

Red Spinach Accelerates the Increase of Hb Levels in Pregnant Women

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Anaemia is one of the physiological conditions that usually occurs during pregnancy. Anaemia in pregnancy generally occurs due to hemodilution. Based on the results of the pre survey obtained from Puskesmas Segala Mider Bandar Lampung, it was found that of 10 pregnant women who attended antenatal care (ANC) there were 6 who were presenting with anaemia and of those 6 there was 2 women with mild anaemia, 3 with moderate anaemia and 1 woman with severe anaemia. The purpose of this study was to study differences in Hb levels before and after giving red spinach in the second trimester of pregnancy to women with anaemia at the Puskesmas Segala Mider Bandar Lampung, in 2019. The type of research used was the Quasi Experiment with a non-equivalent control group. The population in this study were all pregnant women who attended the ANC at Puskesmas Segala Mider, Bandar Lampung. Samples taken were taken from a total of 36 anaemic pregnant women in the second trimester who were in prepared to trial red spinach. The Data taken consisted of primary data, quoted by the t - Independent test, then processed using a computer. Based on the result of the t – Independent test between differences in Hb levels before and after giving red spinach in the second trimester of pregnant women with anaemia obtained α value of $\alpha = 0.000$ to be $\alpha < 0.05$. The result this statistical test prove the differences in Hb levels before and after giving Red Spinach in the second trimester of pregnant women with anaemia at Puskesmas of Segala Mider Bandar Lampung in 2019. The researchers suggest that health workers be able to apply Red Spinach consumption as one of alternative non-pharmacological treatment to overcome anaemia in pregnant women.

Keywords: *Red Spinach, Anaemia, Pregnancy*

Introduction

Anaemia in pregnancy is a national problem because it reflects the value of socio-economic welfare of society, and had an enormous influence on the quality of human resources (Ulfa,

Ariadi, & Elmatris, 2018). Pregnant anaemia called "Potential danger to mother and child" (potentially endanger the mother and child). Anaemia in pregnancy is one of the causes of the high maternal mortality rate (MMR) in Indonesia (Aisha, 2016).

Based on the Indonesia Health Profile 2017, the maternal mortality rate in Indonesia in 2015 decreased, i.e. 305 per 100,000 live births. This is slightly down when compared to the 2012 SDKI data, which amounted to 359 per 100,000 live births. This is slightly down, although not too significant (Ministry of Health RI, 2018).

In Indonesia reported that the cause of high Maternal Mortality Rate (MMR) is bleeding 30.3%, hypertension 27.1%, infection 7.3%, 1.8% prolonged labour, abortion 0.0%, and others 40, 8%. Bleeding is one of the biggest causes of maternal death. The factor that causes the bleeding is anaemia in pregnancy (Ministry of Health RI, 2013).

Pregnancy is a condition where the foetus conceived in the mother's body, beginning with the fertilisation process, the meeting of sperm and egg in the fallopian tube, which is then implanted in the uterus and will conclude with the delivery process (Muhammad Ridwan, & Lopez, 2012). During pregnancy a variety of pathological states can occur in pregnant women that if not treated properly can cause severe problems (Fathonah, 2016).

One of the pathologies that can occur in pregnant women is anaemia which is a maternal condition with haemoglobin levels under 11 g% trimester 1 and 3 or the haemoglobin level <10.5 g% trimester 2 (Prawirohardjo, 2014 and Mohammed et al., 2012), During pregnancy, anaemia is caused by lack of nutrition (malnutrition), lack of iron in the diet (diet), malabsorption, loss of blood; as in the previous childbirth, menstruation, and chronic diseases such as pulmonary tuberculosis, intestinal worms, and malaria (Fathonah, 2016 and Sari, 2019).

According to the Health Nutrition and Population Statistics (2005) in Damayanti (2017), the incidence of anaemia in pregnant women occurs in all countries, both underdeveloped, developing, and developed countries. The prevalence of anaemia among pregnant women is highest, there is in the State of Congo (67.3%), and Ethiopia (62.68%). In developing countries, the prevalence of anaemia among pregnant women is quite high, as in India (49.7%) and Indonesia (44.3%). While in developed countries, the incidence of anaemia among pregnant women is quite low as in France (11.46%) and the United States (5.7%).

According to the Health Data Research (Riskesdas) in 2018, the prevalence of anaemia in pregnant women in Indonesia amounted to 48.9%, consisting of anaemia in pregnant women aged 15-24 amounting to 84.6%, amounting to 33.7% aged 25-34, 33.6% aged 35-44 and 24% aged 45-54. The data showed an increase in the prevalence of anaemia among pregnant women of the year 2013 amounting to 37.1% (Ministry of Health RI, 2018).

Some of the causes of anaemia in pregnancy are as follows: Fe compliance tablet consumption, parity, maternal age, frequency of antenatal care (ANC), socio-economic, science, education, culture, the support of a husband, and infection (Wijayanti, 2018 and Ariyani, 2016).

Complications that occur from anaemia in pregnancy can have an impact on the mother and foetus. The impact of anaemia on the mother is the risk of bleeding during pregnancy, childbirth, and the puerperium (Angrainy, 2017 and Sjahriani & Faridah, 2019). While the impact on the foetus is abortion; intrauterine death occurs, delivery of high prematurity, low birth weight, birth with anaemia, congenital disabilities can occur, infants susceptible to infancy, and low intelligence (Manuaba and Ida, 2007 & Bansu, 2019).

Efforts to prevent anaemia in pregnancy can be given at pharmacological and non-pharmacological therapy (Oktaviani & Rarome, 2009), Pharmacological therapy is the administration of a tablet Fe to increase haemoglobin levels in pregnant women, but these drugs have side effects such as stomach feels unwell, nausea, constipation, and black stool (Fathonah, 2016). While non-pharmacological therapy that can be provided to accelerate the increase in haemoglobin concentration in pregnant women is by eating red spinach (Pujiastutik, Refina, Ferdowski & Yuliana, 2019).

The result of research conducted by KH Endah Widhi Astuti (2013) shows that consuming red spinach juice can overcome anaemia in pregnant women. Hb levels were taken before, one week after, and 2 weeks after taking red spinach juice in Tawangmangu, Karanganyar, on October 31, 2013 - 13 November 2013. Second-trimester pregnant women who were given the red spinach juice increased their Hb levels by an average of 0.93 g% g in 2 weeks. The average value (mean) HB level taken before treatment was 11,210 g%, the average value of HB levels in the first week after treatment was 11,850 g%, and the average (mean) of the second week after the treatment that was 12,140 g%. Significant data was the obtained value of 0.004. T value is 11.282, and 2.860 t table means $t > t_{table}$ then H_0 is rejected, and H_a accepted, p-value < 0.05 then H_0 is rejected, and H_a accepted. It can be concluded that there are differences in levels of Hb before and after consumption of red spinach juice. The increase in Hb levels was found in the second-trimester pregnant women who were given red spinach juice once a day for 2 consecutive weeks. The observations were made by examining the levels of Hb in the second-trimester pregnant women before, one week after treatment, and then again 2 weeks after treatment. Pregnant women who have been selected as the subject of research met the study criteria. Results showed that the second-trimester pregnant women who were given red spinach juice were the largest age group of 85%, being between the ages of 20-35 years, as they are women of childbearing age who are able to get pregnant and give birth with the lowest risk for the mother and the baby (Saifuddin, 2006).

Spinach is one alternative crop in fulfilling the needs of iron in pregnant women who are anaemic (Astuti & Kulsum, 2018). Red spinach contains a lot of energy, protein, fat,

carbohydrates, fibre, potassium, calcium, phosphorus, iron, sodium, copper, zinc, and vitamins (A, B1, B2, B3, C) (Ministry of Health RI, 2017).

Based on data from the health profile of the Lampung Provincial Health Office in 2016 there were 45 cases of maternal mortality due to bleeding, 41 cases due of hypertension, 1 case of infection, 8 cases of annoyance in the circulatory system, 0 cases of metabolic disorders and as many as 45 cases of other complaints (Lampung Provincial Health Office profile, 2016).

Bandar Lampung is the capital of Lampung province consisting of 20 sub-districts where each subdistrict has a community health clinics called Puskesmas that aim to improve public health. Currently, the number of Puskesmas in the city of Bandar Lampung are as many as 30, consisting of 12 Puskesmas centres and 18 non-care Puskesmas. One is non-care Puskesmas is in Segala Mider Bandar Lampung city. Puskesmas Segala Mider is a non-care Puskesmas that provides obstetric services, that include maternal and child health services, and the services provided from the ANC, postpartum, infants, family planning and reproductive health planning.

Based on the results of the initial pre-survey conducted at several clinics in the city of Bandar Lampung. Among the Puskesmas Kemiling, Segala Mider, and Karang City. The largest population of pregnant women with anaemia was found in Puskesmas Segala Mider. At Puskesmas Segala Mider data obtained from 10 pregnant women who attended ANC, 6 women were anaemic. 2 showed mild anaemia, 3 moderate anaemia, and 1 severe anaemia. After, in the interviews with some of the pregnant women who had the ANC examination one said that she did not know that the red spinach could increase haemoglobin levels in pregnant women.

Based on the description above, the writer was interested in the research with the title red spinach accelerates the increases of haemoglobin levels in pregnant women with anaemia in the clinic of Segala Mider Bandar Lampung in 2019.

Methods

The study population was the whole object of the study of the object under study (Notoatmodjo, 2018). The population in this study were all pregnant women who had attended ANC in the clinic of Segala Mider Bandar Lampung city in 2019. And samples are partly taken from the whole object under study and are considered to represent the entire study population (Notoatmodjo, 2018). In obstetrics research, covering sample criteria of inclusion and exclusion criteria, where the criteria for determining whether or not the sample can be used (Hidayat, 2011).

Large Sample Federer calculated using the formula in the book Hidayat:

$$(T - 1) (r - 1) \geq 15$$

Information:

t = a lot of the treatment group

r = number of replications

$$(2-1) (r - 1) \geq 15$$

$$(R - 1) \geq 15$$

$$r \geq 15 + 1$$

$$r \geq 16$$

The samples in this study were of 16 pregnant women with anaemia. The number of samples plus 10% of $1.6 = 2$ for a possible drop out.

The samples taken were 18 pregnant women affected by anaemia given Fe tablets and 18 pregnant women affected by anaemia given red spinach. The sample used was 36 pregnant women in total.

a. The Inclusion Criteria

- 1) Pregnant women who are willing to become respondents
- 2) Pregnant women who experience anaemic trimester II
- 3) Pregnant women who do not suffer from kidney problems, thyroid disease, and gout
- 4) Pregnant women who consume the iron tablet

b. The Exclusion Criteria

- 1) Pregnant women who are not willing to be the respondent
- 2) Pregnant women who are anaemic trimester I and III
- 3) Pregnant women who are suffering from kidney problems, thyroid disease, and gout.
- 4) Pregnant women who do not consume the iron tablet

The sampling technique is a process of selection of the samples used in the study of the population, so the number of samples will represent the entire population (Hidayat, 2011).

This research sampling method using non-probability sampling with a purposive sampling technique, sampling based on a particular judgment made by the researchers themselves, based on the characteristics or properties of the previously known populations (Notoatmodjo, 2018).

Results and Discussion

The population of cases in this study was all pregnant women who had attended antenatal care at the Puskesmas Segala Mider. With a sample of the second-trimester pregnant women who are anaemic totalling 36 women divided into 2 groups: the treatment group and the control group, each group consisted of 18 people. Characteristics of respondents are as follows:

Table 1. Characteristics Of Respondents Pregnant Women At Puskesmas Segala Mider 2019

No.	Characteristics of Respondents	Σ	%
1	Age		
	26-30 years	23	64%
	31-35 years	13	36%
	Amount	36	100%
2	parity		
	primiparas	12	33%
	multiparas	24	67%
	Amount	36	100%
3	Education		
	SD	7	19%
	SMP	11	31%
	High School	17	47%
	Diploma	1	3%
	Amount	36	100%
4	Profession		
	IRT	30	83%
	employee	2	6%
	entrepreneur	2	6%
	Honorary	1	3%
	Trader	1	3%
	Amount	36	100%

Based on the Table 1, shows that the highest age group of respondents in the working area of Puskesmas Segala Mider Bandar Lampung are the respondents ranging between 26-30 years: 64%, or 23 women. Most respondents have multigravida parity as much as 67% or 24 people. The highest education level of respondents is as high as 47% or 17 people. And the average respondent's highest job is IRT as much as 83% or 30 people.

Univariate Analysis

- a. Hb levels in pregnant women with anaemia before given intervention/treatment red amaranth (pre-test)

Table 2. Average Value of Pregnant Women's Hb Levels of Anaemia Before given red spinach intervention

Hb					
Pre-intervention	N	Min	x	mean	St Dev
Kelpk control	18	9.7	10.8	10.256	.2975
Kelpk intervention	18	9.6	10.8	10.256	.2791

From the Table 2, obtained an average Hb pre-test in the control group and the intervention group was 10.26 g%, with the highest haemoglobin levels in the control group and the intervention group at 10.8 g%.

- b. Hb levels in pregnant women with anaemia after a given intervention/treatment red amaranth (post-test)

Table 3. Average value Hb in Pregnant Women with Anaemia After the intervention of the Red Spinach

After Intervention	Hb	N	Min	Max	mean	Std. dev
Group control		18	10.4	11.3	10,889	.2494
Group intervention		18	10.7	12.0	11,467	.3272

From the Table 3, it obtained an average Hb awarded after the intervention (post-test) in the control group was 10.89 g%, with a standard deviation of 0.2494. While the experimental group, an average haemoglobin level of the post-test was 11.47 g%, with a standard deviation of 0.3272. Based on the data above it shows that the average value of Hb group intervention/treatment is higher than the control group.

Bivariate Analysis

- a. Uji Independent Sample T-Test

Table 4 Differences in Hb levels before and after administration of red spinach on Pregnant Women with Anaemia

variables	N	Mean		mean	Sig.2-tailed
		pre	Post		
Intervention group	18	10,256	11,467	1,211	.000
Control group	18	10,256	10,889	0,633	

From the Table 4, test results indicate that there is an average difference in haemoglobin levels of pregnant women in the intervention group of 1,211 g%. In contrast, the control group was 0.633 g% control with sig. 0000.

Table 5. Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	T	Df	Sig. 2tailed	Mean Df	.. Error Difference
Equal variances assumed	.889	.352	5.958	34	.000	.5778	.0970

Based on the Table 5, it is known that the test results statistically independent sample t-test is the Sig. (2-tailed) 0.000 < 0.05, then H_a accepted which means there differences in Hb levels before and after administration of the Red Spinach in pregnant women with anaemia at the Puskesmas Segala Mider of Bandar Lampung 2019.

Based on the univariate analysis of data collected from the two groups, all of the 36 respondents in the study had mild anaemia pre-intervention/ red spinach treatment. The results of data analysis in the intervention/treatment of 18 respondents before being given the red amaranth obtained an average yield of 10,256 g% haemoglobin levels in pregnant women: after a given intervention/treatment with red spinach the average Hb in the pregnant women was 11,467 g%. The average increase in haemoglobin levels of pregnant women after the intervention/treatment was 1,211 g%.

The results of data analysis in the control group of 18 respondents. The average Hb level of pregnant women pre-tests is 10,256 g% while the average haemoglobin levels of pregnant

women post-test of 10,889 g%. The average increase in haemoglobin levels of pregnant women in the control group amounted to 0.633 g%.

The results of Bivariate analysis with testing statistical test independent sample t-test showed that the level of significance testing the test results before and after giving red amaranth by Sig. (2-tailed) 0000, the value is smaller than the value set at 0.05. It can be concluded that there is a difference in Hb levels before and after the administration of red amaranth in pregnant women with anaemia at the Puskesmas Segala Mider Bandar Lampung in 2019.

In this study, elevated levels of haemoglobin in pregnant women the most effective way is to consume iron tablet and red amaranth, namely with an average increase in Hb of 10,256 g% to 11,467 g%, compared with an increase in Hb levels were only consume iron tablet that is only average increase haemoglobin levels of 10,256 gr% to 10,889%.

Patients are encouraged to consume spinach anaemia. Many eating spinach will increase the levels of haemoglobin in the blood (Rohmatika & Umarianti, 2018). This increase was influenced by the iron is very large on spinach (Sukarini, 2015; Ristica, 2013). One of them is red spinach, red spinach is one type of spinach that contains high iron which has the effect of adding blood. Besides, spinach includes vitamins A, B, C, and K, potassium, and phosphorus. Red spinach contains vitamin C, which is quite high. Vitamin C has an important role in the absorption of iron, so iron there can be used optimally (Khaidir, 2007).

Yunaifi (2013) argued that in red spinach contained 7 mg of iron from 100 grams of red spinach that can help increase haemoglobin levels in pregnant women who are anaemic. Red spinach also contains 41 kcal of energy, in addition to the energy content of spinach also contains vitamins and minerals. Some vitamins and minerals included in the category of very good and excellent. The content of vitamin A, vitamin B1, B2, B3, vitamin C, iron, calcium, and potassium included in the excellent category, while copper, phosphorus, and zinc into the type of well (Nurleli, 2017).

The content of vitamin C in 100 grams of red spinach contained 62 mg. Vitamin C to boost immune function, prevent various diseases. Vitamin C also serves to accelerate the absorption of iron. Riboflavin (vitamin B2) and niacin (vitamin B3) helps release energy from the food that we consume. Niacin is also suitable for releasing energy from carbohydrates. In addition to good eye health, vitamin A is good for skin health.

Red spinach contains many minerals. The minerals found in red spinach, potassium, phosphorus, iron, sodium, potassium, copper, and zinc, are needed by the body.

Results Yolanda (2017) that affect red spinach increases Hb levels in the second-trimester pregnant women who stated that the difference in Hb between experimental and control groups

before the intervention in the experimental group was 10.48 mg/dl, and the control group 11,00 mg/dl. While in the experimental and control groups after the intervention in the experimental group was 11.70 mg/dl in the control group of 11.16 mg/dl. From this data, it can be concluded that there are differences in average haemoglobin levels before and after the intervention and declared no effect of red spinach consumption to increase haemoglobin levels of pregnant women.

Based on the description above and compared with the theory, the authors conclude that the red spinach is beneficial to increase the haemoglobin concentration of pregnant women who are anaemic. This is because the red spinach contains high levels of iron that red amaranth could be one alternative food additives other than Fe tablet in increasing haemoglobin levels or accelerate the increase in haemoglobin in anaemic pregnant women.

According to the research, the researchers recommend that pregnant women who are anaemic eat red amaranth as a food as well as take Fe tablets to increase their haemoglobin levels.

Conclusion

The conclusion of this research was that a total of 36 respondents before the intervention averaged mild anaemia (9 g% - 10 g%), the average Hb before giving red amaranth in the intervention/treatment and control groups was 10,256 g%, the average haemoglobin levels after administration of red amaranth in the intervention/treatment was 11,467 g% while the control group in the amount of 10,889 g% and the average increase in haemoglobin concentration is highest in the experimental group, which had been given red amaranth that is equal to 1,211 g% greater than the average increase haemoglobin levels in a control group of 0.633 g%. Then, there are differences in Hb levels before and after administration of red spinach on the second trimester pregnant women with anaemia at the Puskesmas Segala Mider Bandar Lampung 2019, with test results independent samples t-test statistic showed sig. (2-tailed) 0.000 > 0.05, meaning that there are significant differences between before and after the administration of red amaranth in pregnant women with anaemia in increases of Hb levels.

There is suggestion in the research for Pregnant Women to meet their iron requirements during pregnancy by taking Fe tablets 1 x 1 90 tablets during pregnancy in addition to eating foods that contain iron such as red spinach, while eating a balanced nutritional diet. For health workers in Puskesmas Segala Mider, we wish to advise pregnant women with anaemia to consume red spinach as an additional food containing iron in addition to taking Fe tablets, to accelerate the increase of haemoglobin levels so as to no longer suffer from maternal anaemia. For Institutions, hopefully the results of this study can be used as library materials, knowledge, and resources specifically for the prevention of early bleeding due to the increased levels of haemoglobin in anaemic pregnant women. This can help the health clinic businesses improve the quality of public health. For other researchers in future research, it is suggested to become



a reference in subsequent studies. It can be continued and improved to become a source of reliable information related to the effect of red amaranth in increasing haemoglobin levels in pregnant women with anaemia.

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