JURNAL KEBIDANAN DAN KESEHATAN TRADISIONAL

Jurnal Kebidanan dan Kesehatan Tradisional
Volume 10, Number 1, March 2025
https://doi.org/10.37341/jkkt.v10i1.498

Original Research

Fitamia Powder Drink as a Functional Food to Increase Hemoglobin Levels in Anemic Adolescent Girls

Ade Ifah Latifah[1*], Hidayat Wijayanegara[2], Meti Widya Lestari[3], Teni Nurlatifah[4], Yanti Herawati[5], Ma'mun Sutisna[6]

[1]Post Graduate Program of STIKes Dharma Husada Bandung, Indonesia
[2,4,5]Department of Postgraduate Program, STIKes Dharma Husada Bandung, Indonesia
[3]Department of Midwifery, Poltekkes Kemenkes Tasikmalaya, Indonesia
[6]Department of Comercial Administration, Politeknik Negeri Bandung, Indonesia

ABSTRACT

Background: *The low interest in consuming Fe tablets is one of the factors that causes the standard management of anemia in adolescent girls to still not be optimal. Fitamia is a powdered drink combining carrot and ginger which aims to attract teenagers' interest in consuming functional drinks which have the potential to increase hemoglobin levels. The aim of the research is to analyze the effectiveness of Fitamia powder drinks in improving anemia in adolescent girls.*

Methods: *This research uses a quantitative approach in the form of a randomized experiment with a pretest and posttest with control group design. Sampling used a multistage sampling technique. Data analysis used paired t-test, independent t-test, N-Gain percent, and Mann-Whitney.*

Results: *Fitamia powder drink increased hemoglobin levels on the 31st day (p-value < 0.001) and on the 45th day (p-value < 0.001). The acceptability of Fitamia powder drinks is higher than Fe tablets in terms of color (p-value 0.007), aroma (p-value 0.011), taste (p-value <0.001) and lower gastrointestinal effects compared to Fe tablets (p-value < 0.001).*

Conclusion: *Fitamia powder drink can increase hemoglobin levels in young women. The acceptability of Fitamia powder drink products is higher than Fe tablets and causes lower gastrointestinal effects than Fe tablets. Fitamia powder drink is recommended as an alternative iron supplementation for young women due to its effectiveness in increasing hemoglobin levels, higher acceptability, and fewer gastrointestinal side effects.*

ARTICLE HISTORY
Received: January 9th, 2024
Accepted: April 4th, 2025

KEYWORDS
Adolescent girls; anemia; fitamia; hemoglobin; powder drinks

CONTACT
Ade Ifah Latifah
✉
Adeifalatifah9@gmail.com
Postgraduate Program of STIKes Dharma Husada Bandung, Jln. Jakarta Canal No. 75, Antapani, Bandung, Indonesia.

Cite this as: Latifah, A. I., Wijayanegara, H., Lestari, M. W., Nurlatifah, T., Herawati, Y., & Sutisna, M. (2025). Fitamia Powder Drink as a Functional Food to Increase Hemoglobin Levels in Anemic Adolescent Girls. *Jurnal Kebidanan Dan Kesehatan Tradisional*, *10*(1), 19–28. https://doi.org/10.37341/jkkt.v10i1.498

INTRODUCTION

Iron deficiency is a major nutritional problem in developing countries and is the main cause of anemia in the world, more than 20% of women in the world experience iron deficiency during the reproductive period. Based on 2018 Basic Health Research

(Riskesdas) data, the incidence of anemia in pregnant women was recorded at 48.9% and 32% of the proportion of anemia in pregnancy occurred in the 15–24 year age group (Ministry of Health of the Republic of Indonesia, 2018). The incidence of anemia in pregnant women can be caused by the high prevalence anemia in adolescent girls and preconception women due to low preconception iron stores is associated with an increased risk of progressive anemia during pregnancy. WHO has reported that as many as 58% of pregnant women who suffer from anemia have also experienced anemia since before pregnancy Adolescent girls have a higher risk of developing anemia than adolescent boys because every month adolescent girls experience menstruation (World Health Organization/WHO, 2021). Menstruation causes women to lose iron up to twice the amount of iron lost in men. Adolescent girls are the future generation who will determine the next generation, if anemia is not treated immediately it will have a bad impact throughout adulthood and can be a trigger factor for high rates of maternal morbidity and mortality. Anemia that persists until pregnancy can have negative impacts on the mother and fetus, children born with iron deficiency are at risk of experiencing difficulties in cognitive, social, emotional, adaptive and motor function development (Zhang et al., 2022).

Based on the impact and the high incidence of anemia in adolescent girls, this indicates that adolescent girls still need special attention to avoid anemia. Standard management of anemia with Fe tablet supplementation is still not optimal, one of the factors causing this is the problem of compliance due to the gastrointestinal side effects that result, causing patients not to consume Fe tablets regularly or for the recommended period of time, thereby hampering their effectiveness. There are several ways to prevent and treat anemia, one of which isis by creating a product that can attract teenagers' interest in consuming food or drinks that have the potential to increase hemoglobin levels (Rissa, 2024). Since ancient times, people have used plants, especially food plants, to meet their needs. The habits of local communities in the use of plants or food ingredients are influenced by various factors, including availability in nature, culture, taste and nutritional value contained therein. Vegetable food has several advantages over animal food, including easier processing, easier obtainable, and cheaper (Kurniati & Hernawati, 2022).

Carrots are one of the vegetable foods that are widely cultivated in Indonesia, the total production of carrots in Indonesia in 2022 will reach 737.965 tons. Apart from carrots, ginger is a spice plant that is used as a drink or mixture in food which is very often used by Indonesians. According to the Food and Agriculture Organization (FAO), Indonesia is in the top 10 largest ginger producing countries in the world. Based on data from the Central Statistics Agency (BPS), Indonesia is capable of producing up to 247.45 million kilograms of ginger in 2022 and West Java is recorded as the largest national ginger producer with the amount reaching 22.12% of the total ginger production in Indonesia in 2022 (Annur, 2022).

The abundant availability of carrots and ginger with relatively economical selling value should be of benefit to the community. Carrots and ginger can be used as an effort to overcome the problem of anemia in society, especially iron deficiency anemia in young women. Fitamia, which stands for (Fit without Anemia), is a powder drink made from a combination of carrots (Daucus carota L) and ginger (Zingiber officinale Roscoe). The formulation used in the Fitamia powder drink uses 80% carrot powder and 20% ginger juice/starch. Fitamia is packaged using aluminum foil measuring 8x9 cm at a dose of 15 grams per sachet. The carrots used are chantenay carrots which come from the

Agricultural Center of Buniasih Village, Kadipaten District, Tasikmalaya Regency. Chantenay type carrots have higher levels of beta carotene than imperator type carrots. Based on previous research, it was stated that the beta carotene content of chantenay type carrots is 1358.5 mg while the imperator type is 1286 mg. Apart from that, chantenay carrots are preferred because they taste sweet and have minimal unpleasant odor (Lubis, 2019).

The ginger used in making this powdered drink is taken from a group of ginger farmers located in Kp. Parung, Guranteng Village, Pagerageung District, Tasikmalaya Regency. The ginger chosen was large white ginger, because large ginger has a less spicy taste and a less sharp aroma. Although based on research, the vitamin C content of red ginger (Z. officinale var. Rubra) is superior to white ginger (Z. officinale Roscoe), namely 18.11 mg/100 grams, but the vitamin C content of white ginger is also quite high, namely 15.2 mg/100gram (Wahyani & Fera, 2022).

Fitamia is a powdered drink that combines carrots (Daucus carota L) with ginger (Zingiber officinale Roscoe) which aims to attract young women's interest in consuming functional drinks that have the potential to increase hemoglobin levels and are effective for improving anemia. The aim of this research was to determine the effect of Fitamia powder drink in increasing hemoglobin levels in anemic adolescent girls at Public vocational secondary schools Situraja, Sumedang Regency.

MATERIALS AND METHOD

This research has been registered with the Institute of Health Science Dharma Husada Bandung Health Research Ethics Committee with Ethical Clearence No. 200/ KEPK/ SDHB/ B/ XI/ 2023. This research involved 52 anemic female students at Public vocational secondary schools Situraja, Sumedang Regency. The inclusion criteria in this study were female students with Hb levels of 8.0–11.9 and female students who are willing not to drink tea during the research process. The exclusion criteria in this study were anemic female students with comorbidities, anemic female students with menstrual disorders/bleeding outside menstruation (metrorrhagia), students with anemia who have a history of blood disorders such as leukemia, thalassemia, or other hematological disorders that have been diagnosed.

Sampling in this study used a multistage sampling technique, namely the first stage by collecting data on class by looking at the conjunctiva, at this stage 76 female students were captured. Then the 76 female students had their hemoglobin levels checked using a hematology test strip (easy toch GCHb). At this stage, 68 female students were detected with Hb levels of 8.0–11.9. The next stage was sampling of the 68 female students and it was found that 52 female students met the inclusion and exclusion criteria. The next stage is that the female students selected are anemic. Based on inclusion and exclusion criteria, students with odd serial numbers were assigned to the intervention group and control group using a simple random sampling technique, namely by drawing lots, female students with odd serial numbers were included in the intervention group, and female students with even numbers were included in the control group.

After the respondents were selected, they were randomly divided into two main groups; the intervention group, which was the group that was given phytamia powder drink, while the control group, which was the group that was only given Fe tablets. Doses given to both groups, namely phytamia powder drinks were given at a dose of 1x1 sachet/ day in the intervention group, and Fe tablets were given 1x1 tablet/ 4 days in the control group. Both treatments were performed for 44 days. Participants did not know whether

they were in the treatment or control group. During the study to completion there was no impact caused by the administration of Phytamia drinks and fe tablets in both the intervention group and the control group.

The data analysis process was carried out by first testing the normality of the data using Shapiro-Wilk. Apart from the normality test, a homogeneity test was carried out using the Levene test to determine variations in the two sample groups. The paired t-test was used to determine the meaning difference before and after the intervention in each group. The bivariate test for differences in hemoglobin levels for two unpaired groups used the independent t-test, while the test for differences in product preference levels used the Mann Whitney test. Next, an N-Gain test is carried out to determine the level of success/effectiveness of a treatment.

RESULTS

Table 1. The Characteristics of BMI, Menstrual Cycle, Duration of Menstruation, Inhibitor Consumption, and Hemoglobin Levels (n = 52 Female Students)

Variable	Intervention Group (n=26)		Control Group (n=26)		*p-value**
	(n)	(%)	(n)	(%)	
Body Mass Index (BMI)					0.451
Thin	2	7.7	3	11.5	
Normal	23	88.5	21	80.8	
Overweights	1	3.8	2	7.7	
Total	**26**	**100**	**26**	**100**	
Menstrual Cycle					0.175
<28 days	5	19.2	7	26.9	
28–35 days	21	80.8	18	69.2	
>35 days	0	0	1	3.8	
Total	**26**	**100**	**26**	**100**	
Length of Menstruation					0.167
1–7 days	22	84.6	20	76.9	
>8 days	4	15.4	6	23.1	
Total	**26**	**100**	**26**	**100**	
Inhibitor Consumption					0.373
Never	1	3.8	0	0	
Sometimes	20	77	19	73.1	
Often	5	19.2	7	26.9	
Total	**26**	**100**	**26**	**100**	
Hemoglobin levels					0.157
11.0–11.9	16	61.5	18	69.2	
8.0–10.9	10	38.5	8	30.8	
Total	**26**	**100**	**26**	**100**	

Note: n = number of observation; BMI = 18.5-24.9, **Levene's Test*

Based on Table 1, the characteristics of BMI, menstrual cycle, duration of menstruation, inhibitor consumption, and hemoglobin levels in both groups were

homogeneous, which did not affect the results of the study. This shows that there is no significant difference between the two groups with the results of the BMI variable showing a p-value of 0.451, menstrual cycle showing a p-value of 0.175, length of menstruation showing a p-value of 0.167 and inhibitor consumption showing a p-value of 0.373.

Table 2. Differences in Hemoglobin Levels Before and After the 31 st and 45 th Day of Intervention

Variable	Group		*p-value*
	Intervention	**Control**	
	Mean±SD	**Mean±SD**	
Hemoglobin Levels (Before-After the 31 st Day)			
Pre-test	11.04 ± 0.64	11.17 ± 0.50	0.004[a]
Post-test	11.51 ± 0.57	11.95 ± 0.47	
p-value	<0.001[b]	<0.001[b]	
Difference	0.47±0.07	0.78±0.03	0.001[a]
Hemoglobin Levels (Before-After the 45 th Day)			
Pre-test	11.04 ± 0.12	11.17 ± 0.50	0.002[a]
Post-test	11.88 ± 0.10	12.29 ± 0.39	
p-value	<0.001[b]	<0.001[b]	
Difference	0.84±0.2	1.12 ± 0.11	0.017[a]

[a]*Independent t-test*
[b]Paired t-test

Based on Table 2, there was a significant difference in the mean hemoglobin levels within each group before and after the intervention on both day 31 and day 45 ($p<0.05$). On day 31, the hemoglobin level increased from 11.04 to 11.51 in the intervention group and from 11.17 to 11.95 in the control group, with a significant difference between groups ($p=0.004$). On day 45, the hemoglobin level increased to 11.88 in the intervention group and to 12.29 in the control group, with a statistically significant difference between groups ($p=0.002$).

Table 3. Test of The Level of Effectiveness Between Fitamia Powder Drinks and Fe Tablets in Improving Anemia

Variable	Group			
	Intervention		**Control**	
	Gain (%)	**Information**	**Gain (%)**	**Information**
Hemoglobin Levels				
Post-test the 31 st Day	23.9	Ineffective	43.6	Less effective
Post-test the 45 th Day	44.2	Less effective	61.5	Effective enough

[*]N-Gain Percent Effectiveness Test

Based on Table 3 of the effectiveness test using N-Gain percent, it can be seen that the intervention group obtained a score of 23.9% in the ineffective category on the 31st day post-test and a score of 44.2% in the less effective category on the 45 th day of the post-test. Meanwhile, the control group obtained a score of 43.6% in the less effective

category on the 31st day of posttest and a score of 61.5% in the quite effective category on the 45 th day of post-test.

Table 4. Comparison of Acceptability Between Intervention and Control Groups (n = 52 Female Students)

Acceptability Aspect	Group	Median Score	Preference Category	p-value*
Color	Intervention	4.0	Like	0.007
	Control	3.0	Just like it	
Aroma	Intervention	4.0	Like	0.011
	Control	3.0	Just like it	
Flavor	Intervention	4.0	Like	<0.001
	Control	2.0	Do not like it much	
Gastrointestinal Effects	Intervention	1.0	None	<0.001
	Control	2.0	Present	

Note: *Mann-Whitney Test

Table 4. shows that the level of product preference in terms of color, aroma and taste in. Fitamia powder drinks is higher than Fe tablets (p-value <0.05), and the gastrointestinal side effects caused by Fitamia powder drinks are significantly lower than Fe tablets p-value =0.002 (p-value<0.05).

DISCUSSION

Based on research conducted on 26 respondents in the intervention group who were given Fitamia powder drink at a dose of 1x1 sachet (15 grams) every day. It showed that there was a significant difference in the average hemoglobin levels before the intervention was given and after the intervention was given on the 31st day and on the 31st day. 45. This increase in hemoglobin levels is due to the Fe content of 1.5 mg, vitamin C 12 mg and beta carotene 1.5 mg content in the Fitamia powder drink which comes from carrots and ginger. Fe (iron)is the most important element in the formation of hemoglobin (Ani, 2022).

Apart from iron which can increase hemoglobin levels, Fitamia powder drinks also contain vitamin C. Vitamin C can help the absorption of iron in the body by reducing ferric iron (Fe3+) to ferrous (Fe2+) in the intestines so that it is easily absorbed by the body. Vitamin C can increase acidity, besides that vitamin C can form iron ascorbate groups which remain soluble at high pH in the duodenum so that it can increase iron absorption by up to 30%. Apart from vitamin C, beta carotene also plays a role in the formation of red blood cells.Beta carotene is the most active form of provitamin A which is converted into vitamin A in the liver. Vitamin A functions to form new erythrocytes through activating erythropoiesis in the bone marrow.Vitamin A plays an important role in the incidence of anemia because of the influence of vitamin A on Fe metabolism resulting in changes in the hematological status in the body (Fiedor et al., 2021).

This research has results that are in line with previous research that by giving juice using a dose of 100 grams of carrots and 100 grams of guava with iron supplements given 2 times a week for one month, it has been proven to increase the average Hb level by 1.8 gr/dL with a p-value = <0.001, which means statistically there was a significant difference between Hb levels before and after the intervention. Previous research also stated that

there was a significant difference in Hb levels before and after being given processed peanut milk combined with ginger for 2 months (Seprina, 2018).

This research shows that the increase in hemoglobin levels on day 31 and day 45 was higher in the Fe tablet group than in the Fitamia powder drink group. The low increase in Hb levels in the Fitamia powder drink group compared to Fe tablets could be caused by the iron content in Fe tablets being quite high compared to Fitamia powder drinks.This is in line with the theory which says that Fe (iron) is the most important element in the formation of hemoglobin (Ani, 2022). So, rationally increasing Hb levels will be better in the control group than in the intervention group. Previous research stated that assuming an average absorption of 10% iron in the form of medication, the daily iron requirement for women of childbearing age is 20 mg (Jinghuan et al., 2019). Previous research stated that Fe tablets containing 60 mg of iron are an effective supplement for treating anemia. iron deficiency (Haryanti & Kamesyworo, 2020).

In line with the results of Sugita (2020) research that there is an effect of date fruit consumption on increasing hemoglobin levels in third trimester pregnant women. In the discussion that by consuming dates for pregnant women who do not consume tablets blood enhancers or Fe tablets can make dates as an alternative to meet the needs of iron so that they can avoid anemia. The higher increase in Hb levels in the control group could also be caused by Fe supplementation being given intermittently, as previous research states that weekly iron supplementation has the same effectiveness as weekly supplementation and during menstruation in increasing hemoglobin levels in adolescent girls. This in accordance with the theory states that intestinal cells have a turnover period every 5-6 days. Intestinal cells have limited iron absorption capacity so that intermittent iron supplementation is more efficient in absorbing iron (Sugita, 2020).

The research results also showed that Fitamia powder drinks were less effective in improving anemia compared to Fe tablets. The low effectiveness of Fitamia powder drinks in improving anemia is possible because the Fe content in Fitamia powder drinks does not comply with nutritional supplementation product standards as stated in the Regulation of the Minister of Health of the Republic of Indonesia Number 88 of 2014 concerning Standards for Blood Supplement Tablets for Women of Childbearing Age and Pregnant Women, that Iron given to women of childbearing age and pregnant women contains at least iron equivalent to 60 mg elemental iron and 0.40 mg folic acid. Low efficacy is also possible because the duration of intervention in this study was less than the length of the period used in anemia therapy. This is in line with previous research which stated that oral iron therapy in women with deficiency anemia for 3 months showed good tolerability and higher efficacy. In line with previous research using iron supplements containing 14 mg Fe/day and checking on days 15, 45, and 90 showed that hemoglobin and hematocrit increased after giving therapy for 90 days (Mz & Windiastuti, 2018).

The low effectiveness of Fitamia powder drink in improving anemia may be due to its iron content which is in non-heme form. Heme iron found in meat and fish has a higher absorption rate (15-35%) compared to non-heme iron from cereals, legumes, fruits and vegetables (2-20%). This is because human intestinal enterocytes contain specific heme-binding proteins for efficient absorption, whereas non-heme iron relies on non-specific divalent metal transport receptors, reducing its absorption (O'Toole et al., 2024). The low efficacy of Fitamia powder drinks can also be caused by one of the micronutrients in Fitamia in the form of beta carotene (pro vitamin A). This is in accordance with the theory which states that beta carotene will be converted into vitamin A in the body and the chain

will break which will produce 2 retinal, but this does not mean that 1 beta carotene is equivalent to 2 retinal/vitamin A, because the conversion of vitamin A in the body has low efficiency and absorption (Huang et al., 2021). If analyzed further, of course various factors can be found that can cause the hypothesis in this study to be rejected, but the most likely and closest factor is due to several causes that have been explained above. In this study, a more detailed analysis of possible factors was not carried out.

The results of this study show that the acceptability of Fitamia powder drink products based on the level of preference for color, aroma and taste is significantly higher than Fe tablets, and the gastrointestinal effects caused by Fitamia powder drinks are significantly lower than Fe tablets. The overall p-value shows <0.05 so it can be said that Fitamia powder drinks are preferred over Fe tablets. This is in accordance with the theory that there are three factors that can influence the level of liking. The first factor is color, color is the attractiveness of a food or drink for all ages. Then aroma is the second factor which is a strong attraction and is able to stimulate the sense of smell so that it can arouse a person's appetite. The third factor is taste, taste determines the taste of food or drink after appearance, taste has an important role, because with taste indicators consumers can find out and judge whether the food or drink is delicious or not (O'Toole et al., 2024; Rissa, 2024).

Another factor that can influence the level of preference for functional products to increase Hb levels is minimal gastrointestinal side effects, as based on 2018 Basic Health Research (Riskesdas) data, that one of the reasons for non-compliance among young women in consuming Fe tablets is because they cause gastrointestinal side effects. In this study it was discovered that the gastrointestinal effects of Fitamia powder drinks were lower than Fe tablets. The combination of chantenay carrots with white ginger makes the taste of Fitamia powder drink sweet, fresh, and has minimal side effects, making it more preferable than Fe tablets (O'Toole et al., 2024; Rissa, 2024).

This study was limited by a relatively small sample size and a preliminary formulation of the Fitamia powder drink, which may affect the generalizability of the findings. Future studies are recommended to increase the sample size to enhance the validity of the results. In addition, further research should explore reformulating the Fitamia powder drink and testing various dosage levels to identify a more effective and optimized formulation.

CONCLUSION

Fitamia powder drink can increase the hemoglobin levels of anemic teenage girls. The increase in hemoglobin levels with Fitamia powder drinks is lower than the increase in hemoglobin levels with Fe tablets, however, the acceptability of Fitamia powder drink products is higher than with Fe tablets and has lower gastrointestinal side effects than Fe tablets. The advice given is that Fitamia powder drink can be used as a functional drink to increase hemoglobin levels, and Fe tablets should still be consumed as standard therapy in managing anemia.

ACKNOWLEDGEMENT

The authors would like to express their sincere gratitude to STIKes Dharma Husada Bandung for the support and assistance provided during the implementation of this study. The contributions in terms of facilities, resources, and coordination were invaluable to the successful completion of the research.

REFERENCES

Ani, L. (2022). *Pocket book on iron deficiency anemia during pregnancy and pregnancy*. EGC Medical Book Publishers.

Annur, C. (2022). *10 National largest ginger producing provinces*. (downloaded 01 March 2024). Available from: West Java, Largest National Ginger Producing Province 2022 (katadata.co.id).

Fiedor, J., Przetocki, M., Siniarski, A., Gajos, G., Spiridis, N., Freindl, K., & Burda, K. (2021). β-carotene-induced alterations in haemoglobin affinity to O2. *Antioxidants*, *10*(3), 1–12. https://doi.org/10.3390/antiox10030451

Haryanti, E., Kamesyworo, M. (2020). Effect of administering internal iron tablets increased hemoglobin levels in adolescents in high school. *Journal Health Poltekkes Palembang*, *15*(2), 136–9.

Huang, Y., Chen, H., Su, Y., Liu, H., Hu, J., & Hong, K. (2021). Increased blood alpha-carotene, all-trans-Beta-carotene and lycopene levels are associated with beneficial changes in heart rate variability: A CVD-stratified analysis in an adult population-based study. *Nutrition Journal*, *20*(1), 1–10. https://doi.org/10.1186/s12937-021-00700-w

Jinghuan, J., Hu, Y., Li, M., Chen, J., Mao, D., Li, W., Wang, R., Yang, Y., Piao, J., Yang, L., & Xiaoguang, X. (2019). Prevalence of anemia in chinese children and adolescents and its associated factors. *International Journal of Environmental Research and Public Health*. https://doi.org/10.3390/ijerph16081416

Kurniati Y, Hernawati D, P. R. (2022). Ethnobotany of food plants in the village Cigedung, Garut Regency. *J Mathematics, Science and Learning*, *8*(2), 151–8.

Lubis. (2019). *A practical guide to the cultivation and benefits of carrots*. Publisher Bhuana Popular Science Gramedia Group.

Ministry of Health of the Republic of Indonesia. (2018). *RISKESDAS main results*. Jakarta: Research and Development Agency.

Mz, M., & Windiastuti, E. (2018). *Anemia pada neonatus: Buku ajar hematologi onkologi anak*. Ikatan Dokter Anak Indonesia (IDAI).

O'Toole, F. E., Hokey, E., McAuliffe, F. M., & Walsh, J. M. (2024). The experience of anaemia and ingesting oral iron supplementation in pregnancy: A qualitative study. *European Journal of Obstetrics and Gynecology and Reproductive Biology*, *297*, 111–119. https://doi.org/10.1016/j.ejogrb.2024.03.005

Regulation of the Minister of Health of the Republic of Indonesia Number 88 of 2014 Concerning Standard Blood Supplement Tablets for Women of Childbearing Age and Pregnant Women (2014).

Rissa, M. (2024). Impact of iron tablet and moringa leaf capsule supplementation on hemoglobin levels in anemic pregnant women in Pariaman City, 2016. *Journal of Evidence-Based Nursing and Public Health*, *1*(2), 1–11. https://doi.org/10.61511/jevnah.v1i2.2024.1145

Seprina Z, S. F. (2018). Effect of peanut milk and ginger for anemia in pregnant mother. *Science Tower*, *12*(8), 187–93.

Sugita, S. (2020). Pengaruh konsumsi buah kurma terhadap peningkatan kadar hemoglobin pada ibu hamil trimester III. *Jurnal Kebidanan Dan Kesehatan Tradisional*, *5*(1), 58–66. https://doi.org/10.37341/jkkt.v5i1.138

Wahyani A & Fera M. (2022). Analysis of vitamin C and physical content in powder red ginger, large ginger, and emprit ginger as an immune booster. *Journal Public Health*, *10*(2), 246–55.

World Health Organization (WHO). (2021). *Anaemia in women and children. Geneva*. (downloaded 01 March 2024). Available from: Anaemia in women and children

Zhang, J., Li, Q., Song, Y., Fang, L., Huang, L., & Sun, Y. (2022). Nutritional factors for anemia in pregnancy: A systematic review with meta-analysis. *Frontiers in Public Health*, 1–13. https://www.crd.york.ac.uk/prospero/