The Effect of Giving Avocado Fruit (*Persea Americana*) and Honey on Hemoglobin Levels among Trimester III Pregnant Women with Anemia

Bunga Tiara Carolin[1], Rukmaini[1], Silferia Liester Maulina Situmorang[1]

[1]Midwifery Study Program, Faculty of Health Sciences, Nasional University, Indonesia

Correspondence should be addressed to:
Bunga Tiara Carolin
bunga.tiara@civitas.unas.ac.id

Abstract:
Anemia is a health problem in pregnant women with a high prevalence which can have an impact on maternal and fetal death. Pregnancy can aggravate the incidence of anemia due to hemodilution. Providing Fe tablets and education on good nutrition can prevent anemia. Avocados and honey are foods that contain Fe and Vitamin C which can increase blood hemoglobin levels to prevent anemia. This study aims to determine the effect of avocado and honey on blood hemoglobin levels in third-trimester pregnant women in the intervention group and control group and to determine the average hemoglobin levels before and after treatment in the experimental group and control group. The research design used was quasi-experimental research with a pre and post-test design with the control group. The sample in this study was 30 respondents in the third trimester of pregnancy, consisting of 15 respondents in the control group and 15 respondents in the intervention group. The sampling technique uses a purposive sampling technique. The research instrument used a hemoglobin examination observation sheet. Data were analyzed using paired samples t-test and independent t-test. The results of the study showed that there was a significant average difference in hemoglobin levels before and after being given avocado in the intervention group, p=0.000. Avocados and honey can increase hemoglobin levels in third-trimester pregnant women. It is hoped that avocados and honey can be applied as nutritional education in health services.

INTRODUCTION

Anemia is a health problem in pregnant women with a high prevalence which can have an impact on maternal and fetal death. Anemia in pregnancy is a condition of pregnant women with hemoglobin (HB) levels <11 gr/dl in the first and third trimesters, while in the second trimester HB levels are <10.5 gr/dl (Ministry of Health of the Republic of Indonesia, 2013). The Indonesian Ministry of Health (2020) reported that according to the 2018 Riskesdas report, 48.9% of pregnant women in Indonesia experienced anemia, which had increased compared to the 2013 Riskesdas data, namely 37.1%. Data from the DKI Jakarta Provincial Health Service (2018) based on the results of examinations of pregnant women who experienced anemia were mostly at the age of 15-24 years at 84.6%, at the age of 25-34 years at 33.7%, at the age of 35-44 years at 33.6%, and 45–54-year-olds 24%. The results of the 2022 report from the Setiabudi District Health Center found that 497 pregnant women experienced anemia. Common symptoms of anemia are weakness, tiredness, lethargy, tiredness, and weakness.

Meanwhile, the symptoms of anemia in pregnant women can have a negative impact on pregnant women, namely the delivery process takes a long time and results in bleeding and shock due to weak contractions and even death of the mother. Anemia in pregnant women is the main cause of bleeding and infection which is a major factor in maternal death. (Indonesian Ministry of Health, 2014). Bad impacts on the fetus include abortion, premature birth, low birth weight babies, defects in babies and even baby death (Fikawati, 2015).

Various preventive efforts have been made to treat and reduce the incidence of anemia both pharmacologically and non-pharmacologically. Pharmacological treatment is administration of Fe tablets and blood transfusion. This can also be done with non-pharmacological therapy such as giving avocado and honey.

Many nutrients are found in avocados. Data from the Ministry of Health on the Indonesian food composition table (2019), the nutritional content of fresh avocado weighing 100 grams can be eaten at 61%: water 84.3 grams, iron 0.9 ml, β-carotene 189 μg, energy 85 calories, Phosphorus 20 mg, Potassium 278 mg, Calcium 10 mg, Carbohydrates 7.7 gr, Total carotene 180 μg, Fat 6.5 gr, Sodium 2 mg, Niacin 1 mg, Protein 0.9 gr, Riboflavin 0.08 mg, Zinc 0.4 mg, Copper 0.20 mg, Thiamine 0.05 mg, Vitamin C 13 mg.

Honey is a natural substance that has a sweet taste which is produced by bees from nectar or flower essence or liquid originating from parts of living plants which are collected, changed, and bound with certain compounds by bees and then stored in hexagonal-shaped hives (Al Fady, 2015). Honey contains many minerals, such as sodium, calcium, potassium, magnesium, aluminum, iron, phosphorus, zinc, and copper. The vitamins contained in honey are Iron (Fe) 0.9 mg, Phosphorus (P) 16 mg, Potassium 26.9 mg, Calcium (Ca) 5 mg, Carbohydrates (CHO) 79.5 mg, Sodium (Na) 6 mg, Niacin 0.1 mg, Protein 0.3 gr, Riboflavin (B2) 0.04 mg, Zinc 0.2 mg, Copper 0.04 mg, Vitamin C 4 m. Its nutritional content prevents anemia because iron is the main component of Hemoglobin formation.

Previous research conducted by Amelia et al. (2020) showed that giving avocado juice increased hemoglobin levels. In line with research conducted by Utami et al., (2020), it was shown that giving Fe tablets and avocado significantly increased hemoglobin levels compared to the control group who only consumed Fe tablets. In research conducted by Rianti et al., (2021) regarding the effect of giving honey on the hemoglobin levels of pregnant women in the third trimester in 2021, it was found that honey was effective in increasing the hemoglobin levels of pregnant women in the third trimester.

According to a preliminary study at the Setiabudi subdistrict health center, South Jakarta, it is known that during the last three months there were 273 third trimester pregnant women who had their pregnancies checked. From the results of this preliminary study, 26% or 72 pregnant women in the third trimester experienced anemia. Efforts made by the Setiabudi District Health Center to handle this case were by administering additional Fe tablets twice a day and providing education. Judging from the many cases of anemia experienced by pregnant women in the third trimester, it can disrupt the pregnancy process, fetal growth, and the birth process. This research aims to determine the effect of avocado and honey on increasing blood hemoglobin levels in third-trimester pregnant women with anemia at the Setiabudi District Health Center, South Jakarta.

METHOD

This research method uses a quasi-experimental, pre- and post-test design with the control group. The study population was third-trimester pregnant women with anemia. The total research sample was 15 in the experimental group and 15 in the control group. The dependent variable is

the hemoglobin level of pregnant women, while the independent variable is the provision of avocado and honey. This research did not use a questionnaire, so validity and reliability tests were not carried out. This study used observation sheets to assess the increase in hemoglobin levels of pregnant women. Based on the data normality test using skewness and kurtosis values, the calculations are in the range of -3 to +3, so it can be concluded that the data is normally distributed. The statistical tests used are paired t-tests and independent t-tests.

RESULT

The Effect of Giving Avocado and Honey on Hemoglobin Levels of Pregnant Women in the Third Trimester with Anemia in Each Intervention Group and Control Group

Table 1. Average Pre-Test and Post-Test Results of Hemoglobin Levels in the Intervention and Control Groups

Group	Pre-test		Post-test		p-value
	Mean	SD	Mean	SD	
Intervention	10.1	0.6	11.0	0.4	0.000
Control	9.4	0.7	9.9	0.6	0.164

Based on table 1 presents the results of the paired t-test carried out on the intervention group and control group. The results obtained in the intervention group were a mean pre-test of 10.1 and a post-test of 11.0, so the mean difference value was 0.9 (11.0-10.1) and p-value = 0.000 (p < α), so it can be concluded that there is an effect of giving avocado and honey on the hemoglobin levels of pregnant women in the third trimester with anemia in the intervention group. The results obtained in the control group were a mean pre-test of 9.4 and a post-test of 9.8, so the mean difference was 0.4 (9.8-9.4) and p-value= 0.164 (p > α), so it can be concluded There was no difference in the increase in hemoglobin levels pre-test and post-test.

Differences in Hemoglobin Levels of Pregnant Women in the Third Trimester with Anemia in the intervention group and the control group

Table 2. Test the Difference in Hemoglobin Levels in the Intervention Group and the Control Group

	Intervention		Control		p-value
	Mean	SD	Mean	SD	
Pre-test	10.1	0.6	9.4	0.7	0.131
Post-test	11.0	0.4	9.8	0.7	0.030

Based on table 2, the post test results from the intervention group and the control group used an independent sample t-test and obtained a p-value = 0.030 with a mean difference of 1.02 (11.0-9.8) so it can be concluded that there is a significant difference in the hemoglobin levels of pregnant women in the trimester. III with anemia in the intervention group and control group.

DISCUSSION

In this study, the results showed that there was a significant difference in the hemoglobin levels of pregnant women in the third trimester with anemia in the intervention group and the

control group. there is an increase in maternal hemoglobin levels. pregnant in the group given the intervention.

Anemia can be caused by malabsorption (impaired digestion of food) of iron which can result in the iron from blood supplement tablets not being able to be absorbed optimally. This is in accordance with Pratiwi and Widari (2018) that there is a fairly strong relationship between the habit of consuming iron inhibitor food sources and the incidence of anemia in pregnant women in the third trimester. To improve this, it is highly recommended to consume vitamin C which will help the absorption of iron so that anemia can be reduced or overcome.

The conversion of non-heme iron in the form of the inorganic compound Ferri (Fe^{3+}) to Ferrous (Fe^{2+}) will be greater if the pH in the stomach becomes more acidic. According to research results by Jayanti et al., (2018), one of the substances that really helps the absorption of iron is vitamin C (ascorbic acid). Acid will reduce ferric ions to ferrous and inhibit the formation of Fe complexes with insoluble food. Vitamin C can increase non-heme iron absorption fourfold and 200 mg will increase iron absorption by at least 30%. Avocados contain levels of vitamin C in avocados showing a value of 41 mg/per 100 grams of material (Mujid et al., 2021).

Iron is a vital element in the formation of hemoglobin. Based on other research, avocados contain important nutrients, namely vitamin C, vitamin E, vitamin K, iron, folic acid, potassium and quite high levels of calories and fat which are useful as a source of energy (Noormindhawati, 2016). The iron contained in avocado is useful for the formation of red blood cells, increasing oxygen flow throughout the body, preventing and treating anemia (Susanto, 2018). Vitamin C can help the body to absorb iron and calcium (Sunardi, 2017).

According to research by Agustina (2019), there is a significant difference in hemoglobin levels between pregnant women who only consume iron tablets and those who consume iron tablets together with vitamin C. Rahadian (2018) explains that pregnant women's iron needs are around 800 mg, in food. produces 8-10 mg of Fe so you have to take a minimum of 60 blood supplement tablets during pregnancy and you have to take vitamin C which helps the process of absorbing iron in the body. In line with Krisnanda (2020), vitamin C helps in the absorption of iron by changing iron from ferric to ferrous so that it is more easily absorbed by the body.

In research conducted by Feriyal (2020), the results showed that there was a positive effect of giving avocado juice for 14 days on increasing hemoglobin. With the addition of honey, it will further help increase the mother's hemoglobin levels. This is in accordance with research by Rianti et al., (2021), there is an influence of honey on increasing hemoglobin levels in pregnant women in the third trimester.

According to researchers' assumptions, giving avocado and honey more significantly increases the average hemoglobin level, this is because the iron content in avocados and vitamin C in avocados increases hemoglobin levels. With the addition of honey, it will further help increase the mother's hemoglobin levels. Honey contains iron which functions to increase hemoglobin levels in the blood. Honey also contains Vitamin C which can help the absorption of iron in the body. Avocados and honey both contain Fe and Vitamin C so there is more iron.

CONCLUSION

Based on the research results described in the previous chapter, it can be concluded that there is an avocados and honey can increase hemoglobin levels in third-trimester pregnant women. It is hoped that avocados and honey can be applied as nutritional education in health services.

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