Jurnal Aisyah: Jurnal Ilmu Kesehatan

Volume 10, Issue 1, 03 2025, p. 283-296
ISSN 2502-4825 (print), ISSN 2502-9495 (online)

THE EFFECT OF GIVING ROSELLA FLOWER BREWING (*HIBISCUS SABDARIFFA*) ON THE MOTHER'S HEMOGLOBIN (HB) LEVELS

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ABSTRACT

Anemia in pregnancy is one of the causes of iron deficiency with an incidence in the Tatakarya Inpatient Health Center of 17.33%, anemia has negative impacts such as miscarriage, premature labor, uterine inertia, prolonged labor and bleeding and shock. Prevention of anemia is recommended to consume 60 mg of iron and 0.25 folic acid equivalent to 200 mg of ferrous sulfate during pregnancy at least 90 tablets, in addition to consuming foods high in iron and vitamin C such as Rosella flowers (Hibiscus sabdariffa) which have a vitamin C content that can play a role in regulating iron absorption. The purpose of the study was to determine the effect of giving rosella flower infusion (Hibiscus sabdariffa) on Hemoglobin (Hb) levels of pregnant women with anemia in the Tatakarya Inpatient Health Center Work Area, North Lampung Regency. Quantitative analytical research type, pre-experimental design with one group pretest-posttest approach. The population in this study were all pregnant women who experienced anemia in Trimester III as many as 15 respondents using accidental sampling technique. The study was conducted in September-October 2024. Data collection used observation sheets. Univariate and bivariate analysis (paired sample t-test). The results of the study showed that the average

Hb level in pregnant women before being given rosella flower infusion (hibiscus sabdariffa) on the Hemoglobin (Hb) levels of pregnant women with anemia was 10.2 gr / dl and after being given rosella flower infusion (hibiscus sabdariffa) was 10.9 gr / dl. There is an effect of giving rosella flower infusion (Hibiscus sabdariffa) on the Hemoglobin (Hb) levels of pregnant women with anemia in the Work Area of the Tatakarya Inpatient Health Center, North Lampung Regency (p-value = 0.000). Suggestions for pregnant women can consume rosella flower infusion as an alternative to increase Hb levels during pregnancy.

Keywords: Pregnant women, rosella flowers, Hb levels

ABSTRACT

Anemia during pregnancy is partially caused by iron deficiency, with an incidence rate of 17.33% at the Tatakarya Inpatient Health Center. Anemia can have negative effects, such as miscarriage, preterm labor, uterine inertia, prolonged labor, bleeding, and shock. To prevent anemia, it is recommended to consume 60 mg of iron and 0.25 mg of folic acid, equivalent to 200 mg of ferrous sulfate, during pregnancy for a minimum of 90 tablets. Additionally, consuming foods rich in iron and vitamin C, such as roselle flowers (Hibiscus sabdariffa), which are high in vitamin C, can help increase iron absorption. This study aimed to determine the effect of consuming roselle flower infusion (Hibiscus sabdariffa) on hemoglobin (Hb) levels in pregnant women with anemia in the working area of the Tatakarya Inpatient Health Center, North Lampung Regency. This research employed a quantitative analytical method with a pre-experimental design and a one-group pretest-posttest approach. The population consisted of third-trimester pregnant women with anemia, totaling 15 respondents, who were selected using accidental sampling. The study was conducted in September-October 2024. Data were collected using observation sheets and analyzed using univariate and bivariate methods (paired sample t-test). The results showed that the average Hb level of pregnant women before consuming roselle flower infusion (Hibiscus sabdariffa) was 10.2 g/dL, which increased to 10.9 g/dL after consumption. There was a significant effect of consuming roselle flower infusion (Hibiscus sabdariffa) on the hemoglobin (Hb) levels of pregnant women with anemia in the working area of the Tatakarya Inpatient Health Center, North Lampung Regency (p-value = 0.000). It is suggested that pregnant women consider consuming roselle flower infusion as an alternative to increase Hb levels during pregnancy.

Keywords: Pregnant women, rosella flower, Hb levels

INTRODUCTION

Anemia is a condition in which the mass of erythrocytes and/or circulating Hb cannot fulfill its function to provide oxygen to body tissues. Decreased Hb can cause lethargy, fatigue, palpitations, tachycardia, shortness of breath, angina pectoris (Bakta, 2019). During pregnancy, if anemia occurs, it will have various impacts on pregnant women, including premature birth, birth by caesarean section, bleeding and infection in babies in the first week of life (Prawirohardjo, 2020). Globally, an estimated 37% of pregnant women aged 15–49 years have anemia. The WHO region in Africa and Southeast Asia is the most affected with an estimated 106 million women and 103 million children affected by anemia in Africa, while in Southeast Asia 244 million women and 83 million children are affected (WHO, 2023). The results of the 2023 Indonesian Health Survey (SKI) stated that in Indonesia 27.7% of pregnant women had anemia. To prevent anemia, every pregnant woman is expected to receive a minimum of 90 iron tablets during pregnancy (Ministry of Health of the Republic of Indonesia, 2024). Meanwhile, the coverage of iron supplementation for pregnant women in Indonesia is 88.5%, the highest in the Riau Islands at 94.9% and the lowest in Central Papua at 52.0% while Lampung is 92.7% (Ministry of Health of the Republic of Indonesia, 2024). The coverage of pregnant women with Fe3 iron tablets in Lampung Province in 2022 was 91.95%, where this achievement reached the expected target of > 82%. The distribution of the percentage of coverage of pregnant women receiving 90 iron (Fe) tablets per Regency/City in Lampung Province in 2022 found the highest achievement in the Bandar

Lampung area with an achievement of 100.0%, South Lampung 98.20%, and the Fe distribution area that was still below the target was the North Lampung area 85.7% (Ministry of Health of the Republic of Indonesia, 2023). Based on 2023 data, it is known that the achievement of providing iron tablets in Pesawaran Regency was 96.86% and in North Lampung Regency it was 84.08% (Dinkes, 2024). Based on the data I got from medical records, data on pregnant women at the Tatakarya Inpatient Health Center showed an increase in the incidence of anemia in pregnant women, it is known that in 2021, 14.69% of pregnant women were found to have anemia, in 2022, 16.54% of pregnant women were found to have anemia, in 2023 as many as 17.33% with anemia in pregnancy. The target target is only 2.5% of the number of pregnant women who experience anemia. In 2022, the coverage of iron provision in pregnant women was 68.5%, the coverage of iron provision in pregnant women was below the target of 80%. In 2023, the coverage of iron provision in pregnant women reached 98% with the expected target of> 82%.

About 95% of cases of anemia during pregnancy are due to iron deficiency (Fe), the cause is usually inadequate food intake, previous pregnancies, repeated normal blood loss. Consuming foods rich in vitamin C along with iron will increase iron absorption (Proverawati, 2018). Anemia that occurs if it lasts a long time, then the amount of blood to carry oxygen decreases, as a result the fetus cannot get enough oxygen needed for normal growth, especially in the brain. Pregnant women who experience severe anemia will experience symptoms such as excessive fatigue, shortness of breath, headaches, and dizzy eyes. The risk of preterm increases during labor. In a society where the daily diet is mostly from plant sources, the presence of infectious diseases and parasitic investments plays a major role in iron anemia. The low levels of iron contained in plant sources are only part of the reason for the high prevalence of nutritional anemia in Indonesia (Soleha *et al.*, 2020).

The government policy in dealing with pregnancy anemia is the provision of iron (Fe) and folic acid tablets. Pregnant women are advised to consume 60 mg of iron and 0.25 folic acid equivalent to 200 mg of ferrous sulfate during pregnancy, at least 90 tablets. Tablet administration has been started in the first trimester of pregnancy. The main therapy for anemia is the provision of Fe supplements every day 200 mg, if Hb <5-6 gr% then a blood transfusion is needed (Manuaba, 2019). Side effects after consuming iron tablets, pregnant women experience nausea and vomiting, making them feel bored and do not want to continue consuming iron tablets (Yunita *et al.*, 2018). Nausea in consuming iron tablets is not only caused by the side effects of the iron tablets consumed but can also be caused by the pregnancy itself. Health workers need to explain that nausea that may arise as a result of the side effects of iron tablets is generally mild and gradually decreases over time (Septiani, 2017).

The high prevalence of anemia can be due to several factors such as low intake of iron and other nutrients such as vitamins A, C, folate, riboflavin and B12 so that to meet the iron needs of individuals can be done by consuming animal food sources which are sources of easily absorbed iron (Tusiana *et al.*, 2021). Efforts to increase Hb levels include the absorption of iron (Fe) assisted by vitamin C. Iron tablets given together with vitamin C will be more effective than just consuming Fe tablets in a single dose. Because that is a way to increase iron absorption in the body by consuming vitamin C micronutrients (Almatsier, 2018). Rosella flowers (*Hibiscus sabdariffa*) are one type of traditional herbal plant that has various benefits, especially for health. The content of rosella (*Hibiscus sabdariffa*) is calcium, vitamins B1, B2, C, D, omega-3, and magnesium for the body, including agrine and lysine. The vitamin C content in rosella flowers (*Hibiscus sabdariffa*) is 3 times more than black grapes (Mayunita, 2024). Rosella plants are usually known to have properties as a medicine for diabetes, antihypertension. In addition, rosella plants also have the highest content of

vitamin C and minerals (Fe). Every 100 g of rosella flower petals contain 8.98 mg of iron and 244.4 mg of vitamin C (Khoerunnisa, 2024).

This study found that rosella flowers (*Hibiscus sabdariffa*) and Fe tablets given were more effective in increasing the Hb of pregnant women at a Pvalue = 0.047 (<0.05) when compared to those who only consumed Fe tablets. The results of the study showed that the mean in the intervention group was 0.993 and the mean in the control group was 0.310 with a mean difference in the two groups of 0.683. So it can be seen that if rosella and Fe tablets are given together, they can have a more effective effect on increasing Hb levels than taking tablets alone (Khoerunnisa, 2024). The results of the univariate analysis showed that the average difference in giving rosella flower infusion and Fe tablets was 0.733 and the average difference in giving Fe tablets was 0.262. The results of the bivariate analysis showed that rosella flower infusion was effective in increasing hemoglobin levels in pregnant women with a significance level of 0.000. Conclusion Giving rosella flower infusion is effective in increasing hemoglobin levels in pregnant women with anemia. Pregnant women are advised to diligently consume foods containing iron and to be obedient in consuming tablets along with rosella flower infusion before going to bed in order to increase Hb levels in the mother's blood (Pratiwi, A 2022).

Based on the results of observations in June 2024, there were 132 pregnant women in 9 Villages in the Tatakarya Inpatient Health Center Working Area, with details of Trimester I as many as 32 pregnant women, Trimester II as many as 38 pregnant women and Trimester III as many as 62 pregnant women. Based on a survey conducted on 10 pregnant women in Trimester III in Bumi Restu village by examining Hb using the *Easy Touch tool*, it was found that there were 5 pregnant women with an average HB result of 10.2gr%. Based on the results of the interview, the mother said that she got tired quickly, so that daily activities felt heavy, often sleepy, health workers had given Fe tablets every time they carried out the examination and provided education about the importance and benefits of Fe and its side effects. When interviewed with these 5 pregnant women, they said that they did not routinely take the Fe tablets that had been given because of the nausea that arose after consuming the Fe tablets.

Based on the incidence of anemia above, and these complaints, the researcher is interested in researching "The Effect of Giving Rosella Flower (*Hibiscus sabdariffa*) Brew on Hemoglobin (Hb) Levels of Anemic Pregnant Women in the Work Area of the Tatakarya Inpatient Health Center, North Lampung Regency". North 2024.

RESEARCH METHODS

The type of quantitative research, the research design used is a *Pre-Experimental research design* with a *one group pretest and posttest Group* approach. The subjects in this study were all pregnant women who experienced anemia with a gestational age of 28-36 weeks in the Tatakarya Inpatient Health Center Work Area, North Lampung Regency. The research was conducted in September-October 2024. Research variables: HB levels of pregnant women, rosella flower infusion (*Hibiscus sabdariffa*). Data collection using observation sheets and haemocek using easy touch tools, data analysis univariate and bivariate. The population in this study was 32 pregnant women. The sample of this study was taken as many as 15 pregnant women who experienced anemia in the third trimester of gestational age 28-36 weeks. The sampling technique in this study was accidental sampling which means taking samples that were available at the time the research was taking place, but still paying attention to research principles. The intervention involved respondents being given 200 cc of rosella flower infusion and consuming it once a day in the afternoon according to the agreed

time for 14 consecutive days.

RESEARCH RESULTS AND DISCUSSION

Research result

Table 1
Respondent Characteristics

Variables	Category	Frequency	Percent
	<20 years	0	0.0
Age	20-35 years	15	100.0
	>35 years	0	0.0
	Bachelor	3	20
Education	High School/Vocational School	9	60
	JUNIOR HIGH SCHOOL	3	20
	SD	0	0
	housewife	12	80
Work	civil servant	1	6.7
	Self-employed	2	12.3
	Total	15	100

Based on table 1, it is known that out of 15 respondents, 0 (0.0%) were aged <20 years, 15 (100.0%) were aged 20-35 years, and 0 (0.0%) were aged >35 years. The education variable was 3 (20%) respondents with Bachelor's degree, 9 (60%) respondents with high school/vocational high school education, and 0 (0%) respondents with elementary school education. The employment variable was 12 (80%) respondents with housewife jobs, 1 (6.7%) respondents with civil servant jobs, and 2 (12.3%) respondents with self-employed jobs.

Univariate Analysis

Table 2
Average Hb levels before being given rosella flower infusion (*Hibiscus sabdariffa*) on Hemoglobin (Hb) levels of pregnant women with anemia in the work area of the Tatakarya Inpatient Health Center

Hb levels	Mean	SD	Min	Max	N
Before intervention	10.2	0.3	9.5	10.8	15

Based on table 2 above, it is known that based on WHO standards, normal Hb levels for pregnant women in the third trimester are ≥11 g/dL. An average of 10.2 g/dL indicates that this group of pregnant women has mild anemia. The Standard Deviation (SD) of 0.3 g/dL means that the distribution of Hb levels among respondents is quite small, which means that this condition is quite even in the group. The minimum Hb level (9.5 g/dL) is included in the moderate anemia category. The maximum Hb level (10.8 g/dL) is close to the normal limit, but is still below the third trimester standard.

Table 3
Average Hb levels after being given rosella flower infusion (*Hibiscus sabdariffa*) on the Hemoglobin (Hb) levels of pregnant women with anemia in the work area of the Tatakarya Inpatient Health Center

Hb levels	Mean	SD	Min	Max	N
After the intervention	10.9	0.5	9.9	12.0	15

Based on table 3 above, it is known that the average Hb levels in pregnant women after being given rosella flower infusion (hibiscus sabdariffa) on the Hemoglobin (Hb) levels of pregnant women, the average Hb levels increased from 10.2 g / dL (before intervention) to 10.9 g / dL after intervention. Although there was an increase, this value is still slightly below the normal Hb standard for the third trimester (≥11 g / dL). With a Standard Deviation (SD): 0.5 shows that there is slightly more variation in Hb levels among respondents after the intervention. Some pregnant women still experience mild anemia, with levels below normal (9.9 g / dL). Some mothers have reached normal Hb levels for the third trimester.

The analysis test in this study has clearly been fulfilled because the research sample is pregnant women in the work area of the Tata Karya Inpatient Health Center, North Lampung Regency. The level of accuracy in sampling is known, so another analysis requirement test is carried out, namely the normality test using the Shapiro Wilk value, if the Shapiro Wilk value> 0.05 then the distribution is normal (Hastono, 2021).

Table 4
Research Data Normality Test

Variables	Rosella flower (*hibiscus sabdariffa*)	*Shapiro Wilk*	Information
Hb levels	Before	0.218	Normal
	After	0.855	Normal

Based on table 4 above, the data normality test using Shapiro-Wilk for variables before and after in the intervention group obtained a significant value> 0.05, which means the data is normal. The Hb level data before and after the intervention with rosella flowers meets the normality assumption. This normality test shows that the use of parametric statistical tests (such as paired t-test) to compare the average Hb levels before and after the intervention is appropriate.

Bivariate Analysis

Table 5
The effect of giving rosella flower infusion (*Hibiscus sabdariffa*) on the hemoglobin (Hb) levels of pregnant women with anemia in the Tatakarya Inpatient Health Center Work Area

Hb levels during pregnancy	N	Different Mean	SD	t-test	P-Value

Before and after being given					
***hibiscus* flower infusion**	15	0.7	0.4	6.7	0,000
***(Submit*)**					

Based on table 5 above, the data involved 15 pregnant women who participated in the intervention. The average Hb level increased by 0.7 g/dL after being given rosella flower infusion. This shows that the intervention with rosella flowers has a positive effect in increasing Hb levels. Standard Deviation (SD = 0.4) Variation in changes in Hb levels among respondents is relatively small, so these results are consistent in most participants. The t value (t-test = 6.7) shows a significant difference between Hb levels before and after the intervention. The value of the paired sample t-test results, p-value = 0.000 (p-value <α = 0.05), so the difference in Hb levels before and after the intervention is very statistically significant, which means that there is an effect of giving rosella flower infusion (hibiscus sabdariffa) on Hemoglobin (Hb) levels of pregnant women with anemia in the Tatakarya Inpatient Health Center Work Area, North Lampung Regency.
Rosella flower infusion significantly increased Hb levels in pregnant women with an average increase of 0.7 g/dL. These results support the hypothesis that rosella flowers can contribute to increased Hb levels, possibly through the content of iron, vitamin C, or other bioactive compounds that support hemoglobin production. The administration of rosella flower infusion was proven to be statistically significant in increasing Hb levels in pregnant women in the third trimester. This intervention has the potential as an alternative or additional to treat mild to moderate anemia in pregnant women, with an average increase in Hb of 0.7 g/dL after the intervention.

Discussion

Univariate Analysis

Average Hb levels before being given rosella flower infusion (*Hibiscus sabdariffa*) on Hemoglobin (Hb) levels in pregnant women with anemia

Based on the research results, it is known that based on WHO standards, normal Hb levels for pregnant women in the third trimester are ≥11 g/dL. An average of 10.2 g/dL indicates that this group of pregnant women has mild anemia. The Standard Deviation (SD) of 0.3 g/dL means that the distribution of Hb levels among respondents is quite small, which means that this condition is quite even in the group. The minimum Hb level (9.5 g/dL) is included in the moderate anemia category. The maximum Hb level (10.8 g/dL) is close to the normal limit, but is still below the third trimester standard.
Anemia in pregnancy is anemia due to iron deficiency, and is a type of anemia that is relatively easy to treat, even cheap. Anemia in pregnancy is a national problem because it reflects the socio-economic welfare of the community and its influence is very large on the quality of human resources. Anemia in pregnancy is called "potential danger to mother and child", which is why anemia requires serious attention from all parties involved in frontline health services (Manuaba 2019). Anemia is a reduction in red blood cells (erythrocytes) in the blood circulation or hemoglobin mass of pregnant women <11 gr% in the first and third trimesters, and hemoglobin levels <10.5 gr% in the second trimester so that they are unable to fulfill their function as oxygen carriers to all body tissues (Pratiwi 2022).

This study is in line with research (Baturrohmah et al., 2021) the results of the study showed that the average hemoglobin level before the intervention was 11.07. Research (Pratiwi,

2021) showed that the hemoglobin level of pregnant women with anemia before being given rosella flower infusion and Fe tablets was an average of 10.281, standard deviation 0.133 minimum 10.1 and maximum 10.5. Research (Kholijah, 2021) the results of the study showed that the average increase in hemoglobin levels in pregnant women in the third trimester before the intervention was 12.305

According to researchers, giving iron tablets can affect hemoglobin levels in pregnant women who have anemia. This is supported by other factors that affect the increase in hemoglobin levels in the respondents of the study, namely diet, maternal activity, nutrition, rest patterns, and supported by the absence of a history of infectious diseases in pregnant women who are respondents, so that the results obtained can be achieved optimally.

Based on the results of the study, it is known that all respondents are in the age range of 20-35 years (100%), which is the ideal reproductive age. Although this age tends to have a lower risk of pregnancy health compared to ages <20 years or >35 years, anemia can still occur. This shows that other factors, such as diet, nutritional status, or previous health conditions, play a greater role in influencing hemoglobin (Hb) levels. Most respondents have a high school/vocational high school education (60%), while only 20% have a bachelor's degree. Education affects the mother's level of understanding of health and nutrition during pregnancy. Mothers with lower education may be less informed about the importance of iron intake, healthy diets, or compliance with taking iron supplements during pregnancy. Most respondents (80%) are housewives, who may have limited access to resources to buy nutritious food. Meanwhile, respondents who work as self-employed or civil servants (20%) may have better access, but still do not guarantee the fulfillment of nutritional needs if not supported by adequate knowledge.

Based on the data, the average Hb level of respondents was 10.2 g/dL, which is included in the mild anemia category according to WHO. The small distribution of Hb levels (SD 0.3 g/dL) indicates that this anemia condition is quite even among respondents. The minimum Hb (9.5 g/dL) is moderate anemia, indicating that some respondents experience more severe anemia than others.

During pregnancy, iron requirements increase to support fetal and placental growth, as well as to increase maternal blood volume. If iron intake is insufficient or not well absorbed, pregnant women are susceptible to anemia. Lack of consumption of iron-rich foods, such as red meat, green vegetables, or nuts, as well as minimal intake of vitamin C which helps iron absorption, can trigger anemia. Pregnant women often do not routinely take iron tablets given during pregnancy, either because of side effects (such as nausea and constipation) or lack of knowledge about the importance of these tablets. Mothers who have anemia before pregnancy or have chronic diseases such as thalassemia or hookworm infection are at higher risk of anemia during pregnancy. Pregnancies that are too close together without adequate nutritional recovery from previous pregnancies can also cause anemia. The relationship between respondent characteristics and anemia suggests that education, access to nutrition, and compliance in taking supplements are very important to prevent and treat anemia in pregnant women.

Average Hb levels after being given rosella flower infusion (*Hibiscus sabdariffa*) on the Hemoglobin (Hb) levels of pregnant women with anemia

Based on the results of the study, it is known that the average Hb level in pregnant women after being given rosella flower infusion (hibiscus sabdariffa) on the Hemoglobin (Hb) levels of pregnant women, the average Hb level increased from 10.2 g / dL (before intervention) to 10.9 g / dL after intervention. Although there was an increase, this value is still slightly below the normal Hb standard for the third trimester (≥11 g / dL). With a Standard Deviation (SD):

0.5 shows that there is slightly more variation in Hb levels among respondents after the intervention. Some pregnant women still experience mild anemia, with Hb levels below normal (9.9 g / dL). Some mothers have reached normal Hb levels for the third trimester. This study is in line with research (Kholijah, 2021) the results of the study found that the average increase in hemoglobin levels of pregnant women in the third trimester after the intervention was 13.145. Research (Pratiwi, 2021) after being given rosella flower infusion and Fe tablets, the average was 11.014, standard deviation 0.165. Research (Baturrohmah et al., 2021) the average hemoglobin level after the intervention was 11.95.

Efforts to increase Hb levels include the absorption of iron (Fe) assisted by vitamin C. Iron tablets given together with vitamin C will be more effective than just consuming Fe tablets alone with a single dose. Because that is a way to increase iron absorption in the body by consuming vitamin C micronutrients. Vitamin C can also make it difficult for hemosiderin to be carried out so that the required iron can be released (Almatsier, 2018).

Rosella flower (*Hibiscus sabdariffa*) is one type of traditional herbal plant that has various benefits, especially for health. The content of rosella is calcium, vitamins B1, B2, C, D, omega-3, and magnesium for the body, including agrine and lysine. The vitamin C content in rosella flowers is 3 times more than black grapes (Mayunita, 2024). Rosella plants are usually known to have properties as a medicine for diabetes, antihypertension. In addition, rosella plants also have the highest content, namely vitamin C, and minerals (Fe). Every 100 g of rosella flower petals contain 8.98 mg of iron and 244.4 mg of vitamin C (Khoerunnisa, 2024).

Based on the explanation above, the researcher argues that rosella flower infusion (*hibiscus sabdariffa)* can affect hemoglobin levels in pregnant women who experience anemia. This is supported by other factors that affect the increase in hemoglobin levels in pregnant women, namely due to diet, maternal activity, nutrition, rest patterns, and supported by the absence of a history of infectious diseases in pregnant women who are respondents, so that the results obtained can be achieved optimally.

Bivariate Analysis

The effect of giving rosella flower infusion (*hibiscus sabdariff*a) on hemoglobin (Hb) levels in pregnant women with anemia

Based on the results of the paired sample t-test, p-value = 0.000 (p-value <α = 0.05) which means that there is an effect of giving rosella flower infusion (hibiscus sabdariffa) on the Hemoglobin (Hb) levels of anemic pregnant women in the Tatakarya Inpatient Health Center Work Area, North Lampung Regency. This study is in line with research (Pratiwi, 2021) which found the effectiveness of rosella flower infusion on increasing hemoglobin levels in pregnant women with a significance level of 0.000. Research (Kholijah, 2021) found a significant effect between giving dried rosella petal infusion on hemoglobin levels in pregnant women in the third trimester with results (p-value 0.000). Research (Baturrohmah et al., 2021) found the effect of rosella tea on hemoglobin levels of pregnant women in the first trimester in the Karangsari Health Center work area, Cirebon Regency in 2021, with a p value of 0.00 <0.05.

Anemia in pregnancy, especially in the third trimester, is usually caused by increased iron requirements for fetal blood formation, placenta, and increased maternal blood volume. Lack of iron intake or impaired absorption can result in decreased hemoglobin (Hb) levels. This can lead to the risk of complications such as premature birth, low birth weight, and impaired fetal development (WHO, 2020). Anemia can be caused by several factors. There are direct and indirect factors. The direct factors are adequacy of iron supplement consumption, pregnancy spacing, parity, nutritional status, and infectious diseases. Normal Hb levels in pregnant women who consume Fe tablets because the need for Fe during pregnancy cannot

be met from food alone, even though the food eaten contains a lot of iron and has high absorption. Fulfillment of nutritional adequacy is recommended through supplementation (Fanny, 2020).

Rosella is rich in polyphenolic compounds, antioxidants, vitamin C, iron, and organic acids. This content can help increase Hb levels in pregnant women with mild to moderate anemia. Rosella antioxidants protect red blood cells from oxidative damage, while iron supports hemoglobin synthesis (ACOG, 2021). Animal studies have shown that rosella extract is generally safe at certain doses. However, excessive consumption can cause side effects such as stomach upset or hepatotoxicity (Akinmoladun, 2018). Acute toxicity tests in animals indicate that a safe dose of rosella is in the moderate range, usually less than 2 g/kg body weight (Ghazali, S., *et al,* 2019). Studies involving humans recommend a dose of brewed rosella ranging from 200-400 ml per day with a standard concentration, depending on the severity of anemia and individual tolerance. Research also supports its effectiveness in increasing Hb in 2-4 weeks (Ajiboye *et al* , 2020).

A study by Akinmoladun et al. (2018) showed that rosella has anti-anemic effects due to its easily absorbed iron content and antioxidants that support blood health. Similar Research: A study by Ajiboye et al. (2020) found that regular consumption of rosella tea increased hemoglobin levels in individuals with mild anemia. This study supports that rosella can be an additional natural treatment for anemia during pregnancy, provided it is used in the right dosage and under medical supervision. Anemia values in the blood refer to the Guideline on hemoglobin cutoffs to define anemia in individuals and populations (WHO, 2024) in pregnancy are as follows First trimester pregnancy <11 g/dl, Second trimester pregnancy <10.5 g/dl, Third trimester pregnancy <11 g/dl (SKI 2023).

Rosella is a herbal plant that is known to have many benefits, one of which is because of its high vitamin C and Fe content, it can increase the number of erythrocytes and Hb levels in the blood of anemic white mice. Based on the results of the analysis using the Jacob indometri method, it is known that in 100 g of Rosella petals there are 244.4 mg of vitamin C. According to Guyton & Hall (2019) vitamin C and Fe are important essential sources in the body. Vitamin C is needed to increase iron absorption (Kustyawati & Astuti, 2021).

Research (Sari *et al*., 2021) the results of the t-test statistical test obtained a p value in the treatment group of 0.045 (<0.05) and in the control group p value 0.046 (<0.05), which means that the results of the analysis in both groups have a significant effect on increasing hemoglobin levels in pregnant women in the second trimester. It is known that the average hemoglobin level in the group consuming dry rosella tea increased by 1,070 gr /dl and in the group consuming Fe tablets there was an increase of 0,900 gr /dl. From each group, there was an increase in hemoglobin levels, but in the group of respondents who consumed dry rosella tea infusion, there was a higher increase in hemoglobin levels compared to the group of respondents who consumed Fe tablets with an average difference of 0.170 gr /dl, there was a higher increase in hemoglobin levels in pregnant women in the second trimester who consumed dry rosella tea infusion 115.2 mg/kgBW/day for 14 days. The increase in hemoglobin levels higher in pregnant women in the second trimester who consumed rosella tea infusion was influenced by the high iron and vitamin C content in rosella so that it could increase iron absorption in the body, in contrast to Fe tablets whose absorption requires vitamin C intake and will reduce the absorption of iron content if there are polyphenol compounds such as tannins present in the food consumed. This is in accordance with the theory (Sari *et al.*, 2021), which states that the high vitamin C content in rosella flower petals can increase the absorption of iron in non-heme form up to four times, namely by converting ferric to ferrous in the small intestine so that it is easy to absorb. Rosella contains calcium, vitamins C, D, B1, B2, magnesium, omega-3, beta-carotene, iron and 18 essential amino

acids for the body, including lysine and agrine.

The vitamin C content in rosella flowers is 3 times that of black grapes, 9 times that of citrus fruits and 10 times that of star fruit. In this study, the dose of dried rosella tea given to 10 respondents of pregnant women in the second trimester in the treatment group was 115.2 mg/kgBW/day for 14 days. Every 100 grams of dried rosella petals contain 260-280 mg of vitamin C, vitamin D, B2 and iron. In addition, dried rosella petals also contain high calcium (486 mg/100 g) and essential fatty acids (Sari *et al.*, 2021). The findings of this study indicate that there is a significant effect of consuming dried rosella tea infusion on increasing hemoglobin levels in pregnant women in the second trimester. This proves that dried rosella tea infusion is effective in increasing hemoglobin levels, especially in pregnant women in this study.

Research (Sari, Nurkhasanah, Bachri, 2016) Rosella (*Hibiscus sabdariffa L.*) is used as a traditional medicine because it has antioxidant activity. Traditional medicine used for disease therapy must pay attention to safety aspects by conducting toxicity tests so as not to cause toxic effects. This study aims to determine the acute toxicity of ethanol extract of rosella petals aspartate aminotransferase (AST), alanine aminotransferase (ALT), alkaline phosphatase (ALP) activity and liver organ histopathology in Sprague Dawley (SD) rats.

Acute toxicity test was conducted by giving a single dose of rosella calyx ethanol extract orally in doses of 40, 200, 1000 and 5000 mg/kg BW. Toxicity observation was conducted within 14 days after administration. AST, ALT and ALP activities were analyzed using the Diasys kit. The results showed that the ethanol extract of rosella calyx was found to have an LD50 of 850.90 mg/kg BW, the activities of AST, ALT, ALP were not significantly different in the treatment group with the control group ($p<0.05$) and histopathology found several changes in cell and tissue structure in the liver organ and delayed toxic effects until day 14 were also not found. The conclusion of this study is that there is an acute toxic effect of the ethanol extract of rosella calyx on SD rats. With the conclusion that the ethanol extract of rosella calyx given orally to female SD strain rats found an LD50 value of 850.90 mg/kg BW and the activities of AST, ALT and ALP were not significantly different compared to the control group. Histopathological observation of the liver organ caused several changes in cell and tissue structure in the liver organ and no delayed toxic effects were found during the 14-day observation.

This study of pregnant women with anemia in the third trimester was given Rosella flower infusion as a companion to Fe with a dose of 115.2 mg/kg BB/day. The results of the study obtained varying results of increasing Hb levels in each respondent, starting from the lowest increase of 0.6 gr% to the highest of 1.5 gr% of hemoglobin levels after the intervention, this was because the respondents followed the recommendations of the researchers, they routinely drank rosella flower infusion for 14 days in the afternoon to help increase Hb levels. In addition, uncontrolled eating patterns at home can cause an increase in HB levels that are not much, such as consuming drinks that interfere with body absorption, for example, tea, coffee, or other things that can make Hb levels not increase such as lack of rest patterns, heavy physical activity or infectious diseases suffered by respondents.

Researchers argue that rosella flower infusion can increase Hb levels in pregnant women with anemia. Rosella flowers contain high levels of iron so they can help prevent and treat anemia. In addition, the iron in rosella flowers is much more easily absorbed by the body because of the presence of vitamin C in rosella flowers, each of which has been known to help absorb iron in the body.

Research Limitations

Researchers only examined the effect of giving rosella flower infusion to pregnant women with anemia in the third trimester and did not examine the test of substances contained in the rosella flower infusion. Uncontrolled eating patterns at home can cause an increase in HB levels that are not much, such as consuming drinks that interfere with body absorption, for example, tea, coffee, or other things that can cause HB levels not to increase, such as lack of rest patterns, heavy physical activity or infectious diseases suffered by respondents.

TO CONCLUSION AND SUGGESTIONS

1. It is known that the average Hb level in pregnant women before being given rosella flower infusion (hibiscus sabdariffa) in relation to the Hemoglobin (Hb) levels of pregnant women with anemia is 10.2 gr/dl.
2. It is known that the average Hb level in pregnant women after being given a rosella flower infusion (hibiscus sabdariffa) on the Hemoglobin (Hb) levels of pregnant women is 10.9 gr/dl
3. There is an effect of giving rosella flower infusion (Hibiscus sabdariffa) on the hemoglobin (Hb) levels of anemic pregnant women in the work area of the Tatakarya Inpatient Health Center, North Lampung Regency (p-value = 0.000).

For Pregnant Women, increasing and adding insight into alternatives that are easy for pregnant women to do at home, so that they know the benefits of rosella flower infusion, rosella flowers can be used as an alternative companion to Fe in increasing Hb levels in pregnant women in addition to mothers consuming other fruits and vegetables. Consuming rosella flower infusion can be a natural alternative to help increase Hb levels, but must be combined with a nutritious diet rich in iron, protein, and vitamins. Be sure to consult a health worker before consuming herbs such as rosella, especially to avoid potential drug interactions or side effects.

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