings, published in the food chemical journal, also indicate that heating time and cooking methods are equally important for maintaining lutein. The longer the spinach is boiled, the less lutein is left. The effect of heating spinach by microwaves is not recommended because it wil increase the microwaves which make more lutein released than it will consume.

Research conducted in Sweden that spinach can increase strength or immunity and prevent loss of muscle mass in our body. This is done at the Karolinska Institute in Sweden that in one serving of spinach a day it will produce nitric acid which aims to increase the efficiency of the body's muscles.

Based on reproductive age this is supported by the normality of the reproductive period in women, both in the control group and case group. Education in this study did not affect the course of the study. And the characteristics of this work are very supportive of the research process, especially in the control group, the mother who is a housewife is very helpful in the process of making smoothies because mothers have a lot of free time.

Fe tablets, spinach, and tomato smoothies are effective against increasing hemoglobin levels in pregnant women this is supported by the p-value, with a value of {p (0,000) <α (0.05)}.

The case group obtained higher effectiveness than the control group, indicated by the results of the value (r). The correlation value in the case group is (r) = 0.837, meaning that the effectiveness of Fe tablets, spinach smoothie with tomatoes on hemoglobin levels in pregnant women is very strong while the correlation value in the control group is (r) = 0.730 meaning the effectiveness of Fe tablets on hemoglobin is strong in pregnant women.

Anemia in pregnant women can cause these needs are insufficient, so oxygen is channeled to the body's tissues and the fetus becomes limited. Apart from supplements, iron deficiency can also be managed through a healthy and regular diet. Increasing iron food intake is one way to prevent and treat anemia in pregnant women.

So it is recommended that if there are no blood added tablets, pregnant women can consume spinach and tomato smoothies regularly during pregnancy so that the pregnant woman's hemoglobin is normal so there is no bleeding during labor and post-delivery.

It is also recommended that midwives conduct hemoglobin checks on pregnant women every ANC visit and teach pregnant women to consume Fe tablets combined with smoothies containing vitamin C even though Fe tablets are a mandatory program from the government. Midwives can provide health services on giving pregnant women spinach and tomatoes to increase hemoglobin so that pregnant women know how to increase hemoglobin in addition to consuming Fe tables.

Furthermore, this research can be used as evidence-based and additional information to develop further research on other benefits of spinach and tomato smoothie combination therapy on health with a larger number of samples and better research techniques.

This research requires further development by combining the main ingredients containing heme substances to increase the absorption of substances in the body.

4 CONCLUSIONS

The results of this study indicate that spinach and tomato smoothies are effective against increasing levels of hemoglobin in pregnant women this is supported by the value of p-value, with a value of {p (0,000) <α (0.05)}. The case group obtained higher effectiveness than the control group, indicated by the results of the value (r). The correlation value in the

case group was (r) = 0.837, meaning that the effectiveness of Fe tablets, spinach smoothie with tomatoes on hemoglobin levels in pregnant women was very strong while the correlation value in the control group was (r) = 0.730 meaning the effectiveness of Fe tablets on hemoglobin in pregnant women strong.

According to some experts who have researched that anemia in pregnancy is defined as a decrease in hemoglobin levels of less than 11 g / dL during pregnancy during trimesters 1 and 3 and less than 10 g / dL during postpartum and trimester 2. Pregnant women need more blood cells to support fetal development.

ACKNOWLEDGEMENTS

This research was supported by Institut Kesehatan Deli Husada Delitua Institut Kesehatan Medistra Lubuk Pakam, Sembiring Hospital Foundation, and GrandMed Hospital Foundation, Indonesia.

REFERENCES

Dinas Kesehatan Propinsi Sumatera Utara (Dinkes. Prov. Sumut) (2016). Profil Kesehatan Provinsi Sumut Medan: Dinkes Prov Sumut.

Merida, N., Misrawati, Wasisto 2014. *Efektifitas terapi kombinasi jus bayam dan tomat terhadap peningkatan kadar hemoglobin pada ibu hamil dengan anemia. Jurnal Online Mahasiswa bidang Ilmu Keperawatan.*

GetasIw, NingratErlra. *Perbedaan Efektifitas Pemberian Filtrat Daun Bayam Hijau Dan Bayam Merah (Amaranthus Tricolor L) Terhadap Kadar Kolesterol Darah Tikus Putih (Rattus Norvegicus) Strain Wistar.* Media Bina Ilmiah.

DS, Bayu Satya 2015. Koleksi Tumbuhan Berkhasiat, Yogyakarta: Rapha Publishing.

Preservation of bioavtive of a green vegetable smoothie using short time-high temperature mild thermal treatment, vol 2, 2017.N Castillego, GB Martinez.

Amiruddin, R. (2015). Determinan Kesehatan Ibu dan Anak. Jakarta: Trans infomedia.

Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan RI. Riset Kesehatan (Riskesdas 2015). Jakarta. Kementerian Kesehatan Republik Indonesia, 2015.

Kw Tan, Daily Consumption of fruit and vegetable smoothie alters facial skin color. 2015.

Maljeti, M., Mapawang, A. L., Korompis, M. (2017). The effect of spinach capsules (amaranthustricolosl) to increase thu level of hemoglobin (hb) in pregnant women in mahia village, central, tombelo sub- district, north halmahera regency. Internatinaljurnal of health medicine and current research vol.2, september 2017,558-562.

Departemen Kesehatan Republik Indonesia (Depkes RI).(2016). Pedoman Operasional Penanggulangan Anemia GiziIndonesia. Jakarta: Gramedia.

Departemen Kesehatan Republik Indonesia (DepkesRI).(2016). Riset Kesehatan Dasar. Jakarta: Depkes RI.

IzwardyD.Petunjuk Teknis Pemberian Makanan Tambahan (Balita, Ibu Hamil Anak Sekolah) Jakarta: Kementerian Kesehatan RI; 2017. p. 1– 44.

Liu C, Sun J, Lu Y, Bo Y. Effects of Anthocyanin on Serum Lipids in Dyslipidemia Patients: A Systematic Review and Meta-Analysis. J Pone. 2016.

Lalage. (2013). Resep Jus bagi Ibu Hamil dan Menyusui. Penerbit: Cable Book.

Nelma.Analisis Kadar Besi (Fe) pada Bayam Merah (Irsineherbstiihook) dan Bayam Hijau (Amaranthustricolor sp.) yang Dikonsumsi Masyarakat. Pendidik Kim [Internet].2014;6(3):62–5. Available from: https://jurnal.unimed.ac.id/2012/index.php/jpk/article view/5547.

Maryanto S, Fatimah S, Marsono Y. The Effect of Red Guava Fruits Supplementation on The SCFA and Cholesterol Production in. Agritech.2016.

Notoatmodjo, S. (2015). Metodologi penelitian kesehatan.Jakarta: RinekaCipta.

MuchtarF, Hastian.Pengaruh Penambahan Bayam Sebagai Sumber Zat Be si Alami Dalam pembuatan kerupuk stik prosiding seminar, 2017.

Salomeyesudas B, SatheeshP, Hanley J, KuhnleinH. Intervention with traditional food as a majorsourceof energy, protein, iron, vitamin C and vitamin Aforrural Dalit mothers and young childrenin.

Nutrition in later life, j Sheppard, Njohnson, LV Thomas, 2016.hcp.yakult.co.uk.

Santoso, Singgih (2015), Menguasai Statistik Multivariat, Jakarta: Elex Media Komputindo.SchmidM.

Proverawati, A. (2015). Anemidan Anemia Kehamilan.Yogyakarta: NuhaMedika.

The George Mateljan Foundation. (2015). The world healthiest foods spinach. Diperoleh tanggal 2 Wikipedia. (2014). Bayam. Tanggal Akses 20 November 2018, fromhttps://id.wikipedia.org/wiki/Bayam.

Andhra Pradesh, South India. Asia PacJClinNutr[Internet]. 2007;16(1):84–93. Availablefrom:https://www.ncbi.nlm.nih.gov/pubmed/17215184Statistical modeling of physic-chemical and biochemical characterization of various smoothie types,SPopescu,AVelciov. 2018.

Parveen, S., Rangreze, I., Ahmad, S. N., Mufti, S. A., & Khan, S. S. (2014). Prevalence of anemia in patients with COPD and its potential impact on morbidity of COPD patients. International Journal of Clinical Medicine.

Tuyu, S. O. (2015). Hubungan Perilaku mengkonsumsi Tablet Fe dengan kejadian Anemia pada Ibu Hamil diPuskesmas Amurang.5(1).

Wallace T, Slavin M, Frankenfeld CL. Systematic Review of Anthocyanins and Markers of Cardiovascular Disease. J Nutr. 2016.
Lalage, Zerlina. 2015. KhasiatSelangit 101 BuahdanSayur. Prawatan: Galmas Publisher.
Taru S, Sonali. Impact of Iron Suplementation On Anemia During Pregnancy. Ethno-Med., 2(2): 149-151 (2017).
Whitney, E., &Rolfes, S. 2012. Understanding Nutrition.Edisike 12. Belmont USA: Cengage Learning.
Yani, R. 2018. Relationship between Fe and Vitamin C intake with the incidence of anemia in anemia pregnant women in Padang City. Journal of Midwiferry. Volume 72.