Jurnal Ilmiah Kesehatan Sandi Husada

Volume 13 Number 1 Juni 2024
DOI 10.35816/jiskh.v13i1.1137

ORIGINAL ARTICLES OPEN ACCESS

Effectiveness of giving dragon fruit and ambon banana to increase haemoglobin levels in anaemic adolescent girls

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Received: 10 February 2024 ○ Revised: 25 Maret 2024 ○ Accepted: 02 June 2024

ABSTRACT

Background: Anemia is a common health problem among adolescent girls, especially in areas with limited access to nutritious food. One of the efforts to overcome anaemia is to increase the consumption of iron-rich fruits, such as dragon fruit and ambon banana.

Objective: to evaluate the effectiveness of dragon fruit and ambon banana administration in increasing haemoglobin levels in anaemic adolescent girls

Method: Qualitative research combines observational and intervention approaches. The research sample amounted to 2 adolescent female respondents. Instrument of treatment activities using a checklist sheet on elevated haemoglobin levels.

Results: An increase in haemoglobin levels was obtained in adolescents given dragon fruit juice, where the first week was 10.1 g / dl, the second week was 11.2 g / dl, and the fourth week was 12.3 g / dl. There was a slightly slower increase in haemoglobin levels in adolescents who were given Ambonese bananas in the first week of 10.2 g / dl, the second week of 10.8 g / dl, and the fourth week of 11.3 g / dl.

Conclusion: respondents who consume dragon fruit increase haemoglobin levels faster than bananas. It is expected to be used as alternative midwifery care for the midwife profession by giving dragon fruit juice to increase haemoglobin levels. Teenagers are advised to maintain a balanced diet by consuming fruits rich in iron and nutrients, such as dragon fruit and ambon, bananas and other essential nutrients. By maintaining a balanced diet and increasing the consumption of iron-rich fruits, adolescents can improve their haemoglobin levels and maintain overall body health.

Keywords: anaemia; adolescent; banana; dragon fruit haemoglobin.

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INTRODUCTION

Anaemia is a significant health problem that occurs in society and is often found throughout the world, especially in developing countries such as Indonesia. One of the health problems that usually occur in adolescents, especially adolescent girls, is anaemia. This is caused by a lack of nutritional intake, which affects the nutritional status of adolescents (Sri Wulandari Rahman et al., 2023). This happens because adolescent girls lose iron (Fe) during menstruation and need more iron (Fe) intake. Anaemia is one of the common blood disorders that occurs when the level of blood cells (erythrocytes) in the blood is too low. The average Hb level for adolescent girls aged 12-15 is 12 g/dl (Gupta *et al.*, 2021). The behaviour of teenage girls who consume more plant-based foods results in iron intake that does not meet daily iron needs (Indrawatiningsih et al., 2021).

According to the World Health Organization, the prevalence of anaemia in 2015 shows that the incidence of anaemia in the world ranges from 40-88%. In Southeast Asia, it varies from 25-40%; adolescent girls experience mild and severe anaemia, and the teenage age population (10-19 years) in Indonesia is 26.2% consisting of 50.9% male and 49.1% female (Kemenkes RI, 2023). Based on the Indonesian Demographic and Health Survey, the incidence of anaemia among children aged 5-12 years in Indonesia is 26%, and in adolescent girls aged 13-18 years is 23%, far above the World Health Organization (WHO) standard of 20%. Concerning Riskesdas 2018 data. In Banten province, the incidence of adolescent girls experiencing anaemia is around 37.1% (Gusfina, 2022). Based on the results of haemoglobin examination data in 2018 conducted by Picung Community Health Center in several schools in Picung Subdistrict, the results showed that 72 adolescent girls or 21.45% were anaemic, while the results of haemoglobin examination data in 2019 were 238 people or 40.03% were anaemic, due to an increase in the incidence of anaemia by 18.58% from 2018 to 2019. Adolescents who suffer from anaemia will experience weakness, fatigue, lethargy, pale face, dizziness, decreased concentration, reduced physical growth and brain clarity, and decreased work productivity (Rakanita *et al.*, 2020). Therefore, prevention of anaemia in adolescents is essential (Budiarti, Anik and Wirani, 2021).

The most important risk factors for anaemia include low iron intake, low iron absorption from foods high in phytate and phenolic compounds, and periods of human life where iron demand increases (such as during growth and pregnancy), including adolescence (Mantadakis, 2020). Food sources of iron, especially heme iron, which has high bioavailability, are rarely consumed by people in developing countries, who mainly fulfil their iron needs from plant-based products (Shubham *et al.*, 2020). Vegetables still dominate the food consumption pattern of Indonesian people as a source of iron that is difficult to absorb. Meanwhile, meat and animal foods are good sources of iron (heme iron) and are rarely consumed, especially in rural communities. Heme iron in animal foods can be absorbed twice as much as nonheme iron. Iron comes from heme iron (in haemoglobin and myoglobin of animal foods) and nonheme iron (in plant foods). Good sources of nonheme iron include legumes (Wu *et al.*, 2020).

One of the non-pharmacological efforts to overcome anaemia is to consume fruits, including dragon fruit and banana ambon. The content of various nutrients in the fruit provides many benefits for the body (Muliawati, Carolin and Lail, 2022). One of the benefits is that it can increase Hb levels because of its excellent and valuable content, especially its iron content, which is sufficient to replace lost iron in the body and vitamin C, which is adequate to help the absorption of iron in the process of forming haemoglobin in the blood as well as good taste easy to digest, easy to find and affordable (Chowdhury, Helman and Greenhalgh, 2023). The high iron content of dragon fruit and ambon banana can stimulate the production of haemoglobin in the blood of people with anaemia (Fitriasnani, Aminah and Sofianah, 2020). Based on the preliminary study at Puskesmas Picung, the results of interviews on 10 adolescent girls 5 experienced weakness, fatigue, and lack of concentration in learning during menstruation and on physical examination showed pale conjunctiva. In addition, 2 of them were examined for haemoglobin levels with the results of Hb levels below normal, namely 10.3 gr/dl and 10.1 gr/dl. This study aimed to determine

the effect of dragon fruit and banana ambon on increasing haemoglobin levels in anaemic adolescent girls at Picung Health Center in 2023. Based on this description, the researcher is interested in conducting a study entitled, The Effectiveness of Giving Dragon Fruit and Ambon Banana to increase haemoglobin levels in Anaemic Teenage Girls at Picung Health Center, Pandeglang Banten.

METHODS

This type of research is qualitative with case studies, which focus intensively on a particular object, studying it as a case. This research will be conducted at Picung Health Center, Pandeglang Regency, Banten Province. This research will be conducted for one month in August-September 2023. The population used in this study were adolescent girls who had an examination at the Picung Health Center in June-August 2023, totalling 10. The samples used in this study were 2 teenage girls who had an examination at the Picung Community Health Center. The determination of the sample was based on the exact characteristics of the respondents, so that both respondents were similar in age (15-18 years old), had the same complaints of mild anaemia, and health status (no previous history of disease).

Data collection method is the most strategic step in research because the study's primary purpose is to get data. Various data collection methods can be used in a study, including interview techniques, observation techniques, questionnaires or questionnaires, and document studies. The data collection technique used in this study is a questionnaire technique, in which the data collection method is addressed directly to the research subject. The instrument of care activities uses a checklist sheet about increasing haemoglobin levels. After taking measurements, the researcher gave treatment by giving dragon fruit juice as much as 100 grams every 3 days for 1 month to respondent 1 giving ambon bananas as much as 100 grams every 3 days for 1 month to respondent 2. Then, measurements of haemoglobin levels were taken to determine whether there were changes in haemoglobin levels during the consumption of dragon fruit juice and ambon bananas. The examination was carried out on the first third day.

RESULTS

The following are the results of the care of 2 adolescent respondents who experienced anaemia obtained from the results of a midwifery care assessment conducted at Picung Health Center, Pandeglang Regency, Banten Province. This research will be conducted for 7 (seven) days in August-September 2023.

Table 1 Midwifery Care Results of Giving Dragon Fruit Juice to Anemia in Adolescents

Category	Administration of Dragon Fruit Juice		
Haemoglobin level	**Week 1**	**Week 2**	**Week 3**
(gr/dl)	10.1 gr/dl	11.2 gr/dl	12.3 gr/dl

Source: results of observation of midwifery care of Respondent 1

Based on the care provided in the case study I, the respondent experienced anaemia in the first week with HB levels of 10.1 gr/dl as measured by a blood test kit and then given Dragon fruit juice therapy of 100 grams every 3 days for 1 month, after being treated, it was measured again in week 2 with an HB test kit to 11.2 gr/dl. In the fourth week, the respondent was measured again with an HB measuring device and obtained a haemoglobin level of 12.3 gr/dl.

Table 1 Results of Obstetric Care of Dragon Fruit Juice Administration against Anemia in Adolescents

Category	Ambon Banana Feeding		
Haemoglobin level	**Week 1**	**Week 2**	**Week 3**
(gr/dl)	10.2 gr/dl	10.8 gr/dl	11.3 gr/dl

Source: results of observation of midwifery care of Respondent 2

Based on the care provided in case study 2, the respondent experienced anaemia in the first

week with an HB level of 10.2 gr/dl measured by a blood test kit and then given banana fruit therapy as much as 100 grams every 3 days for 1 month, after being treated it was measured again in week 2 with an HB test kit to 10.8 gr/dl. In the fourth week, the respondent was measured again with an HB measuring device and obtained a haemoglobin level of 11.3 mmHg.

DISCUSSION

This study proves a difference between adolescents given dragon fruit juice and those given ambon banana fruit to increase haemoglobin levels. There was an increase in haemoglobin levels in adolescents given dragon fruit juice, where the first week was 10.1 gr/dl, the second week was 11.2 gr/dl, and the fourth week was 12.3 gr/dl. Respondents who were given dragon fruit juice experienced an increase in haemoglobin levels after 1 month of observation. In comparison, respondents who were given ambon banana fruit experienced a rise in haemoglobin levels but slowly after 1 month of observation. This is in line with research that dragon fruit juice 200g/ml is effective for increasing haemoglobin levels of adolescent girls at SMA Negeri 1 Banguntapan Bantul with a p-value of 0.011 ($P < 0.05$), which means there is a difference before and after being given dragon fruit juice (Wahyuningsih, Khasanah and Widodo, 2021). Other results showed that the mean or average value of haemoglobin levels before treatment was 11.14%, and the average value of haemoglobin levels after treatment with dragon fruit was 12.47%, so it can be concluded that giving dragon fruit juice affects increasing haemoglobin levels in adolescent girls (Marwang, Passe and Sudirman, 2023). The results of further research show that the dragon fruit group has a significance level (ρ value) of 0.004. Thus, the two variables before and after treatment significantly differ because the ρ value is smaller than α (0.05)). The study's results showed that the average post-test haemoglobin level was 11.53. The average haemoglobin level before and after being given dragon fruit was 10.42, and the average post-test haemoglobin level was 10.62 (Hardianti, Corniawati and Sinaga, 2023).

Dragon fruit juice contains a lot of water, protein, fat, crude fibre, calcium, phosphorus, iron, niacin and vitamin C (Aryanta, 2022). The benefits of consuming dragon fruit juice can stimulate the formation of red blood cells, increase immunity, prevent anaemia, maintain brain development, add energy and treat constipation; dragon fruit juice can help bone and tooth formation, is a source of healthy fats and antioxidants and a source of omega 3 and 6 acids. Consuming dragon fruit juice on haemoglobin levels is due to the significant content of various essential nutrients in dragon fruit, such as vitamin C, vitamin B1 (thiamine), vitamin B2 (riboflavin), carbohydrates, protein, antioxidants, fibre, and iron so that it can increase haemoglobin levels (Aulya, Silawati and Margareta, 2021). According to the researcher's assumption, there is a difference in haemoglobin levels in adolescents who consume dragon fruit juice and adolescents who consume ambon banana fruit. Adolescents who do not experience an increase in haemoglobin levels are due to insufficient nutritional intake, lack of rest, increased nutrient loss, and increased nutritional needs, while adolescents who experience an increase in hemoglobin levels are due to adolescents often consume foods rich in iron, such as liver, red meat, shrimp, tofu, spinach, almonds, dates, oysters, asparagus. Hemoglobin levels due to vitamin C deficiency can be improved by consuming foods that contain lots of vitamin C, such as papaya, oranges, lemons, strawberries, peppers, broccoli, tomatoes (Chowdhury, Helman and Greenhalgh, 2023). In addition, adolescents do not eat foods such as coffee, tea, soft drinks, wine, beer that can inhibit iron absorption. One of the causes of stunting is anemia in pregnant women and Chronic Energy Deficiency (CED) in pregnant women, due to insufficient food intake. Various foods to increase hemoglobin, body weight, and Upper Arm Circumference (UAC) of pregnant women were studied (Sjamsuddin, Alfianita and Surtimanah, 2022).

A recent review of global vitamin C status has indicated a high prevalence of deficiency, particularly in low- and middle-income countries and specific subgroups within high-income countries. Here, we provide a narrative review of potential factors influencing vitamin C status globally (Carr and Rowe, 2020). Among patients with IDA, oral iron supplements alone were equivalent to oral iron supplements plus vitamin C in improving haemoglobin recovery and iron

absorption. These findings suggest that on-demand vitamin C supplements are not essential to take along with oral iron supplements for patients with IDA (Li *et al.*, 2020). That anaemia is caused by low family income, low knowledge, not consuming foods that encourage iron absorption, abnormal nutritional status, and adolescents who do strenuous activities (Novelia, Rukmaini and Purnama Sari, 2022).

CONCLUSIONS

There was an increase in haemoglobin (Hb) levels before and after the dragon fruit and ambon banana intervention. Giving adolescents dragon fruit and ambonese bananas affects haemoglobin (Hb) levels. Respondents who consume dragon fruit increase haemoglobin levels faster than bananas. Teenagers are advised to maintain a balanced diet by consuming fruits rich in iron and nutrients, such as dragon fruit and ambon, bananas and other essential nutrients. Adolescents can improve their haemoglobin levels and overall body health by maintaining a balanced diet and increasing the consumption of iron-rich fruits.

Acknowledgement

The author would like to thank the University of Indonesia Advanced Academic Community and family and friends who are in the process of completing this report.

Funding Source

Funding sources are obtained from the researchers themselves

Conflict of Interest

Declare that this research is independent of conflicts of interest and organization.

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How to cite this article: Supriati, Y., & Kusumastuti, I. (2024). Effectiveness of giving dragon fruit and ambon banana to increase hemoglobin levels in anemic adolescent girls. Jurnal Ilmiah Kesehatan Sandi Husada, 13(1), 41-46. https://doi.org/10.35816/jiskh.v13i1.1137