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EFFECT OF MORINGA OLEIFERA COOKIES IN ANEMIA ADOLESCENT

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ABSTRACT

Anemia is one of four nutritional problems in Indonesia. Groups that are susceptible to anemia are young women. Anemic adolescent girls are due to iron intake from insufficient food, menstruation, and activities. With the high incidence of anemia in young women so that prevention and treatment is needed. Anemia treatment efforts can use local foodstuffs for Moringa Oleifera. Moringa leaves have a high nutritional content of protein and iron. Moringa leaves with processing into cookies is one of the alternative utilization of moringa leaves for the prevention and treatment of anemia in young women. The purpose of research is to assess the effect of Moringa Oleifera cookies in anemia adolescent.

The research used was quasi experiment with pre test post test group control design with the intervention of Moringa Oleifera cookies in women adolescent anemia. Subjects in this study are 62 women adolescent anemia. The results showed that most respondents aged 10-13 years (64.5%), most of the nutritional status of respondents normal nutritional status (91.9%), mean Hb before intervention 11.13 ± 0.81 and mean Hb after intervention 12.67 ± 1.08. There showed that there were effect of Moringa Oleifera cookies to female teenage Hb (p <0.05).

It can be concluded that there is an effect of Moringa Oleifera cookies to anemia female adolescent

Keywords: Cookies, Moringa Oleifera, Adolescents, Anemia

INTRODUCTION

Iron deficiency anemia is one of the most widespread preventable nutritional problems in the world. Globally 50% of anemia is attributed to iron deficiency and accounts for approximately 841,000 death annually worldwide. The prevalence of anemia nationally was 14.8%. There are 20 provinces which have anemia prevalence bigger than national prevalence, one of them is Yogyakarta with 15%.1

Anemia is one of four major nutritional problem in Indonesia. Anemia is defined as condition in which blood haemoglobin level less than 9. Iron nutritional anemia is anemia caused by iron deficiency in the body. Some of the common causes of iron deficiency are inadequate intake, chronic or acute blood loss, malabsorption and menstruation. Groups that are at risk of anemia include adolescent girls and this is shown to be a high prevalence of iron deficiency anemia in young women. Adolescents with anemia have symptoms such as apathy, irritability, decreased ability to concentrate and learn.2 Therefore anemia becomes the target of community nutrition improvement by providing iron supplementation. Anemia prevention efforts in Indonesia have three strategies such as iron supplementation, nutrition education and food fortification.

Moringa Oleifera leaves have long been used the problem malnutrition among, children, adolescent and pregnant. In addition, with micronutrient substances Moringa Oleifera can be used an alternative supplement for women adolescent to prevent anemia.3 Moringa Oleifera have high nutrient content especially iron and protein.4 Diversification of food by adding Moringa Oleifera to cookies can make products for prevention and
treatment of anemia in young women. The purpose of this study was to assess the effect of *Moringa Oleifera* cookies to anemia female adolescent.

**METHOD**

The study design was quasi experiment, pretest posttest group design. The subject are sixty two women adolescent anemia in Primary High School Saptosari. The design was an interventional study with purposive sampling. The intervention conducted for 21 days. The intervention received one portion snack with 100 gram/day of *Moringa Oleifera* cookies.

This study were hb levels before and after intervention. Diagnosis anemia use *cyanmethemoglobin* method, food consumsion using food recall and nutritional status using anthropometry (weight and height). Analysis was based on percentages and proportions. Pairet t test was used to find out any significant difference between before and after intervention.

**RESULT**

The characteristic responden age and nutritional status can be seen in table 1 below:

<table>
<thead>
<tr>
<th>Table 1. Age and Nutritional Status From Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variabel</td>
</tr>
<tr>
<td>Age (years)</td>
</tr>
<tr>
<td>10-13</td>
</tr>
<tr>
<td>14-16</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>Nutritional Status</td>
</tr>
<tr>
<td>Underweight</td>
</tr>
<tr>
<td>Normal</td>
</tr>
<tr>
<td>Obes</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Table 1. Above shows that the Most respondents aged 10-13 years (64.5%), nutritional status most of the normal nutritional status (91.9%). An increase in mean Hb level between before intervention and after intervention. The mean of Hb level before intervention and after intervention can be seen in Table 2.

<table>
<thead>
<tr>
<th>Table 2 Hb Level Before Intervention And After Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemoglobin Levels</td>
</tr>
<tr>
<td>Hb levels before (g/dl)</td>
</tr>
<tr>
<td>Hb levels after (g/dl)</td>
</tr>
</tbody>
</table>

The mean rate of haemoglobin in measurement before intervention was 11,13 ± 0.81 gr / dl. In the measurement after the intervention, the mean hemoglobin level was 12.67 ± 1.08 gr / dl. The food intake mean known that average energy intake 1215.45 kcal, protein intake 49.15 gram, intake of fat 21.52 gram, intake of iron 8.61 gram, and intake of vitamin C 12.22 gram. The food intake can be seen Table 3. Below
Table 3. Food Consumption Of Respondents

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Min</th>
<th>Max</th>
<th>Mean±SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>989.30</td>
<td>1531.20</td>
<td>1215.45±106.89</td>
</tr>
<tr>
<td>Protein</td>
<td>41.20</td>
<td>61.10</td>
<td>49.15±4.92</td>
</tr>
<tr>
<td>Fat</td>
<td>15.60</td>
<td>26.20</td>
<td>21.52±2.04</td>
</tr>
<tr>
<td>Carbohydrate</td>
<td>181.50</td>
<td>274.10</td>
<td>220.00±24.65</td>
</tr>
<tr>
<td>Iron</td>
<td>7.10</td>
<td>9.60</td>
<td>8.61±0.66</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>10.20</td>
<td>15.20</td>
<td>12.22±1.13</td>
</tr>
</tbody>
</table>

Table 4 shows an increase in Hb levels between before and after intervention. This result is supported by the result of paired t-test which shows a significant increase of mean Hb between hemoglobin level before and after intervention. This means that *Moringa Oleifera* cookies can increase hemoglobin levels in adolescent anemia (p<0.05).

Table 4. Hb Levels Between Before and After Intervention

<table>
<thead>
<tr>
<th>Variable</th>
<th>Min</th>
<th>Max</th>
<th>Mean±SD</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td>7.00</td>
<td>11.90</td>
<td>11.13±0.81</td>
<td>0.10</td>
<td>0.010</td>
</tr>
<tr>
<td>After</td>
<td>9.30</td>
<td>14.70</td>
<td>12.67±1.08</td>
<td>0.14</td>
<td></td>
</tr>
</tbody>
</table>

There are many studies conducted which the beneficial effect of *Moringa Oleifera* on anemia. *Moringa Oleifera* has been known from ancient times and has been used by our ancestors as cure for numerous ailment. After 21 days intervention there was a significant rise in haemoglobin levels (p<0.05). The protein in the *Moringa Oleifera* prevented any loss weight in the adolescent. However the study concluded that *Moringa Oleifera* being a locally available food must be utilised more effectively instead of the local relying on supplements and fortified food for the essential nutrients.

The linkage of iron with hemoglobin levels can be explained that iron is the main component that plays an important role in the formation of blood (hemopoiesis) that is synthesizing hemoglobin. Excess iron is stored as a ferritin protein, hemosiderin in the liver, spinal cord and the rest in the spleen and muscle. If the iron deposits are reduced and the amount of iron obtained from food is also reneged, there will be an iron imbalance in the body, resulting in hemoglobin levels falling below the normal limit called iron anemia.

The increase of Hb level of respondents was caused by the consumption of 100 g/day leaf cookies as long as 21 days. *Moringa leaves* contain vitamin A, vitamin C, vitamin B, calcium, potassium, iron and protein in very high amounts. The leaves of *moringa* effectively increase hemoglobin levels in women with anemia. *Moringa leaves* are rich in nutrients and flour moringa effective in healing anemia.

Teenagers who consume kelor leaf cookies can increase hemoglobin levels in the blood by 1.25 g / dl in 30 days. Giving *Moringa leaf extract* for two months can increase the female hemoglobin level of 1.61 g / dl. Increased levels of hemoglobin adolescent girls occur due to the intake of nutrients contained in the leaf kelor leaf. The iron content contained in moringa leaf cookies has high protein content (8.75 g) and iron (22.86 mg). The present study also concludes that *Moringa Oleifera* effectively corrected haemoglobin levels in anemia. *Moringa Oleifera* powder is effective in treatment of anemia. This evidently is because of its content of quality protein, iron, vitamins A and C.

In conclusion, *Moringa Oleifera* cookies have significant effect to increase haemoglobin level in women adolescent. This may be promoted in the community as a dietary supplementation in anemia women.
REFERENCES