The Differences of Giving Green Nuts and Vegetables to Hemoglobin (Hb) Levels in Trimester Iii Pregnant Women: A Study from Two Group Posttest Design Approach

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Abstract

Background: One of the complications during pregnancy is pregnant women with iron deficiency anemia. Anemia in pregnancy can be overcome by consuming foods that contain iron such as spinach and nuts. One type of legume that contains high iron is green beans (vigna radiata). Based on the survey results at the Baitussalam Community Health Center, it was shown that the number of pregnant women who had anemia was 217 people (58.96%). Pregnant women who experience anemia say that they don't consume foods that contain iron so that there is no increase in Hb levels during pregnancy.

Objective: To find out the difference in giving green bean and spinach juice to hemoglobin (Hb) levels in third trimester pregnant women in the working area of the Baitussalam Community Health Center, Aceh Besar district.

Materials and Methods: This type of research is experimental design with a two group posttest design approach. This research was conducted on March 17 - April 5 2020. The population and sample in this study were all pregnant women with anemia, amounting to 217 people, while the sample taken in this study amounted to 30 people consisting of two groups. The research instrument used a questionnaire and observation sheet. The data processing was carried out using statistical test paired sample t test.

Results and Discussion: The results of statistical analysis showed that there were differences in the pretest and posttest in group A which were given mung bean juice to third trimester pregnant women with a p-value of 0.000. Then there were differences in the pretest and posttest in group B who were given spinach to pregnant women in the third trimester with the statistical result of p value 0.000.

Conclusion: Based on the results of this study, it can be concluded that there were differences in group A who were given green bean juice and group B who were given spinach to pregnant women. trimester III. Group A which was given green bean juice had more of an increase in Hb levels compared to group B who was given spinach. Therefore, pregnant women are expected to consume green bean extract and spinach to increase Hb levels so that anemia does not occur during pregnancy.

Keywords: Green Beans Juice, Spinach Vegetable, and Hemoglobin Levels.

INTRODUCTION

One of the health problems that need to be considered is the health of mothers and children in the context of pregnancy, childbirth, family planning (KB), because maternal and child health is the capital for health development in Indonesia [1]. Health problems that must be considered is the period of pregnancy. Various kinds of complications of health problems during pregnancy, one of which is pregnant women with iron deficiency anemia. This is due to reduced levels of hemoglobin (Hb). During pregnancy, the need for oxygen is higher, which triggers an increase in erythropoietin production. As a result, plasma volume increases and red blood cells (erythrocytes) increase. However, the increase in plasma volume occurs in a larger proportion when compared to the increase in erythrocytes resulting in a decrease in hemoglobin concentration [2].

Hemoglobin is a protein that carries oxygen in red blood cells and gives red blood cells their red color. People with anemia don't have enough hemoglobin. Anemia often occurs due to iron deficiency because in pregnant women there is a twofold increase in iron requirements due to an increase in blood volume without expansion of plasma volume, to meet maternal needs (to prevent blood loss during childbirth) and fetal growth [3].
According to WHO (World Health Organization) in 2014, the prevalence of anemia in pregnant women in Asia was 48.2%, Africa 57.1%, America 24.1%, and Europe 25.1%. About 2 million people suffer from iron deficiency anemia with a prevalence of about 30% of the population of pregnant women. In 2017, the prevalence of anemia in Asia and Africa reached 85%, with women as the most sufferers. There are 202 million women in Asia, and 100 million women in the West Pacific aged 15-49 years who contract anemia. Meanwhile, globally, 41,800 pregnant women and nearly 60% of pregnant women suffer from anemia. Generally, pregnant women have iron (Fe) deficiency. The prevalence of anemia in Asia is still quite high, where around 80% of pregnant women die from complications from iron deficiency anemia [4].

Data from the Basic Health Research (Riskesdas) in 2018 the number of pregnant women suffering from anemia was 48.9%, this is an increase compared to 2013 of 37.1%. From the 2018 data, the highest number of pregnant women who experienced anemia was at the age of 15-24 years at 84.6%, aged 25-34 years at 33.7%, aged 35-44 years at 33.6%, and age 45-54 years at 24%. The group of pregnant women is one of the groups at high risk of developing anemia, although the anemia experienced is generally relative anemia due to physiological changes in the body during pregnancy [5].

Based on the health profile of Aceh province, in 2007 the incidence of anemia in pregnant women was 57.19%. The number of pregnant women who consumed 90 tablets of Fe3 tablets in 2012 was 82.76%. In 2015, the number of pregnant women who checked their hemoglobin (Hb) levels was 47,467 people and 83.23% had mild anemia, compared to 59.72% of severe anemia. One of the health problems that contribute to maternal mortality is anemia in pregnancy, namely iron deficiency anemia [6].

According to [3] the impact of anemia on pregnant women will cause danger to pregnancy and the fetus during pregnancy in the form of abortion, premature delivery, obstacle to growth and development of the fetus in the uterus, susceptibility to infection, the risk of cord decompensation in Hb less than 6 g%, occurs hydatiose mole, hyperemesis gravidarum, antepartum hemorrhage and premature rupture of membranes. Anemia in pregnant women also results in placental disorders such as hypertrophy, calcification, and infarction, resulting in impaired function.

Anemia during pregnancy occurs due to increased maternal total blood volume by about 30-50% in single pregnancies and 50% in multiple pregnancies. Total blood volume is the combination of plasma volume increased by 70% and red cell volume which also increased by 33% from the pre-pregnancy value all this causes visible hemodilution at low hematocrit levels which is known as physiological anemia in pregnancy and often occurs in gestational age 24-32 weeks. The increase in total blood volume starts at the beginning of the first trimester which then increases rapidly until mid-pregnancy and then slows down to the 32nd week [2].

Anemia in pregnancy can be overcome by consuming foods that contain iron such as spinach and nuts. One type of legume that contains high iron is green beans (vigna radiata). Mung beans are very beneficial for the health of pregnant and lactating women, as well as to support the child's growth period. The iron content in green beans is mostly found in embryos and seed coat [7]. Green beans contain as much as 2.25 mg of iron in every 2 cups of green beans every day has consumed 50% of the daily iron requirement of 18 mg and can increase Hb levels for 2 weeks. Green beans also contain phytate by 2.19%. Mung bean seeds that have been boiled or processed and then consumed have high digestibility and low flatulence [8].

Meanwhile, according to [9] one alternative to meeting iron needs can be done by consuming vegetables containing iron in the diet. Iron is found in vegetables, including spinach (Amaranthus spp). Leafy green vegetables like spinach are great sources of nonheme iron. Spinach that has been cooked contains iron as much as 8.3 mg / 100 grams. Adding iron to spinach plays a role in the formation of hemoglobin. Green spinach has good benefits for the body because it is a source of calcium, vitamin A, vitamin E and vitamin C, fiber, and also beta-carotene. In addition, spinach also has a high iron content to prevent anemia. The mineral content in spinach is quite high, especially iron which can be used to prevent fatigue due to anemia.

Based on research conducted by [10], it shows that the average hemoglobin level before being given green beans is 9.33 g / dl, and the average hemoglobin level after being given green beans is 10.80 gr / dl. The results of the t-test obtained p value 0.000 <α (0.05) so that there is an effect of giving green beans on the increase in hemoglobin levels in pregnant women in the second trimester in the Way Kandis Inpatient Health Center in Bandar Lampung. The results of research conducted by [11] showed that the average change in hemoglobin levels in pregnant women in group I was 0.541 gr / dl and in group II was 0.22 gr / dl. The test results showed that the consumption of green spinach extract had an effect on changes in hemoglobin levels with a p value of 0.038, which means that the hijam spinach extract significantly affected changes in hemoglobin levels.
Based on preliminary data collection at the Baitussalam Puskesmas, Aceh Besar district, the number of pregnant women in 2017 was 433 people. Of the total pregnant women, 342 people (78.98%) had mild anemia. Whereas in 2018 the number of pregnant women decreased by 413 people with a total of 284 pregnant women with mild anemia (68.76%). The number of pregnant women in 2019 from January to October was 368 with 217 pregnant women with anemia (58.96%) [12].

The results of interviews and observations to 7 pregnant women who experienced low Hb, they said they did not consume foods that contain iron. In addition, they have never consumed green bean juice to increase hemoglobin levels during pregnancy. However, most of them often consume spinach. Based on the above background, researchers are interested in conducting research "The difference in the distribution of green bean and spinach extract on hemoglobin (Hb) levels in pregnant women in the third trimester in the working area of the Baitussalam Community Health Center, Aceh Besar district".

**RESEARCH METHOD**

This research is an experimental research design with a two group posttest design approach. This research was conducted in the working area of the Baitussalam Puskesmas, Aceh Besar district on March 17 - April 5, 2020. The population in this study were all pregnant women who experienced anemia in the Baitussalam Community Health Center working area in 2019 from January to October totaling 217 people. The sampling technique in this study using purposive sampling method. The samples taken in this study amounted to 30 people consisting of two groups. According to researchers, in order for the analysis to produce correct information, there are four stages in data processing, namely editing, coding, transferring and tabulating. The data analysis is the t-test analysis technique (t-test).

**RESULTS AND DISCUSSION**

Table 1: Frequency Distribution Based on Food Consumption of Third Trimester Pregnant Women

<table>
<thead>
<tr>
<th>No.</th>
<th>Food consumption</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Yes</td>
<td>9</td>
<td>30</td>
</tr>
<tr>
<td>2.</td>
<td>No</td>
<td>21</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>30</td>
<td>100</td>
</tr>
</tbody>
</table>

Based on Table 1, it shows that of the 30 respondents, respondents who did not consume food to increase Hb levels were greater, namely 21 people (70%) compared to respondents who consumed food to increase Hb levels by 9 people (30%).

Table 2: Differences in Giving Green Beans and Spinach Vegetables on Hemoglobin (Hb) Levels in Third Trimester Pregnant Women

<table>
<thead>
<tr>
<th>Group</th>
<th>Me</th>
<th>Std. Deviation</th>
<th>Median (Min-Maks)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Pretes</td>
<td>10,180</td>
<td>0.3489</td>
<td>9.8 – 10.8</td>
</tr>
<tr>
<td></td>
<td>Postes</td>
<td>12,353</td>
<td>0.6988</td>
<td>11.2 – 13.7</td>
</tr>
<tr>
<td>B</td>
<td>Pretes</td>
<td>10,220</td>
<td>0.5199</td>
<td>9.2 – 10.9</td>
</tr>
<tr>
<td></td>
<td>Postes</td>
<td>11,707</td>
<td>0.5574</td>
<td>11.1 – 12.5</td>
</tr>
</tbody>
</table>

Based on Table 2, it shows that the results of the study in group A pretest obtained a mean value of 10.180, a standard deviation of 0.3489. The minimum and maximum values in group A pretest were 9.8 - 10.9. Then in group A posttest, the mean value was 12.353, standard deviation 0.6988. The minimum and maximum scores in group A posttest were 11.2 - 13.7. From the results of the t test for group A, namely the pretest and posttest, the p value = 0.000 was obtained. This shows that there is a
difference in pretest Hb levels, namely before giving green bean juice and post-test Hb levels, namely after giving green bean juice.

The results of the study in the pretest group B obtained a mean value of 10.220, a standard deviation of 0.5199. The minimum and maximum values in group B pretest were 9.2 - 10.9. Then in the group B posttest, the mean value was 11.707, the standard deviation was 0.5574. The minimum and maximum values in group B post-test were 11.1 - 12.5. From the results of the t test for group B, namely the pretest and posttest, the p value = 0.000 was obtained. This shows that there is a difference in pretest Hb levels, namely before giving spinach and posttest Hb levels, namely after giving spinach.

Based on the results of the t test between group A which was given green bean juice and group B which was given spinach, the p value was = 0.029. This shows that there are differences in the Hb levels of pregnant women who are given green bean juice and those given spinach.

A. Differences in Giving Mung Bean Extract on Hemoglobin (Hb) Levels in Third Trimester Pregnant Women

Based on the results of the t test for group A, namely the pretest and posttest, the p value = 0.000 was obtained. This shows that there is a difference in pretest Hb levels, namely before giving green bean juice and post-test Hb levels, namely after giving green bean juice.

This is in accordance with the theory that iron is a very important element to form red blood cells or hemoglobin. One type of nuts that contain high iron is green beans. Mung beans contain iron, vitamin C, and zinc which play a role in treating iron deficiency anemia. Green beans also contain vitamin A of 7 mcg in half a cup. Vitamin A deficiency can worsen iron deficiency anemia. Vitamin A supplementation has a beneficial effect on iron deficiency anemia. The interaction of vitamin A with iron is synergistic. Based on the amount, protein is the second main arrangement after carbohydrates. Mung beans contain 20-25% protein. The protein in raw green beans has a digestibility of about 77%. The low digestibility is caused by the presence of anti-nutritional substances, such as anti-trypsin and tannins (polyphenols). To increase the digestibility of these proteins, green beans must be processed first through a cooking process, such as boiling, steaming, and sangria [8].

Green bean drinks can significantly increase hemoglobin levels in the blood because they contain iron, vitamin C, and zinc and vitamin A has many roles in the body, including growth and differentiation of progenitorerythrocyte cells, body immunity against infection and mobilization of all iron reserves. network. Thus, it is recommended for pregnant women to consume green beans which are useful for preventing iron deficiency anemia [7].

The results of this study are related to research conducted by [13] which shows that the average hemoglobin level before being given green beans is 9.33 gr / dl, the average hemoglobin level after being given green beans is 10.80 gr / dl. The t test results obtained p value 0.000 <α (0.05). Thus, there is an effect of giving green beans on the increase in hemoglobin levels in trimester II pregnant women.

The results of other studies related to this study also carried out research conducted by [14] showing that the average hemoglobin level of pregnant women before receiving treatment in the intervention group was 9.8906 and in the control group was 10.1063. The average hemoglobin level of pregnant women after receiving treatment in the intervention group was 10.7969 and in the control group was 10.1250. The t test results obtained p value 0.000. Thus, there is an effect of giving green bean juice on hemoglobin levels in pregnant women.

Researchers assume that giving green bean juice is very useful for increasing the Hb levels of pregnant women. This is in accordance with the results of research by researchers where the Hb level in group A posttest, namely after being given green bean juice, increased compared to the Hb level in group A pretest before being given mung bean juice. In the results of this study, the respondents admitted that they rarely consumed green bean juice. Usually, to increase Hb, respondents only consume green vegetables and fruits. Respondents also often experience dizziness and fatigue during pregnancy, this is due to a lack of Hb. Then the researchers advised mothers to consume green bean juice which is very beneficial for pregnant women to increase iron in the body. Thus, it will reduce the anemia rate in pregnant women and can improve the health status of pregnant women during pregnancy.
B. Differences of Spinach on Hemoglobin (Hb) Levels in Third Trimester Pregnant Women

Based on the results of the t test between group A given green bean juice and group B given spinach, the p value = 0.029 was obtained. Thus, there was a difference in the Hb levels of pregnant women who were given green bean juice and those given spinach.

This is in accordance with the theory that iron contained in spinach is essential for forming red blood cells or hemoglobin. One alternative to meet iron needs can be done by consuming vegetables that contain iron in the diet. Iron is found in vegetables, including spinach. Green vegetables like spinach are great sources of iron. Spinach that has been cooked contains iron as much as 8.3 mg / 100 grams. Adding iron to spinach plays a role in the formation of hemoglobin [15].

Green spinach has good benefits for the body because it is a source of calcium, vitamin A, vitamin E and vitamin C, fiber, and also beta-carotene. In addition, spinach also has a high iron content to prevent anemia. The mineral content in spinach is quite high, especially iron which can be used to prevent fatigue due to anemia. Because the iron content in spinach is quite high, plus the content of B vitamins, especially folic acid, in the past, spinach was consumed by pregnant women and giving birth [7].

The results of this study are related to research conducted by [11] which was conducted on 34 respondents consisting of group I (green spinach extract) and group II (Fe tablet) for 7 days. During the supplementation, the average change in hemoglobin levels in pregnant women in group I was 0.541 g / dl and in group II was 0.22 g / dl. The results of the non-parametric Man Whitney Test showed that the consumption of green spinach extract had an effect on changes in hemoglobin levels with a p value of 0.038, which means that the hijam spinach extract significantly affected changes in hemoglobin levels. Thus, it is recommended for pregnant women to consume green beans which are useful for preventing iron deficiency anemia.

The results of other studies related to this study also carried out research conducted by [16] which showed that the average hemoglobin level of respondents before giving green spinach juice was 9.0308 with Std. Deviation is 0.81587, while after giving green spinach juice is 10.2615 with Std. Deviation 0.85200. It can be seen that the mean difference between before and after giving green spinach juice is 1.23077 with a standard deviation of 0.47150. The results of statistical tests with paired sample t test obtained a value of 0.000, which means <0.05, this indicates that there is an effect of giving green spinach juice on changes in hemoglobin levels of anemic pregnant women.

Researchers assume that giving spinach is very useful for increasing the Hb levels of pregnant women. This is in accordance with the results of research by researchers where the Hb level in the post-test group B, namely after being given spinach, had an increase compared to the Hb level in the post-test group B before being given spinach. In the results of this study, the respondents admitted that they sometimes consume spinach but not always. Usually, to increase Hb, respondents only consume green vegetables and fruits. Respondents also often experience dizziness and fatigue during pregnancy, this is due to a lack of Hb. Then the researchers advised mothers to consume spinach which is very beneficial for pregnant women to increase iron in the body. Thus, it will reduce the anemia rate in pregnant women and can improve the health status of pregnant women during pregnancy.

Based on the results of the research, the overall researcher showed that group A who had consumed green bean juice had a rapid increase in Hb levels compared to group B who had consumed spinach. This is consistent with the theory that iron levels in green bean juice are higher than spinach. Thus, it is better to consume green bean juice. However, spinach still contains iron which can increase Hb levels in pregnant women so that it can prevent anemia in pregnancy. In addition, in this study the respondents experienced an increase in their Hb levels from previously having low Hb levels. This is also because researchers routinely provide green bean and spinach juice to pregnant women which can increase Hb levels during pregnancy.

CONCLUSION

There are differences in the pretest and posttest given green bean extract to third trimester pregnant women in the work area of the Baitussalam Community Health Center, Aceh district with a statistical result of p value 0.000. There are differences in the pretest and posttest given spinach to pregnant women in the third trimester in the work area of the Baitussalam Community Health Center, Aceh district with a statistical result of p value 0.000. There was a difference between group A who were given green bean juice and group B who were given spinach in pregnant women in the third trimester in the working area of the
Hemoglobin levels of pregnant women. If the Hb level decreases, it is hoped that pregnant women can consume foods that can increase Hb levels such as green bean extract and spinach and it is hoped that the next researchers can carry out different research with this research such as with a different title, type of research, research variables, and the sample used. In addition, other researchers can also take health problems and data contained in this study.

Acknowledgement

With the completion of this research, we would like to thank the Baitussalam Community Health Center, Aceh Besar District for supporting and giving permission for this research. As well as the entire academic community at the University of Ubudiya Indonesia who have provided motivation, assistance and funds in the implementation of this research activity, so that this activity is carried out well.

Authors’ contributions: Conceptualization, writing, review, editing and resources, Marniati; methodology, software, validation, formal analysis, investigation and writing original draft, Nuzulul Rahmi

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