

COMPARISON OF THE BENEFITS OF MORINGA LEAVES AND ORANGE IN INCREASING HEMOGLOBIN LEVELS IN PREGNANT WOMEN

Nuryati*, Ninik Indayani

STIKES Abdi Nusantara, Jl. Swadaya No.7, Jatibening, Pd. Gede, Bekasi, West Java 17412, Indonesia

*nuryati.smf@gmail.com

ABSTRACT

Anemia has a negative impact even in all cycles of pregnancy to childbirth such as: bleeding, difficulty fighting infection, premature birth and even increasing the risk of fetal death. Many non-pharmacological therapies that can scientifically increase haemoglobin levels include Moringa leaves and oranges. The purpose of this study was to determine the effect of Moringa leaf cooking water and sweet orange juice on hemoglobin levels of pregnant women with anemia. This research is a type of intervention research with experimental quasy design. The location used for this research is in the working area of the Lightning Health Center in June 2023. The sample used in this study used a total sampling of 30 pregnant women who would be divided into 2 groups, namely 15 pregnant women with Moringa leaf water and 15 pregnant women with orange juice. Analysis of the difference test with the independent t test and the difference test between the two groups with the Wilcoxon signed rank test. The results of the independent T test where the pair Pretest intervention and posttest intervention group Moringa leaves and squeezed oranges showed Sig.2-tailed values of $0.000 < 0.05$.

Keywords: hemoglobin; moringa leaves; orange

INTRODUCTION

Strictly Globally, in 2020, the global prevalence of anemia was 29.9% in women of childbearing age, equivalent to more than half a billion women aged 15-49 years. The prevalence in non-pregnant women of childbearing age was 29.6%, and 36.5% in pregnant women. In Indonesia in 2019 for data on the coverage of giving TTD (Blood Added Tablets) for pregnant women by 64%. While in Indonesia in 2018 the prevalence of anemia in pregnant women was 48.9% (Ministry of HealthRI, 2020). In Banten Province, in 2022 the incidence of anemia is still very high with a prevalence of 37.1%, while the chance of anemia incidence (prevalence) in pregnant women in the Serang Regency area is 72.5% with an average Hb level of 9.7 gr/dL (Wu, 2020) (Mardhiati, 2022) When a woman is pregnant, the woman's body will form more red blood cells that aim to meet the needs of oxygen and also as a transport of nutrients to the fetus. To produce red blood cells, many components are needed, one of which is iron (Fe). Iron (Fe) in the human body is useful for the formation of hemoglobin which is in charge of carrying oxygen to red blood cells, therefore iron intake for pregnant women is important to note because there is an increase in the need for iron (Fe) during pregnancy (PURANTIRA, 2023)

Iron is needed to help the body produce fresh red blood cells that are rich in oxygen and nutrients. Blood flow, oxygen, and nutrients are very important to support the process of fetal growth and development and maintain optimal placental conditions. Iron deficiency anemia is the lack of eating iron-rich foods, such as animal protein from before and during pregnancy. This anemia condition will cause various negative effects such as babies born prematurely (babies born prematurely), low birth weight (low birth weight), even fatal ones can cause maternal and infant death (Tiyasasih, 2023). Anemia has a negative impact even in all cycles of pregnancy to childbirth including: anemia during pregnancy can increase the risk of postpartum depression, anemia during

labor, this will endanger their safety when bleeding occurs, anemia can also cause the body of pregnant women more difficult to fight infection, the danger of anemia in the next pregnant woman is premature birth. Some studies show that anemia in pregnancy can increase the risk of fetal death, before and after delivery Labor (Karami, 2022). Efforts to overcome anemia during pregnancy, you can increase your intake of iron, folic acid, and vitamin B12. These nutrients can be obtained from the food you consume daily or supplements given by a doctor. The Ministry of Health of the Republic of Indonesia, (2018) emphasized that the incidence of anemia found in pregnant women can be associated with increased events such as premature birth (born prematurely), death in pregnant women and also conceived children, and diseases due to infection. Iron deficiency anemia that often occurs in pregnant women can affect the growth and development of the fetus during pregnancy and after birth. (Mulianisaa, 2021)

In general, all pregnant women will get Fe tablets and must be consumed during pregnancy from the age of 3 months (trimester 1) to the age of 9 months (trimester 3). This is to support iron intake into the body of pregnant women, because pregnant women do need a lot of iron intake during pregnancy. Moringa leaves are one of the types of trees for food sources that thrive in Indonesia. The results showed that the calcium content of Moringa leaves (*Moringa oleifera*) amounted to 497.8 mg / 100 grams and iron content of 6.24 mg / 100 grams. Consuming Moringa leaves by making vegetables has become a habit of the community, especially rural communities in the Petir sub-district. The purpose of this study was to determine the effect of Moringa leaf cooking water and sweet orange juice on hemoglobin levels of pregnant women with anemia. (Dhafir, 2020)

METHOD

This research is a type of intervention research with an experimental quasy design. The location used for this research is in the working area of the Lightning Health Center in June 2023. The sample used in this study used a total sampling of 30 pregnant women who would be divided into 2 groups, namely 15 pregnant women with Moringa leaf water and 15 pregnant women with orange juice and had signed informed consent. The intervention was given for 2 weeks, data and research progress were sent and assessed periodically via virtual group (whatsapp). Group 1 received boiled water of 500 mg of Moringa leaves mixed with 250ml of water to drink 1x a day. Group 2 received 250 ml of pure orange juice juice to consume at least 1 orange in a day. Hemoglobin levels are assessed using Hb sticks during ANC examination and categorized in continuous data. Univariate data analysis was displayed to see the distribution of respondent characteristics. The difference test analysis was performed after the normality test and analyzed with an independent t test. Analysis of the difference test between the two groups will be carried out with the Wilcoxon signed rank test.

RESULT AND DISCUSSION

Table 1 based on the table above, this study used respondents as many as 30 samples in terms of age, in this study the majority of pregnant women are young pregnant women under 20 years, which is as many as 15 respondents (50%), not much different respondents at the productive age of 20-35 years as many as 13 people or equivalent to 43.3%,. The highest parity of primipara was 23 respondents or 76.7%. With a high school education of 20 respondents or 66.7%, the majority are housewives and self-employed or work in several factories, with a total of 13 respondents each or equivalent to 43.3%.

Table 1.
Characteristics of Respondents (n=30)

Age of Respondents	f	%
< 20 Years	15	50
20 – 35 Years	13	43.3
> 35 Years	3	6.7
Education		
Elementary (Elementary-Junior High)	10	33.3
Graduated from High School	20	66.7
Parity		
Primipara	23	76.7
Multiparous	7	23.3
Work		
Housewives	13	43.3
Trader/ self-employed	13	43.3
Civil servants	4	13.3

Table 2.
Independent T Test Analysis for the Effect of Moringa Leaves on Haemoglobin Levels (n=30)

Result	Independent T-Test					Df	Sig (2-tailed)
	Hb content (mmHg)			95 Confidence Interval			
	Mean	Minimum	Maximum	Lower	Upper		
Before	8.0	7.3	9.5	8.25	9.12	30	0.000
After	8.9	7.3	11.4				

Table 2 results of the independent T test where the pair Pretest intervention and posttest intervention obtained Sig.2-tailed values of $0.000 < 0.05$, it can be concluded that there is an average difference in haemoglobin levels before and after being given Moringa leaf cooking water. Based on the results of the table above, it can be concluded that the provision of Moringa leaf cooking water is effective in increasing haemoglobin levels and is statistically significant. In addition, there was an increase in the average haemoglobin levels before and after the administration of Moringa leaf water, which was 0.9 mmHg and the maximum value also increased quite significantly from before the intervention only 9.5 mmHg to 11.4 mmHg.

Table 3.
Independent T Test Analysis for the Effect of Squeezed Oranges on Haemoglobin Levels (n=30)

Result	Independent T-Test					Df	Sig (2-tailed)
	Hb content (mmHg)			95 Confidence Interval			
	Mean	Minimum	Maximum	Lower	Upper		
Before	8.3	7.2	9.7	8.01	8.92	30	0.000
After	9.1	7.0	10.8				

Table 3 results of *the independent T test* where the pair Pretest intervention and posttest intervention obtained Sig.2-tailed values of $0.000 < 0.05$, it can be concluded that there is an average difference in haemoglobin levels before and after being given squeezed orange. Based on the results of the table above, it can be concluded that the administration of Moringa leafy oranges is effective in increasing haemoglobin levels and is statistically significant. In addition, there was an increase in average haemoglobin levels before and after the administration of squeezed orange juice, which was 0.8 mmHg and the maximum value also increased quite significantly from before the intervention of only 9.7 mmHg to 10.8 mmHg.

Table 4.
Wilcoxon signed rank analysis

Haemoglobin Levels	Wilcoxon Signed Rank					
	Ranks			Test Statistics		P value
	Mean Rank	Negative rank (n)	Positive rank (n)	Z	Df	
Moringa leaf group	14.32					
Orange Group	16.53	14	16	-0.65	30	0.510

Table 4 results of *the Wilcoxon signed rank* test where the pair Pretest intervention and posttest intervention from both groups gave Sig.2-tailed values of $0.510 > 0.05$, it can be concluded that there was no significant difference in the increase in haemoglobin levels between the groups given Moringa leaf or squeezed orange intervention. Both interventions are considered to increase haemoglobin levels and based on the results of the analysis there were 14 respondents in the orange squeeze group had smaller haemoglobin levels than the Moringa leaf group. While there were 16 respondents in the Moringa leaf group who had haemoglobin levels greater than orange juice.

The Effect of Moringa Leaves on Haemoglobin Levels

Based on the results of the table above, it can be concluded that the provision of Moringa leaf cooking water is effective in increasing haemoglobin levels and is statistically significant. This result is in line with research that reported that there was an increase in the average hemoglobin level of third trimester pregnant women before being given Moringa leaf extract with a mean of 9,642 with after consuming Moringa leaf extract mean 10,648 and p-value $0.000 < 0.005$. Thus there is an effect of Moringa leaf extract consumption on increasing hemoglobin levels of pregnant women. (Hartati, 2021) Moringa leaves have very important nutritional content to prevent various diseases. In addition, it also contains all the essential amino acid elements, namely *argine, histidine, isoleucine, leusine, lysine, methionine, phenylalanine, threonine, tryptophan* and *valine*. In addition, Moringa dain contains protein, fat, *beta carotene* (Vit,A) *thiamin (B1)*, riboflavin (*B2*), *niacin (B3)*, *vitamin C*, *calcium*, *calories*, *carbohydrates*, *copper*, *fiber*, *iron*, magnesium, and *phosphorus*, this is an extraordinary source of Moringa leaf plants (Rismawati, 2021).

According to the Indonesian Food Composition Table (TKPI) in 2018, the energy in 100 grams of Moringa leaves is 92 kcal. In 100 mg of Moringa leaf soup contains 0.85mg of iron, there are also 6.7 gm of protein, and 1.7 gm of fat, energy of 92 Kcal, 440 mg (Ca) calcium, 0.8 mg of Niacin or commonly known as B3, 0.05 mg of Riboflavin or commonly known as Vitamin B2, 0.06 mg Thiamine or commonly known as B1 and the last is 220 mg of Vitamin C. Moringa leaf vegetables can increase the hemoblobin levels of pregnant women in the work area of the Batang-batang

Health Center. Besides being economical, Moringa plants are very easy to obtain. This complementary therapy can support Fe tablets taken by pregnant women (Karami, 2022). (Thenmozhi, 2020)

The Effect of Oranges in Increasing Haemoglobin Levels

Based on the results of the table above, it can be concluded that the administration of Moringa leafy oranges is effective in increasing haemoglobin levels and is statistically significant. This result is in line with research (Putri, 2019) which states that the average hemoglobin pretest level in the intervention group was 9.27gr/dl and the post test was 9.67gr/dl and the t-test results obtained p value $0.000 < \alpha (0.05)$. Thus the provision of orange juice can increase haemoglobin levels in anemic pregnant women. Citrus fruits are high in vitamin C. Keep in mind that vitamin C helps iron absorption up to 30%. When iron needs are large, vitamin C is needed to help the iron absorption process (Simatupang, 2022). Organic acids such as ascorbic acid (vitamin C) can help iron absorption by reducing ferrous to ferrous which is easily absorbed 3-6 times (Irdiansyah, 2022). In addition to containing vitamin C, citrus fruits are easy to obtain, economical, practical and almost everyone likes oranges, and there has been no research that states citrus fruits can cause allergies.

Vitamin C is a white crystal that is easily soluble in water. The main function of vitamin C is for the formation of collagen proteins through the process of hydroxylation. Meanwhile, another function is in metalloenzymes for the formation of nerophineohrine, carnitine, elastine and nucleosides. This vitamin also functions as a reducing agent so that it can increase the absorption of Fe nom heme and reduce metal components for the catalytic activity of related enzymes and inhibit the formation of nitrosamines (Simatupang, 2022).

CONCLUSION

There was no significant difference in increased haemoglobin levels between the groups given Moringa leaf or squeezed orange intervention.

REFERENCES

- Wu, Y. Y. (2020). Prevalence of anemia and sociodemographic characteristics among pregnant and non-pregnant women in southwest China: a longitudinal observational study. *BMC pregnancy and childbirth*, 20, 1-10.
- Mardhiati, R. A. (2022). Hubungan Karakteristik, Pengetahuan Dan Sikap Ibu Hamil Dengan Kepatuhan Mengkonsumsi Tablet Fe di Klinik Karawaci Medika Kota Tangerang Provinsi Banten Tahun 2022. In *Jurnal Formil (Forum Ilmiah) Kesmas Respati* , 7(3), 297-305.
- Karami, M. C. (2022). Global Prevalence of Anemia in Pregnant Women: A Comprehensive Systematic Review and Meta-Analysis. *Maternal and child health journal*, 26(7), 1473-1487.
- Tiyasasih, A. S. (2023). Hubungan Pemberian Zat Besi dalam Kehamilan dengan Kejadian BBLR. *Jurnal Penelitian Perawat Profesional*, 5(1), 209-214.
- PURANTIRA, W. P. (2023). Hubungan Pemberian Asi Eksklusif, Asupan Zat Gizi, Riwayat Bblr, Dan Pengetahuan Gizi Ibu Dengan Kejadian Perawakan Pendek Pada Baduta (Studi di

Wilayah Puskesmas Kandungan Kabupaten Temanggung) . (Doctoral dissertation, Universitas Diponegoro).

Mulianisaa, R. T. (2021). Hubungan Anemia dan KEK dengan Kejadian BBLR. *Jurnal Kebidanan Bestari*, 5(2), 149-157.

Dhafir, F. &. (2020). Kandungan Kalsium (Ca) dan Zat Besi (Fe) Daun Kelor (*Moringa oleifera*). *Jurnal Kreatif Online*, 8(1).

Hartati, T. &. (2021). Konsumsi Ekstrak Daun Kelor Dalam Meningkatkan Kadar Hemoglobin Pada Ibu Hamil. *Malahayati Nursing Journal*, 3(1), 101-107.

Rismawati, R. J. (2021). Manfaat Kapsul Daun Kelor Dalam Meningkatkan Kadar Hemoglobin Ibu Hamil. *Jurnal Kebidanan Malahayati*, 7(2), 229-233.

Putri, S. &. (2019). Perbedaan Pemberian Tablet Fe Dengan Jus Jeruk Dan Tablet Fe Dengan Vitamin C Terhadap Kenaikan Kadar Hemoglobin Pada Ibu Hamil Trimester II. *Jurnal Kebidanan Malahayati*, 5(2).

Simatupang, M. &. (2022). Efektivitas Jus Jeruk, Tomat, dan Madu untuk Mengatasi Anemia pada Ibu Hamil. *Jurnal Penelitian Kesehatan" SUARA FORIKES"(Journal of Health Research" Forikes Voice"*, 13(4), 913-919.

Irdiansyah, M. Y. (2022). Asuhan Keperawatan melalui intervensi pemberian jus jeruk sunkist pada ibu hamil dengan anemia dalam kehamilan di desa pengalaman. *Nerspedia*, 4(1), 1-7.

Simatupang, M. &. (2022). Efektivitas Jus Jeruk, Tomat, dan Madu untuk Mengatasi Anemia pada Ibu Hamil. *Jurnal Penelitian Kesehatan" SUARA FORIKES"(Journal of Health Research" Forikes Voice"*, 13(4), 913-919.

Thenmozhi, P. N. (2020). *Moringa oleifera* leaves soup on hemoglobin among antenatal mothers. *Education*, 34(40), 5.