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The Effects of Giving Moringa Leaf Tea for Increasing Hemoglobin Levels in Adolescent Girls

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ABSTRACT

Anemia is a condition in which the number of red blood cells is insufficient to meet the physiological needs of the body due to the rapid growth rate combined with the depletion of iron stores and an inadequate diet. Based on data from the East Java Provincial Health Office in 2020 the prevalence of female adolescents in East Java who have anemia is 42%, including Sidoarjo Regency is ranked first in East Java with a prevalence of 32.9%. The purpose of this study was to determine the effect of giving moringa leaf tea on increasing hemoglobin levels in female adolescents. Pre Experimental research method with pretest-posttest design one group design . The population of this study were all young women at the Youth Posyandu in Putat Tanggulangin Village Sidoarjo and as many samples 19 young women (calculations attached) who met the inclusion and exclusion criteria . Research data were analyzed using data analysis Univariate was tested by paired t-test with a significant level of p.value <0.05 . Got results that there was a significant difference between hemoglobin levels before and after administration of moringa leaf tea *(p<0.05)*.

Keywords: Anemia; Hemoglobin Levels; Moringa Leaf Tea; Young Women

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INTRODUCTION

Anemia is a condition in which the number of red blood cells or hemoglobin concentration is lower than normal. Hemoglobin is needed to carry oxygen, if there are too few or abnormal red blood cells, there will be a decrease in the capacity of the blood to carry oxygen throughout the body's tissues. This causes symptoms such as weakness, fatigue, shortness of breath and dizziness [1]. Universally, Iron Deficiency Anemia (IDA) is the most common nutritional problem affecting around 2 billion people worldwide, most of whom (89%) are in developing countries. Anemia is associated with low socioeconomic status, caste, long menstrual periods, poor personal hygiene, poor nutrition, and infections in young women [2].

World Health Organization define teenager is resident in range ages 10 to 19 years. Adolescent girls have a higher risk of experiencing anemia because of their rapid physical growth and the menstruation they experience causes their bodies to require higher levels of iron [3]. Adolescent girls who experience anemia will be faced with decreased immunity, decreased concentration, decreased academic achievement, decreased adolescent fitness and productivity. Especially for young women who will later become mothers, anemia can also trigger pregnancy complications, such as premature birth, or babies born with low weight and the risk of death due to bleeding during childbirth. Therefore, young women are a national asset whose health needs to be maintained.

Efforts to prevent and treat anemia can be carried out pharmacologically and non-pharmacologically, pharmacologically of course by giving Fe tablets which is a government program. Fe tablets are tablets for nutritional anemia control supplementation, each tablet contains 200mg of iron sulfate (equivalent to 60mg of elemental iron) and 0.25mg of folic acid. Besides that, you can also consume vitamin A, vitamin C and zinc. Meanwhile, prevention and treatment that can be carried out non-pharmacologically can utilize existing natural resources, such as Moringa leaves. Indonesia has abundant natural resources as natural sources of nutrients. Most natural sources of nutrients come from plants, one of which is the Moringa plant. Moringa is known to contain more than 90 types of nutrients in the form of essential vitamins, minerals, amino acids, anti-aging, and anti-inflammatory. Moringa contains 539 compounds known in traditional African and Indian medicine and has been used in traditional medicine to prevent more than 300 diseases [4].

The content of high nutritional value, the many properties and benefits that make Moringa known as the Miracle Tree. In 100grams of fresh Moringa leaves it has an iron content of 28.29mg which is equivalent to the iron content in 30mg Fe tablets so that an increase in hemoglobin levels in consumption of Moringa leaf tea for 14 days is an increase of 1.7gr/dl to 2 ,9gr/dl [5]. The World Health Organization recommends consuming Moringa leaves to meet iron levels in the body, especially those with iron

deficiency anemia. Various studies have proven the effectiveness of giving Moringa leaves in various preparations as a therapy for anemia sufferers. Iron in Moringa leaves can help the process of forming red blood cells so that it can increase hemoglobin levels in the blood [6]. The process of absorption of iron in the body is divided into 3 parts, namely the luminal phase, mucosal phase, and systemic phase. In the luminal phase, iron bonds from foodstuffs (Moringa leaf tea) are released or converted into dissolved and ionized forms. Then the iron in the ferric form (Fe3+) is reduced to the ferrous form (Fe+2) so that it is ready to be absorbed by the intestine. In this process gastric juice plays an important role. In 100grams of Moringa leaves contain many amino acids that help the process of polymerization and iron precipitation. In addition, in Moringa leaves there is also vitamin C which is an ingredient that promotes iron absorption contained in Moringa leaf tea which is very strong and functions as a reducing agent that can convert ferric to ferrous, maintains intestinal pH to remain low thereby preventing iron precipitation and is monomeric. chelators that form iron-ascorbate chelates which are more easily absorbed by the body [7].

In the mucosal phase, iron is absorbed actively through receptors, if the dose is too large, iron will enter passively by diffusion. In enterocyte cells, iron will be bound by a specific protein carrier and transferred through capillary cells or stored in the form of ferritin in enterocytes and then removed along with desquamation of the intestinal epithelium. And finally, through the systemic phase where iron that enters the plasma will be bound by apotransferrin to become transferrin in the bone marrow. All cells have transferrin receptors on their surface. Transferrin is captured by this receptor and then through the process of pinocytosis enters the vasculature in the cell. As a result of a decrease in pH, transferrin iron and receptors will be released from the bond. Iron is used by the cell while receptors and transferrin are secreted for reuse. Furthermore, iron (Fe) together with folic acid and vitamin B12 will process to become hemoglobin [7]. Consumption of Moringa leaves can be done in various ways. Apart from being consumed fresh, moringa leaves can be made into various preparations aimed at increasing hemoglobin levels, for example consumed in the form of tea bags. One tea bag of Moringa leaves contains 2.5 grams of dried Moringa leaf powder. For high antioxidant, anti-inflammatory and nutritional sources, consumption of Moringa leaf tea can be done twice a day, namely in the morning and evening. The way to consume it is enough to brew it using 250 ml of hot water, wait until the solution changes color and is ready to be consumed in a warm state [8]. Contraindications to consuming Moringa leaf tea can cause diarrhea, nausea, vomiting and allergies [9].

Based on data from Riskesdas year in 2018, the prevalence of anemia in adolescents was 32%, meaning that 3-4 out of 10 adolescents suffer from anemia [10]. Based on the World Health Organization the prevalence of anemia in adolescents in Indonesia is 32% [11]. Meanwhile, based on data from the East

Java Provincial Health Office in 2020, 42% of young women in East Java experienced anemia and in Sidoarjo Regency, 32.9% of young women with anemia in Sidoarjo [12]. In view of the still high incidence of anemia in Sidoarjo Regency, it is necessary to make efforts to increase hemoglobin levels in female adolescents.

METHOD

The design of this study uses the pre-Experimental design with method One Group Pretest Posttest, namely the research design where the first observation (pretest) was carried out before giving Moringa leaf tea, then a second observation (posttest) was carried out with the aim of knowing the effect of giving Moringa leaf tea on increasing hemoglobin levels in female adolescents. The population of this study were all young women at the Youth Posyandu in Putat Tanggulangin Village Sidoarjo and as many samples 19 young women (calculations attached) who met the inclusion and exclusion criteria were taken using the nonprobability technique sampling, namely purposive sampling with inclusion and exclusion criteria. The inclusion criteria in this study were female adolescents aged 10-19 years, had experienced menstruation, were willing to be examined and signed an informed consent, had no history of diseases such as cancer, diarrhea and colitis and were not currently taking vitamins or additional supplements. While the exclusion criteria were young women who were unwilling and not present at the Youth Posyandu, and young women who did not consume Moringa leaf tea more than 3 times and refused to continue consuming Moringa leaf tea would be excluded from being involved in the sample (Drop Out). Sample the later will given tea leaf moringa consumed 2 times a day in the morning day (06.00 – 07.00) and evening (15.00 – 16.00) for 14 days in a manner regular. The research material used tea bags of Moringa leaves weighing 2.5 grams and branded Moringa tea bags. The content in Moringa leaf tea is fat (1.7gr), carbohydrates (14.3gr), protein (6.7gr), phosphorus (70mg), iron (70mg), calcium (440mg).

Retrieval of research data This during the initial 14 days from March 12, 2023 – March 26, 2023, where data collection is carried out in a manner observation in a manner direct adolescent hemoglobin levels daughter before and after treatment. Instruments for collecting data used an observation sheet and a digital Hemoglobinometer (Easy touch) to check Hemoglobin levels before and after treatment. The research data were analyzed using data analysis univariate which form objective paired t -test for see the average hemoglobin level before and after treatment. If got mark p. value <0.05 then Ha is accepted means There is enhancement adolescent hemoglobin levels daughter after done gift tea leaf moringa, meanwhile if p. value >0.05 then Ha is rejected which means No There is enhancement adolescent hemoglobin levels daughter after done gift tea leaf moringa.

RESULTS

Characteristics of adolescent respondents who experience anemia at the Youth Posyandu in Putat Tanggulangin Village Sidoarjo is seen by age and education shown in the following table:

Table 1. Distribution of the characteristics of adolescent respondents who are anemic at the Youth Posyandu in Putat Tanggulangin Village, Sidoarjo Regency

Characteristics	Frequency	Percentage %
Age (year)		
10-15	11	57.9%
16-19	8	42.1%
Education		
Junior High School	10	52.6%
Senior High School	9	47.4%

Based on table 1 in above it is known that most of the respondents are aged 10-1 5 years and education level mostly Junior High School (SMP).

Table 2. Hb levels before and after giving Moringa leaf tea to adolescents at the Youth Posyandu in Putat Tanggulangin Village

Treatment	Max	Min	Number of	Average HB levels
Before	11.9	10.4	19	11.38±0.4004
After	14.9	12.6	19	13.72±0.6358

Based on the results of the study, the average hemoglobin level in female adolescents who experienced anemia before administration of moringa leaf tea was 11.38 with a standard deviation of 0.4004 and after administration of moringa leaf tea was 13.72 with a standard deviation of 0.6 358.

Table 3. Differences in hemoglobin levels before and after giving moringa leaf tea to adolescents at the Youth Posyandu in Putat Tanggulangin Village (n=19)

Treatment	Max	Min	Average HB levels	Mean difference	*P*
Before	11.9	10.4	11.38±0.4004	-2.34±0.4635	0.000
After	14.9	12.6	13.72±0.6358		

Based on the results of the study, the average hemoglobin level before administration of Moringa leaf tea was 11.38 ± 0.4004gr/dL and after that it was 13.72 ± 0.6358gr/dL with a mean difference of -2.34 ± 0.4635gr/dL. Results of paired statistical analysis t test can be seen that there is a significant difference between hemoglobin levels before and after administration of moringa leaf tea (p<0.05). based on the results of the study can be stated that moringa leaf tea is effective in increasing hemoglobin levels in young women who experience anemia at the Youth Posyandu in Putat Tanggulangin Village.

DISCUSSION

Based on results study can stated that tea leaf moringa in a manner significant can increase hemoglobin levels in adolescent daughter at Posyandu Teenager Village put handle it. There is a difference in the average hemoglobin level before and after giving Moringa leaf tea. In this study the dose used was 1x2 tea bags per day, which were taken in the morning and evening for 14 consecutive days. One bag of Moringa leaf tea contains 2.5grams of Moringa leaf powder, so the daily dose is 5grams. From the results of the study, it was found that the average hemoglobin level before administration of Moringa leaf tea was 11.38 ± 0.4004gr/dL with the lowest hemoglobin level 10.4gr/dL and the highest hemoglobin level 11.9gr/dL while the average hemoglobin level after administration Moringa leaf tea was 13.72 ± 0.6358gr/dL with the lowest hemoglobin level of 12.6gr/dL and the highest hemoglobin level of 14.9gr/dL. It can be seen from the results of this study that there was an increase in hemoglobin levels before and after administration of moringa leaf tea with the lowest increase of 1.7gr/dl and the highest increase of 2.9gr/dl, so that the average increase in hemoglobin levels before and after administration of moringa leaf tea was obtained. of -2.34gr/dL.

Increased hemoglobin in tea leaf moringa in line with research conducted by Yulina Dwi Hatuty, et al (2022) regarding Moringa leaf extract and its effect on hemoglobin levels of female adolescents at SMA Negeri 1 Pancur Batu which stated that there was a significant increase in adolescents who were given Moringa leaf extract for 14 days with an average hemoglobin level before administration of Moringa leaf extract was 10.83 and the average hemoglobin level after being given Moringa leaf extract increased to 12.72 [13].

Moringa leaves contain iron which is quite high. Iron in Moringa leaves can help the process of forming red blood cells so that it can increase hemoglobin levels in the blood. Besides In addition, iron also has several essential roles in the body, including as a means of transporting oxygen from the lungs to the body's tissues, a means of transporting electrons in cells as well as an integrated part of various enzyme reactions in the tissues of the human body. In addition, this substance is mainly needed in hemopobysis (blood formation), namely in the synthesis of hemoglobin [14].

In study this is also visible that teenager daughter more Lots have anemia _ educated youth _ School Upper Middle (52.6%), so There is connection between education with incidence of anemia in adolescent daughter at Posyandu Teenager Village put Tanglelangin Sidoarjo. this _ in line with research conducted by Ngatu (2019) which states that level education somebody will affect election food everyday, fine attitude nor his behavior. Selection made often impact on intake every day so that affect circumstances nutrition individual concerned, including anemia statu. teenager is the time for look for identity self. Modernization is happening and technology is getting proceed make teenager moment it's

very easy tempted by use technology information and communication. Phenomenon the result in a shortage knowledge good for can applied in life everyday, knowledge about nutrition in adolescents. Incident This affect due to anemia related with fulfillment need substance nutrition, in particular substance iron [15].

During research, before respondent consume tea leaf moringa There is several complaining respondents often feel dizzy in the morning day and body feels limp. After consume tea leaf moringa This for 14 days, their complaints feel previously reduced, this because 4 times more vitamin A content tall compared to carrots, content calcium taller from milk, substance iron taller compared to almost spinach and vitamin C The same with orange important for strengthen system immunity body and fight disease infection including flu and colds. Content nutrition in leaf moringa own potency complete need nutrition in body very well. With consume leaf moringa so balance nutrition in body will fulfil so people who consume leaf moringa will help for increase energy and endurance body.

Based on results study This seen that tea leaf moringa proven effective for increase adolescent hemoglobin levels anemic daughter. According to several studies previously state that leaf moringa known as one _ source substance iron showing _ results that in 1kg of leaves moringa there is Fe content of 54.92mg. Leaf Moringa also contains protein. Proteins have role important in transportation substance iron inside body. Lack of internal protein intake body will affect of obstruction transportation substance iron so that cause happening deficiency substance iron and resulted lack hemoglobin level in blood. The lower protein intake, then the lower hemoglobin levels.

CONCLUSION

Giving Moringa leaf tea at a dose of 2.5 grams given 2 times a day for 14 days proved effective in increasing hemoglobin levels (p <0.05), where before being given Moringa leaf tea in young women the average hemoglobin level was 11.38 ± 0.4004 and after being given moringa leaf tea it became 13.72 ± 0.6358. The use of Moringa leaf tea can be used as an alternative to increase hemoglobin levels, therefore individuals who experience anemia can consume Moringa leaves regularly in their daily menu so that anemia problems can be overcome.

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