

Is Remakuda Juice Effective to Elevate Haemoglobin Level and Descend Dysmenorrhea in Female Adolescents?

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ABSTRACT

Background: The negative effect of low hemoglobin levels for adolescents can reduce intelligence, learning achievement, mental motor development, inhibition of optimal height growth and reproductive health. Dysmenorrhea is pain or discomfort that occurs in the abdomen during menstruation as a result of prostaglandin secretion which can increase uterine contractions. The purpose of this study was to determine the effect of Remakuda juice on an increase in hemoglobin and a decrease in the intensity of dysmenorrhea in female adolescents.

Subjects and Method: An experimental study with no control group was conducted at Junior High School I Tembelang, Jombang, East Java, in September 2021. A total of 60 female adolescents was selected by purposive sampling. The dependent variables were hemoglobin level and dysmenorrhea. The independent variable was Remakuda juice. Dysmenorrhea was measured by the Numeric Rating Scale (NRS) and the Wong Baker Pain Rating Scale. Hemoglobin level was measured by digital haemometer. The data were analyzed using t-test.

Results: Hemoglobin levels after intervention (Mean= 2.00; SD= 0.00) were higher than before (Mean= 1.73; SD= 0.45), with $p= 0.010$. Dysmenorrhea after intervention was lower (Mean= 1.43; SD= 0.59) than before (Mean= 2.70; SD= 0.65), with $p<0.001$.

Conclusion: Remakuda juice can increase hemoglobin levels and reduce dysmenorrhea in female adolescent.

Keywords: Remakuda juice, hemoglobin, dysmenorrhea.

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BACKGROUND

Adolescent girls are more prone to a decrease in hemoglobin levels, to diagnose anemia, namely if the hemoglobin level is less than 12 g/dl. Menstruation is a phase that occurs as a result of not fertilizing an ovum, one of the effects of menstruation in adolescents resulting in a decrease in hemoglobin levels and dysmenorrhea. The high incidence of anemia in adolescent girls is

caused by the intake of the wrong, irregular and unbalanced diet with adequate nutritional sources needed by the body including energy intake, carbohydrate intake, fat intake, protein intake, vitamin C and especially the lack of food sources containing iron, and folic acid. Dysmenorrhea that occurs during menstruation as a 10-fold prostaglandin secretion causes dysmenorrhea, namely pain or pain in the abdominal

area. The incidence of dysmenorrhea in Indonesia is 64.25% consisting of 54.89% primary dysmenorrhea and 9.36% secondary dysmenorrhea. Dysmenorrhea pain is associated with endometrial prostaglandins and leukotrienes. The ovulation process responds to an increase in the production of progesterone and fatty acids, an increase in cell membrane phospholipids. The release of arachidonic acid and omega-7 fatty acids initiates a flow mechanism of prostaglandins and leukotrienes in the uterus, resulting in the mediation of inflammatory and tense responses during menstruation (Puji, 2016).

Lemongrass contains antioxidants contained in citronellal and geraniol compounds which function as reducing pain during menstruation. Lemongrass contains active ingredients that can function as an analgesic, anti-pyretic, anti-inflammatory, antioxidant, and antidepressant. Lemongrass makes the body relax will stimulate the hormones enkephalin, serotonin, and endorphins. Enkephalin which is known as a hormone that makes a sense of comfort / hormone of happiness is thought to cause perisynaptic inhibition and inhibition in type C and dela A fibers where they synaptic in the comudorsalis. The inhibition process by blocking pain receptors, so that pain is not sent to the cerebral cortex and will further reduce pain perception (Magdalena, 2019).

Dates contain iron which can be absorbed by the intestines and carried by the blood for hemopoiesis or the process of blood formation, young coconut water (*Cocos Nucifera L*) contains folic acid which helps the formation of red blood cell nuclei in the blood formation process (Ilahi, 2019). The purpose of this study was to analyze the effectiveness of Remakuda juice on increasing hemoglobin levels and decreasing the

intensity of dysmenorrhea in female adolescent at Junior High School 1 Jombang, East Java, Indonesia, in 2021.

SUBJECT AND METHOD

1. Study Design

This was an experimental study with no control group. The study was conducted at Junior High School 1 Tembelang, Jombang, East Java, Indonesia, in September 2021.

2. Population and Sample

The study population was female students. A total of 60 female adolescents was selected by purposive sampling.

3. Study Variables

The dependent variables were hemoglobin level and dysmenorrhea. The independent variable was Remakuda juice.

4. Operational Definition of Variable

Remakuda juice is juice made from 250 ml of young coconut water, 150 grams of dates and 50 mg of lemongrass. It was given to the female students to drink for 5 days.

Hemoglobin is a protein in red blood cells that gives blood its red color and is responsible for transporting oxygen. The structure consists of four chains. Each chain contains a compound called heme, which contains iron.

Dysmenorrhea is a symptom of pain or discomfort in the lower abdomen during menstruation that can interfere with daily activities which is most often found in young and reproductive women.

5. Study Instrument

The research instrument used was an observation sheet to check hemoglobin levels with a digital haemometer and an observation sheet on the Numeric Rating Scale (NRS) pain scale and the Wong Baker Pain Rating Scale to measure the intensity of menstrual pain/dysmenorrhea before and after administration of remakuda juice.

6. Data Analysis

The data were analyzed by statistical test using SPSS (Statistical Product and Service Solution) version 22 for windows t-test.

7. Research Ethic

This research has received a certificate of passing the ethical test from the Health research commission from the Jombang Medical Cendekia College of Health Sciences with the number 014/KEPK/ICME/-IX/2021.

RESULTS

Most of the weight of the students of SMPN I Tembelang 36.7% between 41-50 kg, for an average height of 48% between 151-160 cm and BMI 46% in the normal category (Table 1).

Before giving juvenile juvenile juice, young women had mild anemia as much as

Table 1. Sample Characteristics

Variable	Sample Characteristics		
	Category	Frequency (n)	Percentage (%)
Weight	30-40 kg	20	33.3
	41-50 kg	22	36.7
	51-60 kg	11	18.4
	61-70 kg	5	8.3
	71-80 kg	2	3.3
Height	130-140 cm	1	1.7
	141-150 cm	26	43.3
	151-160 cm	29	48.3
	161-170 cm	4	6.7
	Underweight	26	43.3
BMI	Normal	28	46.7
	Overweight	5	8.3
	Obesitas	1	1.7

26% and after drinking juvenile juice for 5 days, the hemoglobin level became normal as much as 100% (Table 2).

Most of the teenage girls experienced moderate dysmenorrhea as many as 31 students (52%) and after giving remakuda juice for 5 days most of the intensity of dysmenorrhea became normal as many as 37 students (62%) (Table 3).

Hemoglobin level after (Mean= 2.00; SD= 0.00) was greater than before (Mean= 1.73; SD= 0.45) giving Remakuda juice, and this result was statistically significant (p= 0.010). The intensity of dysmenorrhea after (Mean= 1.43; SD= 0.59) was lower than before (Mean= 2.70; SD= 0.65), and this result was statistically significant (p< 0.001) (Table 4).

Table 2. Distribution of the frequency of anemia in adolescent girls

Variable	Sample Characteristics		
	Category	n	%
Before Drinking Remakuda Juice	Mild anemia	16	26
	Normal	44	74
After Drinking Remakuda juice	Anemia	0	0
	Normal	60	100

Table 3. Distribution of the frequency of dysmenorrhea in adolescent girls

Variable	Sample Characteristics		
	Category	n	%
Intensity of Dysmenorrhea Before drinking Remakuda Juice	Lightweight	23	38
	Medium	31	52
	Heavy	6	10
Intensity of Dysmenorrhea After drinking Remakuda Juice	Normal	37	62
	Remember	20	33
	Currently	3	0.5

Table 4. Results of T-test for HB levels and intensity of dysmenorrhea before and after administration of remakuda juice

Variable	N	Mean	SD	p
HB levels before treatment	60	1.73	0.446	< 0.001
HB levels after treatment	60	2.00	0.000	
Dysmenorrhea intensity before treatment	60	2.70	0.646	< 0.001
Dysmenorrhea intensity after treatment	60	1.43	0.593	

DISCUSSION

1. Effect of Remakuda juice on the increase in hemoglobin

The results of this study found that Remakuda juice increases hemoglobin. Hemoglobin is a protein molecule that transports red blood cells as a medium for transporting O₂, hemoglobin is formed in red blood cells in the bone marrow, and the failure of hemoglobin formation can be caused by protein deficiency (Rahayu, 2017). Anemia is a decrease in the quantity of red blood cells in circulation or the amount of hemoglobin is below normal limits (Berliana, 2020).

Anemia is the impact of nutritional problems in adolescent girls. Nutritional anemia is caused by a lack of nutrients that play a role in the formation of hemoglobin, due to lack of consumption or impaired absorption. These nutrients are iron, protein, vitamin B12 which acts as a catalyst in the synthesis of heme in the hemoglobin molecule, vitamin C, zinc which affects the absorption of iron and vitamin E which affects the stability of red blood cell membranes. The volume of blood that comes out during a normal menstrual period the amount of blood that comes out ranges from

25 to 60 ml. Removal of iron from the tissues through the skin, digestive tract, or urine, amounts to 1 mg per day. Meanwhile, blood loss during menstruation shows a rapid loss of iron stores in accordance with the amount of blood that comes out (Arintina, 2020).

The volume of blood lost during normal menstrual periods has been studied by several research groups who found that the amount of blood loss ranged from 25 to 60 ml. At a normal hemoglobin (Hb) concentration of 14g/dl with an iron Hb concentration of 3.4 mg/g, this blood volume contains about 12 to 29 mg of iron and represents a blood loss equivalent to 0.4 to 1.0 mg of iron per day for cycle. The amount of iron absorbed from food is usually quite limited, so this seemingly insignificant loss of iron is important because it contributes to the reduction of iron stores, which in most women are already low. Removal of iron from tissue. Removal of iron from the tissues through the skin, digestive tract, or urine, amounts to 1 mg per day. Meanwhile, blood loss during menstruation shows a rapid loss of iron stores in accordance with the amount of blood that comes out. Meanwhile, the longer a woman experiences

menstruation, the more blood comes out and the more she loses iron deposits. Therefore, menstruating women are a group that is more likely to experience iron deficiency.

Women who lose blood of 60 ml or more will experience a decrease in the amount of iron stores. Ten of the 137 women had iron deficiency anemia (hemoglobin level less than 12 g/dl) and the mean menstrual blood loss in this group of anemic women was 58 ml. Dates contain potassium, salicylic acid, sugar, vitamin A, thiamin, riboflavin, niacin, carotenoids, phosphorus, dietary fiber, unsaturated fat, and iron, rich in protein, sugar fiber, vitamins A and C, and minerals calcium, sodium, and potassium (Miftachul.2018). The protein content in dates is 1.8-2.0%; fiber as much as 2.0-4.0%; and sugar by 50-70% glucose. Dates also contain alkaline salts which can increase the acidity of the blood which serves to offset the effects of excess carbohydrate foods. Dates have a variety of nutritional content such as: potassium, salicylic acid, sugar, vitamin A, thiamin, riboflavin, niacin, carotenoids, phosphorus, dietary fiber, unsaturated fats, and iron. The benefits of dates for health include anti-diabetic, anti-microbial, anti-inflammatory, anti-oxidant, anti-hyperlipidemic, preventing anemia, the iron content in dates is able to help the formation of hemoglobin which can carry more oxygen so that it helps speed up metabolism in cells. Date palm juice is a herbal drink derived from dates which contain protein, fat, minerals, iron and acids. Dates are very rich in fiber and an excellent source of potassium. In 5 dates, it contains 115 calories and 1.2 mg iron which can help increase hemoglobin levels and prevent anemia (Sofia, 2019).

Young coconut water contains several nutrients that help the process of hematopoiesis. Young coconut water contains folic acid which is needed in various types of

biochemical reactions. Folic acid is required for the formation of red blood cells and their maturation in the bone marrow. Coconut water has good properties and nutritional value. There are so many benefits, coconut water is rich in potassium which can restore stamina immediately.

2. The effect of Remakuda juice on decreasing dysmenorrhea

The results of this study found that Remakuda juice can reduce dysmenorrhea.

Dysmenorrhea is pain or discomfort that occurs in the abdomen during menstruation as a result of prostaglandin secretion which can increase uterine contractions and at excessive levels activate the large intestine. Increased prostaglandin (PG) F₂-alpha which is a cyclooxygenase (COX-2) which can cause hypertonus and vasoconstriction in the myometrium, causing ischemia and pain during menstruation. Dysmenorrhea has two causes, namely hormonal and psychological imbalances. Women with severe dysmenorrhea have high levels of prostaglandins during the menstrual cycle, this high concentration occurs for 2 days from the menstrual phase (Isy, 2018).

Lemongrass contains antioxidants found in citronellal and geraniol compounds. The effect of antioxidants and in the biosynthesis of prostaglandins, where prostaglandins play a role in causing pain sensations, antioxidants have a role in reducing menstrual pain. The antimicrobial substances are also able to reduce bad microbes in the body and repair damaged digestive cells. Prostagaldin is a product of arachidonic acid metabolism. which are unsaturated fatty acids that are abundant in phospholipid membranes. The release of arachidonic acid from this phospholipid membrane will trigger the synthesis of prostaglandins. The release of arachidonic acid from the phospholipid membrane occurs through an enzymatic reaction by the phospholipase A₂

enzyme, antioxidants can inhibit the release of arachidonic acid by their mechanism of inhibiting protein kinase C, which can affect the activity of the phospholipase A2 enzyme. The presence of inhibition of arachidonic acid synthesis will reduce the production of prostaglandins. The mechanism of antioxidant effects in the biosynthesis of prostaglandins, plays a role in causing the sensation of pain, antioxidants have a role in reducing menstrual pain. Lemongrass contains antioxidants found in citronellal and geraniol compounds (Berliana, 2020).

Compounds containing lemongrass (*Cymbopogon citratus*), in Yuliningtyas (2019) it is stated that the lemongrass plant has a distinctive aroma, a strong aroma, and can also be used for herbal medicine. After being tested on lemongrass plants containing active compounds including Alkaloids, Flavanioid compounds, Saponins, Quinones, and Tannins which are efficacious as antibacterial, antioxidant, pain reliever, relieve joint pain, reduce stomach acid pain, and as aromatherapy because of its distinctive aroma (Magdalena, 2019).

Young coconut water contains several nutrients that help the process of hematopoiesis. Young coconut water contains folic acid which is needed in various types of biochemical reactions. Folic acid is required for the formation of red blood cells and their maturation in the bone marrow. Coconut water has good properties and nutritional value. There are so many benefits, coconut water is rich in potassium which can restore stamina immediately. Apart from minerals, coconut water also contains sugar (varying between 1.7 to 2.6%) and protein (0.07-0.55%). Because of this nutritional composition, coconut water has the potential to be used as raw material for food products. Young coconut water, which is rich in calcium, potassium, electrolytes, chloride and

magnesium, can relieve pain and increase uterine contractions (Kurniati, 2019).

Remakuda juice contains 50 mg lemongrass, 150 grams of dates and 250 ml of young coconut water contains calcium, potassium, electrolytes, chloride, magnesium, protein, sugar fiber, vitamins A and C, as well as minerals such as iron, calcium, sodium, potassium, folic acid, and citronellal and geraniol compounds that trigger hormone secretion Enkephalin inhibits perisynaptic, type C and dela A fibers that synaptically in the commudorsal block inhibit pain receptors that can reduce the intensity of dysmenorrhea, Remakuda content causes a catalyst in the synthesis of haem in hemoglobin, vitamin C, zinc molecules which affect the absorption of iron and vitamin E which affect the stability of red blood cell membranes so that it can be used as a complementary therapy to increase hemoglobin levels to prevent anemia in adolescents (Sofia, 2019).

AUTHOR CONTRIBUTION

Zeny Fatmawati as the lead researcher compiles research proposals, collects, processes data on students of Junior High School I Tembelang and compiles publication articles, Elis Fatmawati, and Elly Rustanti as research members who assist the process of collecting and processing data.

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CONFLICT OF INTEREST

There is no conflict of interest in this study.

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