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The Effect of Dutch Eggplant Juice (*Solanum Betaceum Cav*) on the Prevention of Anemia in Adolescents

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Abstract:
Anemia is a condition where the concentration of red blood cells is below normal. Anemia can be caused by damage to blood cells due to heavy exercise which generally causes a loss of iron (Fe) so that hemoglobin (Hb) levels decrease. This study aims to determine the effect of Dutch eggplant juice in preventing anemia in adolescents. This research uses an experimental method, using a pre-experimental design with a pretest-posttest design. The instrument used in this research is an Hb measuring instrument, then the measurement results are observed. The results of the research show that there is an effect of giving tamarillo juice before and after with p-value = 0.000 (α<0.05). For further research, you can add comparative variables such as giving dragon fruit juice.

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INTRODUCTION

Anemia is a condition where the hemoglobin concentration or number of red blood cells is below normal. Iron deficiency anemia is prone to occur in adolescent girls because of the increased need for iron during growth. Apart from that, blood loss during menstruation also increases the risk of anemia. The occurrence of anemia can be caused by damage to blood cells due to heavy exercise, which generally causes a loss of iron (Fe) so that hemoglobin (Hb) levels decrease (Budiarti, 2021). The emergence of anemia can also be caused by improper, irregular, and unbalanced eating patterns with adequate nutritional sources needed by the body, including energy intake, protein intake, carbohydrate intake, fat intake, vitamin C, and especially a lack of food sources that contain iron and folic acid. According to Savitri (2021), tamarillo is a plant with complete nutritional content, especially iron rich. This content is one of the main ingredients for increasing hemoglobin levels because hemoglobin is a blood component that binds to iron (Fe). Apart from the high Fe content for the hemoglobin formation process, tamarillo plants are also rich in vitamin A.

According to Harahap (2023), hemoglobin formation is also influenced by vitamin A. Sufficient vitamin A will increase the hemoglobin value and increase vitamin A hemoglobin in the treatment group by 17.10%. According to WHO data, the prevalence of anemia in non-pregnant women (15-49 years) in the Southeast Asia region is 45.7% and is included in the category of serious public health cases. The same data states that Indonesia is in the moderate anemia problem category (Tono, 2020). The prevalence of anemia in Indonesia is 21.7%, with a proportion of 20.6% in urban areas, 22.8% in rural areas, 18.4% in men, and 23.9% in women. Based on the

age group, 26.4% of anemia sufferers are aged 5-14 years, and 18.4% are in the 15-24 year age group (Sitoayu, 2020).

The proportion of anemia in girls is higher than in adolescent boys, so adolescent girls are a population that is vulnerable to anemia problems. Anemia is defined as a reduced concentration of hemoglobin in erythrocytes. Anemia is measured by looking at a person's hemoglobin levels. Normal hemoglobin levels for women over 15 years of age are >12.0 g/dl (>7.5 mmol) (Aulya, 2022). Knowledge is the result of knowing and occurs after people sense a particular object. Knowledge is a very important domain in shaping one's actions. This article is a literature study that aims to present a summary of information from previous studies as secondary data regarding the relationship between the level of knowledge about anemia and the incidence of anemia in adolescent girls. The results show a relationship between the knowledge level and anemia incidence in adolescent girls. Adolescent girls with good knowledge will be more alert in preventing anemia than those with poor knowledge. Apart from that, several other factors influence the incidence of anemia, namely menstruation, as well as the desire of young women to have a slim stomach, which has an effect on fulfilling nutrition (Kusnadi, 2021).

According to the initial research survey, it was found that most young women do not understand anemia well, so they do not take anemia prevention measures such as consuming Blood Supplement Tablets (*Tablet Tambah Darah*=TTD). As a result, young women feel effects such as dizziness and dizzy eyes. Poor eating and sleeping patterns, as well as heavy menstruation, are the causes of anemia in young women. Adolescent girls still do not understand clearly about anemia, so poor eating and sleeping patterns and heavy menstrual production cause anemia suffered by adolescent girls. Young women often experience dizziness and dizzy eyes due to their anemia. Young women have never taken anemia prevention measures and rarely consume Blood Supplement Tablets (TTD). This study aims to determine the effect of Dutch eggplant juice in preventing anemia in adolescents.

METHOD

This type of research uses experimental research with a pre-experiment research design, and this research uses a one-group pretest-posttest design, namely research that does not have a comparison group (control). Still, instead, observations are carried out first (pre-test) before the intervention is carried out. The instrument used is the HB measuring instrument. Before the research begins, the researcher obtains permission and contracts with the research respondents. After the respondents agreed with the researcher's explanation, the researcher measured the Hb before giving Dutch eggplant juice, and then after that, the Hb was measured again. The before and after results will be analyzed using statistical analysis of the T-test to see whether the intervention provided has an effect.

RESULT

Table 1. Average of Hemoglobin Levels Before and After the Intervention

Variable	Mean	N	SD	p-value
Pretest	10.38	15	0.765	0.000
Posttest	11.57		0.843	

The results of Table 1 show that the average hemoglobin for teenagers before intervention was (10.38) with a standard deviation of (0.765). After the intervention, the average was (11.57)

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with a standard deviation of (0.843). The statistical test results show a p-value <0.05, meaning there is a significant influence between the pretest and posttest on preventing adolescent anemia.

DISCUSSION

The results of the statistical test show that Dutch eggplant juice has an effect on increasing hemoglobin (HB) levels. According to Kumalaningsih (2021), a Dutch eggplant is a plant that has complete nutritional content and is especially rich in iron. This content is one of the main ingredients that increase hemoglobin levels because hemoglobin is a blood component that binds to iron (Fe). According to Almatsier (2021), vitamin A also influences hemoglobin formation. The relationship between vitamin A and increased hemoglobin is very important because iron and vitamin A in food are very good for maintaining healthy epithelial tissue, including the endothelium in blood vessels. Sufficient vitamin A will increase the hemoglobin value and vitamin A. Apart from that, tamarillo plants also contain vitamin B6. According to Hoffbrand (2022), there is a relationship between vitamin B6 intake and hemoglobin levels. Vitamin B6 is needed as a coenzyme in protein metabolism, which is also required for heme synthesis to form hemoglobin.

Heme synthesis mainly occurs in mitochondria through a series of biochemical reactions that begin with the condensation of glycine and succinyl coenzyme A by the action of key enzymes that limit the reaction rate. Pyridoxal phosphate (vitamin B6) is a coenzyme for this reaction stimulated by erythropoietin. Finally, protoporphyrin combines with iron in the ferrous form (Fe2+) to form heme. Each heme molecule combines with a globin chain made in polyribosomes. Tetramers consist of four globin chains, each with its heme group in a pocket, and they are then arranged into one hemoglobin molecule. The results of research conducted by Sianturi (2021) in Medan regarding the effect of tamarillo fruit juice on the number of erythrocytes and hemoglobin levels of anemic male mice of the DDW strain through sodium nitrite ($NaNO_2$) induction showed an increase in hemoglobin levels in the treatment group by 17.10%.

CONCLUSION

From the results of this study, it can be concluded that there is an effect of Dutch eggplant juice on increasing hemoglobin levels in adolescents with p-value = 0.000 ≤ α (0.05).

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CONFLICT OF INTEREST

There is no conflict of interest in this research. The research was carried out according to procedures and obtained official research permission. Research is not related to the interests of other parties or anything else.

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