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The Effect of Administration of Morage Brownies on Increasing Hemoglobin Levels in Pregnant Women

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Abstract

Data of Provincial Health Agency in 2017 revealed that there were 899 pregnant mothers with anemia while the second-highest number recorded in Gorontalo City for 161 people. Additionally, data of Health Agency of Gorontalo City in 2018 found Puskesmas Dungingi as the highest spot with anemia for 64 people. The research aimed to analyze the influence of moringa brownies towards the increase of hemoglobin level at pregnant mothers in the working area of Puskesmas Dungingi of Gorontalo City in 2019. Research methodology: it applied pre-experimental research with one group pre-post test approach. The population of this research was 50 pregnant mothers in trimester II and II. The sampling applied purposive sampling so that it obtained 30 people as samples. The independent variable was moringa brownies, and the dependent variable was the hemoglobin level. The finding of research: the hemoglobin level of respondents who consumed moringa brownies increased for 66,7% and those who did not increase was 33,3%. The data analysis used Mc Nemar test, which achieved p-value for 0,002 < 0,05. Conclusion: there was an influence of moringa brownies towards the increase of hemoglobin level at pregnant mothers.

Keywords: *moringa brownies, pregnant mothers, and hemoglobin level*

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Introduction

Pregnancy is something that is very coveted by all couples, but sometimes pregnancy is accompanied by various complications that can harm the mother and the fetus. One of the most common problems encountered in pregnancy and is a common problem in health is anemia. Anemia in pregnancy is a national problem, because it reflects the value of the socio-economic welfare of the community and has a very large influence on the quality of human resources (Safitri, Husna, & Sakdiah, 2021). Anemia is one of the public health problems in Indonesia that can be experienced by all age groups from toddlers to the elderly. 2018 basic health research shows that the prevalence of anemia in pregnant women in Indonesia is 48.9% (Kemenkes RI, 2018). Pregnant women are

one of the groups prone to malnutrition, because there is an increase in nutritional needs to meet the needs of the mother and fetus. The wrong diet in pregnant women has an impact on the occurrence of nutritional disorders, including anemia, less weight gain in pregnant women and impaired fetal growth. (Susiloningtyas, 2012) Iron deficiency anemia in pregnant women can cause low birth weight, premature birth, perinatal and neonatal death (Wesström, 2020). In addition, anemia can cause significantly higher maternal morbidity and mortality and perinatal mortality. Pregnant women who suffer from severe anemia can increase the risk of maternal and infant morbidity and mortality, the possibility of giving birth to LBW and premature babies is also greater (Kurniawati, 2019)

Iron deficiency anemia is one of the manifestations of anemia in mothers, children and nutritional problems (Usastiawa, ty Cik Ayu Saadiah Isnainy, & Rosalia, 2019). Anemia is a common blood disorder that occurs when the level of red blood cells (erythrocytes) in the body becomes too low. Anemia is a condition with hemoglobin levels below 11 g/dl in

pregnant women in the first and third trimesters or levels <10.5 g/dl in the second trimester. Pregnant women are said to have anemia. if the concentration of hemoglobin (Hb) < 11.0 g/dl. Anemia in pregnancy can be caused by iron deficiency and is a type of anemia whose treatment is relatively easy and even cheap. The contribution of anemia in pregnancy to maternal mortality in Indonesia is estimated at 10% to 12%. This means that 10-12% of maternal deaths in Indonesia can actually be prevented if the incidence of anemia in pregnant women can be reduced to a minimum (Safitri et al., 2021). Factors that can cause iron deficiency anemia include lack of iron intake which is influenced by people's consumption patterns, increased body needs due to infection, chronic disease, pregnancy, menstruation and socio-economic factors. Iron deficiency anemia can cause impaired immune response that is susceptible to infection, gastrointestinal disorders, impaired physical work ability, cognitive and behavioral disorders. In addition to developmental disorders, iron deficiency can also cause neurological disorders

(Usastiawa, ty Cik Ayu Saadiah Isnainy, & Rosalia, 2019).

Indonesia is a developing country with various types of health problems, including anemia in pregnant women. Based on Riskesdas data in 2018, the prevalence of anemia in pregnant women in Indonesia was 48.9%. Based on data from the Provincial Health Office in 2017, the Maternal Mortality Rate was 205.1 per 100,000 live births. Data from the 2017 Provincial Health Office of anemia in pregnant women as many as 899 people, with the highest number being in Boalemo Regency as many as 507 people, Gorontalo City 161 people, Gorontalo Regency 151 people, North Gorontalo Regency 74 people, Bone Bolango Regency 6 people. This figure shows that anemia in pregnant women is approaching a public health problem. Data from the Gorontalo City Health Office 2018 the number of pregnant women with the highest anemia was at the Dungigi Health Center as many as 64 people. Based on an initial survey conducted by researchers by interviewing 15 pregnant women in the city of Gorontalo, some pregnant women believe that they are only allowed to eat with

vegetables and do not eat side dishes, especially meat and eggs. In addition, the food menu was found to be less varied. This will result in a lack of consumption of iron derived from animal iron so that it will lead to iron deficiency anemia in pregnant women. The government's efforts in suppressing the incidence of anemia are currently still focused on the fulfillment of Fe tablets consumed during pregnancy. Chemical drugs have side effects that make consumers uncomfortable, high drug resistance, and the possibility of accumulating in the body. Giving iron supplements, with a daily dose of 1 tablet containing 60 mg elemental iron and 0.25 g folic acid for at least 90 days during pregnancy. Compliance in taking iron supplements is something that must be considered. Optimizing the handling of anemia in pregnant women can be done through diversification of the development of local food formulas by considering aspects of nutrition, health benefits, acceptability, endurance and superiority of local food resources. One of the efforts that can be done is through the development of food products into supplements. Foods that have good nutritional content are Moringa

leaves (Moringa Oleifera). (Irwan, Salim, & Adam, 2020)

One way to overcome anemia in pregnant women is to increase the consumption of foods that contain high iron, one of which is Moringa leaves (Moringa Oleifera). The high content of iron (Fe) in Moringa leaves is equivalent to 25 times higher than spinach. Moringa leaves can be used as an alternative to overcome anemia in pregnant women, Moringa leaves contain iron 28.29 mg in 100 grams (Mutia Rahmawati, 2017)

Based on the results of research conducted by Yulianti (2016) that consumption of Moringa leaf extract in adolescent girls can increase hemoglobin levels (Yulianti, Hadju, & Alasiry, 2016).

Based on the results of research by Aninda et al (2019) that Moringa leaves can be made into powder to facilitate its use as a functional food ingredient. Not only that, Moringa leaves that are dried into powder have more nutritional content than when this plant is in the form of raw leaves. Trees for Life, which is an organization in America reports that per gram of dried Moringa leaves (powder) contains 10 times more vitamin A than carrots, 17 times more

calcium than milk, 25 times more iron than spinach, 9 times more lots of protein from yogurt, and 15 times more potassium than bananas.

Based on the description of the problem above, researchers are interested in making an update in previous research, namely making brownies with the substitution of Moringa leaf flour (moringa oleifera) as an effort to overcome anemia in pregnant women.

Method

Method This type of research is a type of quantitative research with the Pre Experiment method with a research design of one group pretest posttest design (Sugiono).

The variables used in this study are the independent variable, namely Moringa brownies and the dependent variable, namely hemoglobin levels.

The sample in this study was 30 pregnant women with Hb levels below (Hb <11 g/dl) based on sampling using a non-random sampling technique in the form of purposive sampling. Determination of sample size using inclusion and exclusion criteria.

a. Inclusion Criteria

    The sample in this study is the sample encountered during research that meets the following inclusion criteria:

    1) Pregnant women with a gestational age of 13-28 weeks and 29-40 weeks

    2) Hemoglobin level <11 g/dl

    3) Willing to be a respondent.

b. Exclusion Criteria

    The criteria for research subjects are not eligible to be used as samples because they do not meet the research sample requirements, namely:

    1) Mothers with pregnancy complications.

    2) Currently in the process of another therapy.

The research location was carried out at the Dungingi Health Center, Gorontalo City, this research was carried out on June 09 - June 23, 2020. he analysis used to determine the relationship between the independent variable, namely Moringa brownies, and the dependent variable, namely Hb levels using the Mc Nemar test with tools using the Statistical Data Processing Software program.

Results and Discussion

The analysis used in this research is univariate and bivariate analysis.

Univariate analysis is to determine the characteristics of each variable studied while bivariate analysis is an analysis used to assess the relationship between two variables.

a. Univariate Analysis

    Table 1. Hemoglobin levels before consuming Moringa brownies

Pre Intervensi	Total	%
≥11 gr/dl	0	0
≤11 gr/dl	30	100,0
Total	30	100,0

    Based on the results of the study in Table 1. it shows that before giving Moringa brownies the respondents had Hb levels not 11 g/dl as much as 100.0%.

    According to Manuaba (2017), pregnant anemia is called "potential danger to mother and child' anemia (potentially endangering mother and child). Anemia in pregnant women is a condition in which red blood cell levels decrease so that it can affect the oxygen carrying capacity of the mother and fetus to be reduced. (Manuaba, 2017)

An indication of anemia in pregnancy is if the hemoglobin concentration is less than 10.5 to 11.0 g/dl. The low capacity of the blood to carry oxygen triggers the body's compensation by spurring the heart to increase cardiac output. A heart that is constantly being pushed hard can lead to failure. heart and other complications such as preeclampsia (Roosleyn, 2016)

According to Purwaningtyas et al (2017) that anemia that often occurs in pregnant women is anemia due to iron deficiency (Fe) or called iron nutritional anemia (AGB). Approximately 95% of cases of anemia during pregnancy are due to iron deficiency (Anggraini & Rahayu, 2017)

According to the results of research conducted by Purnamasari et al (2020) anemia in pregnancy is influenced by education, knowledge and information about anemia (T, 2020), The results of research conducted by Syalfina et all (2019) that anemia in pregnant women is influenced by factors of work, income and husband's support (Syalfina, A. D., Irawati, D., & Priyanti, 2019)

Based on the description above, anemia in pregnancy is still a public health problem that really needs special attention in creating the maximum degree of women's health, because women's health is the main parameter of public health status because women are the ones who create new lives and sustain the lives of all family members.

Table 2. Hemoglobin levels after consuming Moringa brownies

Post Intervensi	Total	%
Meningkat	20	66,7
Tidak Meningkat	10	33,3
Total	30	100,0

Based on the results of the study in Table 2. It shows that there is an increase in hemoglobin levels after consuming Moringa leaf brownies as much as 66.7%.

Based on the results of Fitriyaa's research (2020) stated that there was an effect of Moringa leaf flour supplementation on increasing hemoglobin levels in adolescent girls. Suggestion (Fitriyaa, 2020)

The results of research conducted by (Atika, 2021) said that the results of this study stated that the analysis of the effect of Moringa leaves on hemoglobin levels with the P value of the Paired T-Test was 0.000 with an

average difference of HB levels of 0.6054 gr%, the results of the comparison test were obtained. hemoglobin levels before and after being given Moringa leaves using paired t-test showed a significance value (p) of 0.000. Thus, the results showed that there was a significant effect of giving Moringa leaves on hemoglobin levels of pregnant women. (Atika, 2021)

According to Hamzah et al (2019), one of the foodstuffs that contain high iron is the Moringa plant. The leaves are often consumed as a vegetable. In addition to food, Moringa leaves contain phytosterols which can increase the production of breast milk (Air Susu Ibu) for women who are breastfeeding and overcome the problem of anemia in children and pregnant women. Keor leaf extract contains Fe 5.49 mg/100 g, sitosterol 1.15%/100 g, and stigmasterol 1.52%/100 g (Hamzah & Yusuf, 2019).

In this study there were still 10 people (33.3%) who did not experience an increase in Hb levels. The researcher assumed that the Hb level did not increase due to the respondent's age >35 years and the third trimester of pregnancy. This is in line with Ariyani's (2016) theory, that pregnant women at a risky age are prone to anemia. This is because the body's immune system begins to decline and is easily affected berbagai infeksi seperti bacterial vaginosis, vaginal yeast infections, and group B streptococcal (GBS) infections during pregnancy. This is in line with the research of Oktaviani, et al (2016), which stated that there was a significant relationship between age and Hb levels in pregnant women.

b. Analisis Bivariate

The analysis was carried out to see the relationship between the independent variable and the dependent variable. The analysis used in this study is the Mc Nemar test analysis.

Pretest	Posttest				Jumlah	%	Sig 2-tailed)
	Meningkat	%	Tidak Meningkat	%			
≥11 gr/dl	0	0,0	0	0,0	0	0,0	0,002
≤11 gr/dl	20	66,7	10	33,3	30	100,0	
Total	20	66,7	10	33,3	30	100,0	

Based on the results of the study in Table 3. shows that after giving Moringa brownies, the respondent's Hb level increased by 66.7% with an average Hb level before and after which was 10 g/dL and 10.9 g/dL with an average difference of increase, namely 1.31.

The results of statistical tests with Mc Nemar obtained p value = 0.002 (p <0.05)

Thus H0 is rejected and Ha is accepted, meaning that there is an effect of Moringa brownies on hemoglobin levels in mothers pregnant in the working area of Dungingi Health Center Gorontalo City.

Based on the results of research by Yulianti et al (2016) it was found that Moringa leaves contain very high amounts of vitamin A, vitamin C, vitamin B, calcium, potassium, iron, and protein, which are easily digested and assimilated by the human body. Moringa leaves contain a large amount of nutrients, various macro and micro nutrients and active ingredients that act as antioxidants. Contains important nutrients such as iron (fe) 28.2 mg, calcium (ca) 2003.0 mg and vitamin A 16.3 mg rich in -carotene, protein, vitamins A, C, D, E, K, and B (thiamine, riboflavin, niacin, pantothenic acid, biotin, vitamin B6, vitamin B12, and folate). It also contains a number of important nutrients to help absorb iron in the body, such as vitamin C, which is 220 mg/100 grams of fresh leaf material (Yulianti et al., 2016).

According to Usastiawa (2019) that the vitamin C content in Moringa leaf extract helps iron absorption. Moringa can be used as the main ingredient in hundreds of drugs, both for prevention and treatment. (Usastiawa, ty Cik Ayu Saadiah Isnainy, Rosalia, et al., 2019)

The benefits and efficacy of the Moringa plant (Moringa oleifera) are found in all parts of the plant, including leaves, stems, roots and seeds. The high nutritional content makes Moringa have functional properties for health and overcome nutritional deficiencies (Irwan et al., 2020)

In this study, researchers used Moringa leaf flour substitution as the basic ingredient for making Moringa leaf brownies. Brownies are one of the most popular types of chocolate cake. Brownies have a sweet taste, good aroma, and the texture is not too fluffy. Currently, various innovations have been developed in the manufacture of brownies with the raw materials of mokaf flour, jackfruit seeds, and a mixture of rice flour, starch, cornstarch. (Barqi, dkk, 2017).

Moringa brownies are given to pregnant women as much as two pieces per day each

weighing 50 grams, consumed in the morning and evening for 14 days. The average increase in hemoglobin levels in pregnant women who consume brownies is 1.31 g/dl, so it can help increase hemoglobin levels during pregnancy.

Conclusion

There was an increase in blood hemoglobin levels before and after giving Moringa Brownies to pregnant women. Giving Moringa Brownies given as much as 50 grams for 14 days can significantly increase blood hemoglobin levels in pregnant women.

References

Anggraini, D. E., & Rahayu, S. R. (2017). Higeia Journal of Public Health. *Higeia Journal of Public Health Research and Development*, *1*(3), 84–94.

Atika, et all. (2021). Pengaruh Daun Kelor Terhadap Kadar HB Ibu Hamil Di PMB Zummatul Atika. *Jurnal Binawakya*, *15*(8), 4971–4978.

Fitriyaa, M. (2020). *Upaya Peningkatan Kadar Hemoglobin Melalui Suplemen Tepung Daun Kelor Pada Remaja Putri*. 86–94.

Hamzah, et all. (2019). Analisis Kandungan Zat besi (Fe) Pada Daun Kelor (Moringa oleifera Lam.) Yang Tumbuh dengan Ketinggian Berbeda di Daerah Kota Baubau. *Indo. J. Chem. Res.*, *6*(2), 88–93.

Irwan, Z., Salim, A., & Adam, A. (2020). Pemberian Cookies Tepung Daun Dan Biji Kelor Terhadap Puskesmas Tampa Padang. *Jurnal Action : Aceh Nutrition Journal*, *2020*(5), 45–54.

Kemenkes RI. (2018). Riskesdas 2018. *Development*, 1–220.

Kurniawati, et all. (2019). Pengaruh Pemberian Tepung Kelor Terhadap Peningkatan Kadar HB dalam Darah Tikus. *Jurnal Ilmiah Kesehatan*, *XII*(1), 470–480.

Mutia Rahmawati. (2017). Peningkatan Kadar Hemoglobin Ibu Hamil Trimester 2. *Fakultas Ilmu Kesehatan Universitas Aisyiyah Yogyakarta*.

Roosleyn, I. P. T. (2016). *Strategi dalam penanggulangan pencegahan anemia pada kehamilan*. *3*(3), 1–9.

Safitri, F., Husna, A., & Sakdiah, R. (2021). Penyuluhan Kesehatan Tentang Cegah Anemia pada Ibu Hamil di Puskesmas Padang Tiji Kabupaten Pidie. *Jurnal Pengabdian Masyarakat (Kesehatan)*, *3*(1), 10–16.

Susiloningtyas, I. (2012). Pemberian Zat Besi (Fe) Dalam Kehamilan Oleh : Is Susiloningtyas. *Suhardjo, 2003*, *50*, 128.

Syalfina, A. D., Irawati, D., & Priyanti, S. (2019). Faktor yang Berpengaruh terhadap Pengetahuan Ibu hamil tentang Anemia Kehamilan. *Seminar Nasional Seri III*, 169–177.

T, P. (2020). Faktor-Faktor yang Berhubungan dengan Pengetahuan Ibu Primigravida Tentang Anemia pada Kehamilan di Wilayah Kerja UPTD Puskesmas Sukahaji Kabupaten Majalengka. *Jurnal Kampus STIkes YPIB Majalengka*, *8*(1), 34–44.

Usastiawa, ty Cik Ayu Saadiah Isnainy, L. A., & Rosalia, D. (2019). Pengaruh Konsumsi Ekstrak Daun Kelor Dan Madu Terhadap Peningkatan Hb Ibu Hamil Di Wilayah Kerja Puskesmas Way Halim Kota Bandar Lampung. *Concept and Communication*, *null*(23), 301–316.

Usastiawa, ty Cik Ayu Saadiah Isnainy, L. A., Rosalia, D., Yulianti, H., Hadju, V., Alasiry, E., … Yusuf, N. R. (2019). PERI DALOR (Permen Jeli Daun Kelor) : Inovasi Permen Kaya Antioksidan Sebagai Solusi Kesehatan. *JST Kesehatan*, *6*(1), 399–404.

Wesström, J. (2020). Safety of intravenous iron isomaltoside for iron deficiency and iron deficiency anemia in pregnancy. *Archives of Gynecology and Obstetrics*, *301*(5), 1127–1131.

Yulianti, H., Hadju, V., & Alasiry, E. (2016). Pengaruh ekstrak daun kelor terhadap peningkatan kadar haemoglobin pada remaja putri di SMU Muhammadiyah Kupang. *JST Kesehatan*, *6*(3), 399–404.