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EFFECTIVENESS OF COLD PRESSED JUICE COMBINATION OF RED SPINACH, PINEAPPLE, HONEY AND PIR ON INCREASING HEMOGLOBIN LEVELS IN WOMAN ADOLESCENT

Intan Nugraheni Hasanah[1], **Ida Ariyanti**[2], **Dhita Aulia Octaviani**[3]

[1,2,3]*Department of Midwifery Poltekkes Kemenkes Semarang, Indonesia*

Corresponding author: Intan Nugraheni Hasanah
Email: intankemal82@gmail.com

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ABSTRACT

Background: Prevalence of anemia among young people in developing countries is about 27%, while in developed countries around 6%, the incidence of anemia often affects the adolescent women due to stress and menstruation. Red spinach has a higher iron content compared to other leafy vegetables. Honey pineapple contains bromelain which is useful in boosting the body's immune system. The pears contain antioxidants that are useful for fighting inflammation. **Methods:** This study used a quasi-experimental approach with a pretest posttest design. The study population consisted of students from the Semarang Health Ministry's Polytechnic majoring in midwifery with a sample of 15 people in the treatment group. Respondents previously measured their Hb first and then given treatment from the first day to the seventh day. On the 8th day, Hb was measured again. The sampling technique used consecutive sampling. The research instrument used a digital Hb meter and checklist. **Results:** As a result, the mean hemoglobin level of the treatment group before the combination of time count, pineapple honey and cold fruit juice was 13.32 g/dl, the lowest value is 11, 3 g/dl, the highest value is 15.7 g. /dl, and the mean hemoglobin level after treatment was 11.8 g/dl. dl, the lowest is 11.8 gr/dl, the highest is 15.8 gr/dl. Test results with independent t-test in p-value of 0.003 (<0.005), Thus, Ho is rejected, and Ha is accepted, indicating that the combination of cold-pressed juice with red spinach, pineapple honey, and pears effectively increases hemoglobin levels in adolescent women. **Conclusion:** The cold-pressed juice, a combination of red spinach and honey pineapple, increased hemoglobin levels in young women. The preventive and promotive efforts can be used through consumeing the iron food and some of foods, so that the adolescent nutrients fulfilled. The results of this study should provide information about childbirth and community health, provide future research, and be used for research. Hopefully, next researcher can discover new innovations, such as combinations of different foods that can increase blood hemoglobin levels.

Keywords: cold pressed juice1; hemoglobin levels 2; woman adolescents 3.

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Introduction

Adolescence is defined as the period of transition between childhood and maturity. According to WHO (2007), the age limit for youth is 12 to 24 years. The stage of adolescence includes early puberty (10-14 years), puberty (14-17 years) and late puberty (18-24 years). However, if a person marries in their teens, they are classified as an adults instead of minors. On the other hand, if they are no longer teenagers but is still depend on their parents (not yet independent), then they are still considered a youth.[1] Adolescence is defined as the period of transition between childhood and maturity. During this period, various changes occur, including hormonal, physical, psychological, and psychosocial changes. These changes occur very quickly and sometimes unconsciously. Iron deficiency anemia that occurs in adolescent women causes an inability to learn and concentrate, pale skin, feeling tired and weak, and easily lethargic.[2] Woman adolescents with diabetes are more likely to become women without diabetes and then to become pregnant women who are weak and even have low protein. This increases the risk of low birth weight and stunted growth, complications during childbirth, and other pregnancy-related risks.[3]

Inadequate nutritional needs, whether macro or micro, lead to sub-optimal physical growth, decreased intelligence, decreased work productivity, decreased immune system which can cause high rates of infections deseas and even death. One of the cases of nutrition that still encountered in Indonesia is anemia. Anemia is a condition of person with below normal hemoglobin levels due to the body's physiological needs not being met.[4] Those at risk of anemia is adolescents, because adolescents are experiencing growth and require a higher intake of nutrients. If a person suffers from anemia during adolescence, it can cause developmental disorders, productivity decreases, fatigue quickly, difficulty concentrating on studying which can reduce the child's intelligence and comprehension so that in the long run it will result in several diseases such as congestive heart failure, thalassemia and immune system disorder.[5]

Adolescence is defined as the period of transition between childhood and maturity. According to WHO (2007), the age limit for youth is 12 to 24 years. The stage of adolescence, includes early puberty (10-14 years), puberty (14-17 years) and late puberty (18-24 years). Various changes occured during this period, including hormonal, physical, psychological, and psychosocial. These changes occur very quickly and may not be noticed. Iron deficiency anemia in adolescent women causes difficulty concentrating, pale, often tired, weak and easily drowsy. [6] Pregnant women and adolescent women will not be able to nour provide adequate nutrition for themselve and their fetus, causing pregnancy and pregnancy complications which can lead to high-risk childbirth, low birth weight babies and perinatal deaths. The incidence of anemia in adolescent women is between 40% and 88%. As many 25% to 40% of adolescent women in Southeast Asia suffer from anemia. The prevalence of anemia among adolescents in developing countries is 27%, compared to 6% in developed countries. According to the World Health Organization (2015), anemia with 40% is categorized as severe, 10%-39% is moderate and less than 10% is mild.[7] One of the government's efforts to overcome the problem of adolescent anemia is the establishment of the Adolescent Care Health Services Program / Pelayanan Kesehatan Peduli Remaja (PKPR). The Ministry of

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Health of the Republic of Indonesia has published a plan to deal with anemia and women of childbearing age. Iron tablets for adolescent women aged 12-18 years. Iron absorption is strongly influenced by the role of vitamin C in the process of reducing iron in the intestines. The higher the pH, the higher the acid in the stomach.[8]

The high iron content in spinach is 3,9mg/100g. Spinach is rich in food fiber, the price is cheap and the harvest cycle is short, only 2 weeks. The chemical content of spinach includes proteins, lipids, carbohydrates, potassium, iron, vitamins A and vitamin B. There is more iron in red spinach than other green vegetables. Red spinach contains red pigment which indicates thats it is very rich in flavonoid which have antioxidant properties.[9] Red spinach increases blood iron and hemoglobin levels more than iron tablets. Red spinach contains substance that help synthesize hemoglobin. Increased hemoglobin is also able to increases the maximum oxygen capacity of the blood. According to Indonesian food composition data, 100 grams of red spinach contains nutrients, including 41 calories, 520 mg calcium, 80 mg phosphorus, 7 mg iron, 62 mg vitamin C.[10]

Honey pineapple contains 0.28 mg of iron, 8 mg of phosphorus, 108 mg of potassium, 56.4 mg of vitamin C, 0.08 mg of vitamin B1 and 0.114 mg of vitamin B6. The first value of honey pineapples for health is to maintain the body's immune system. The bromelain compounds present in honey pineapple. In addition, the antioxidants present in honey pineapple play an important role in strengthening the body's immune system.[11]

The role of antioxidants and vitamin C in pears can help fight free radicals. In 100 grams of pear contains folic acid 12.5 mg, calcium 16 mg, iron 0.3 mg, magnesium 12.5 mg, phosphorus 21.4 mg, potassium 206 mg and sodium 1.8 mg. The high concentration of iron, flavonoid and vitamin K in pears helps anemic patients recover.[12]

One of the current innovation techniques in fruit processing is cold pressed juice, which is a fruit and vegetable extraction method with *zero-heat extraction* to maintain the vitamin and mineral content of fruits and vegetables.[13] Cold press juice technology uses fresh fruit and vegetable without added water, sugar, artificial sweeteners or preservatives. Apart from being practical, the liquid consistency of the juice makes it easier for substances and minerals to be easily absorbed by the body. By making juice, the cellulose cell walls of fruits and vegetables will be broken down and dissolved making it easier for the stomach and digestive tract to digest.[14]

Based on the background above, the author is interested in studying the effectiveness of cold pressed juice a combination of red spinach, honey pineapple and pear to increase Hb levels in woman adolescents.

Methods

This study used a quasi-experimental approach with a pre-test-post-test design.[15] The study population consisted of students from the Semarang Health Ministry's Polytechnic majoring in midwifery with a sample of 15 people in the treatment group with inclusion criteria, namely not currently menstruating, undergoing treatment and not consuming Fe tablets. Respondents previously measured their Hb first and then given treatment from the first day to the seventh day. On the 8th day Hb is measured again. The sampling technique used consecutive sampling. The research

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instrument used a digital Hb meter and checklist.

Results and Discussion

1. Univariat Analysis
   a. Hemoglobin levels before and after intervention in the treatment groups

Table 1. Hemoglobin levels before and after the intervention

Hb	N	Mean	Min	Max	SD
Pre	15	13,32	11,3	15,7	1,228
Post	15	14,24	11,8	15,8	1,070

According to table 4.1, the average hemoglobin level of adolescent women before the procedure is 13.32 g/dl, the lowest value is 11.3 g/dl, the highest value is 15,7 g/dl and the standard difference is 1.228. 11.8 gr/dl with a maximum of 15.8g/dl and a standard deviation of 1.070.

2. Bivariat Analysis
   a. Hemoglobin level pre-post difference in the treatment groups

Table 4.2 the difference in hemoglobin levels (pre-post) in treatment groups

Hb	N	Mean	SD	p-value
Pre	15	13,32	1,228	0,003
Post	15	14,24	1,070	

t test dependent

Table 4.2 obtained that based on the statistical test results of 15 adolescent women studied, the treatment group reached 13,32 g/dl, with a minimum of 11,3 g/dl at a maximum of 15,7 g/dl, while the hemoglobin level after treatment was obtained of 11,8 g/dl, with a minimum of 11,8 g/dl and a maximum of 15,8 g/dl.

Iron is an essential mineral forming red blood cells. The mineral is also available as an ingredient in the myoglobin concept of supplying oxygen to the muscles. One of the important elements in the process of forming red blood cells is iron.[16] Hemoglobin is the protein that carries oxygen in red blood cells, which make up red blood cells. Hemoglobin contains heme and iron called globulin. Red blood cells contain about 300 hemoglobin molecules. Each hemoglobin molecule has four parts that carry oxygen. Oxygen is bound to hemoglobin called oxyhemoglobin. Low hemoglobin is often caused by foods such as a poor diet or a lack of nutrients such as iron, vitamin B12, vitamin C and folic acid, which are important for the production of red blood cells. Green spinach and spinach are rich in vitamin C, but green spinach is rich in vitamin A, and spinach contains a lot of iron.[17]

Giving cold presses juice, red spinach, honey pineapple, and pear helps to increase the oxygen circulation in the blood. Vitamins A and C contained within them and antioxidants protect the body. Vitamin C also helps the process of absorption iron, boosting the immune system, vitamin B12 and folic acid, both are important combinations to form new cells that ar useful for the increase of hemoglobin.[18]

Red spinach contains carotenoids and flavonoids, which are antioxidants. The main component of spinach is beta-carotene and another active ingredient is chlorophyll. Lutein and quercetin, types of flavonoids found in spinach, are powerful antioxidants that scavenge free radicals, release superoxide, and block low-density lipoprotein cholesterol oxidase. The iron content in red spinach can be used as an alternative to prevent or treat iron deficiency anemia.[19]

adolescent women are included in the anemia group because adolescent women that still relatively young and experience menstrual periods every month cause iron loss occurs. Iron nutrition anemia along with vitamin A and iodine deficiency (GAKI) is one of the priority for improving the society's

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nutrition. Anemia causes fatigue, reduces the ability to concentrate in study, leads to poor academic achievement and decreases work productivity.[20]

Iron is needed by the body to produce red blood cells. Red blood cells carry oxygen from the lungs to all tissues in the body. The harder the body works, the more oxygen it needs. Therefore, the body needs a certain amount of iron. The process of iron deficiency is divide into three phases, namely iron depletion, iron deficiency, and iron deficiency anemia. Anemia can cause fatigue and reduce ability to concentrate on studying, which can lead to poor performance and reduce work efficiency.[19] Anemia also lower the body's immune and thus is more susceptible to infections. Improper management of anemia in adolescence to maturity can be a major cause of maternal death, premature birth, and low-birth weight babies at birth. adolescent women are one of the groups who are prone to anemia because of having a monthly menstrual cycle and poor eating habits. adolescent women tend to lose weight to maintain their appearance. A lack of iron in the body can weaken a person's immune system, causing weakness and fatigue. In youth, the occurrence of growth velocities makes it necessary for youths to receive a relatively sufficient nutritional intake to support their growth. Determination of irone needs for youth is estimated due to the loss of basal, the addition of hemoglobin masses and iron stores.[21]

Results from t-test obtained of p value 0.003 (< 0.05), then Ho is denied and Ha accepted, which means that cold pressed juice combination spinach, honey pineapple, and pear are effective in raising levels in adolescent women. Adolescents experience individual development which begins with the maturation of the physical (sexual) organs so they are able to reproduce. Changes during adolescence affect their eating habits. The problem of self-esteem intensively occurs in adolescent women when they gain weight, increase in body fat presentation, height growth, breast development and matters related to the maturity of the body of adolescent women, such as menstruation for the first time. Adolescents must be in adequate nutritional status because it is useful for normal and sustainable growth and development of adolescents.[22]

Red spinach is one of the vegetables that is very beneficial for our digestive system. The content in red spinach can help regulate the work of our intestines. As already mentioned, red spinach is an excellent source of fiber because of its high fiber content. For 100 g of Red spinach, energy is 41.2 Kcal, protein 2.2 g, fat 0.8 g, calcium 520 mg, carbohydrate 6.3 g, fiber 2.2g, vitamin C 2.2g, iron 62mg is up to 7mg. Spinach will cause a drop in blood pressure to the pregnant women because of nitrate levels in spinach and prevent blood pressure from rising and bringing back blood pressure to normal. Consumption of spinach is a good choice for helps lower blood pressure. Spinach is a plant that is rich of many nutrients, especially iron (Fe), which is quite high, namely up to 6.43 mg for 180 gr.[23] There are many factors influence the absorption of iron form in food. Heme iron, which is part of the hemoglobin and mioglobin found in the meat. Meat can absorb iron twice as much iron as contains about 40% iron. Meat, chicken, and fish contains hemes and iron while non-heme is found in eggs, whole grains, nuts, and green vegetables. This absorption of iron consists of amino acids that bind iron to absorb milk, cheese, and eggs. Vitamin C is very helpful in iron absorption. The normal Hb level is 12 gr/dl in female adolescents. Anemia can cause fatigue, decreased concentration in studying. This can be bad if left untreated because it will significantly contribute to maternal mortality, premature babies and low birth weight babies.[24]

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Conclusion

The cold pressed juice are the combination of red spinach and honey pineapple that increased hemoglobin on adolescent women. The preventive and promotive efforts can be used through consumeing the iron food and some of foods, so that the adolescent nutrients fulfilled. The results of this study should provide information about childbirth and community health, provide future research, and be used for research. Hopefully, next researcher can discover new innovations, such as combinations of different foods that can increase blood hemoglobin levels.

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