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The differences in hemoglobin levels before and after consuming ambon bananas in students ☆

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Abstract The purpose of this study is to determine whether there are differences in hemoglobin levels before and after consuming ambon bananas in students of Prodi Kebidanan Metro. The specific purpose of this study was to determine hemoglobin levels before consuming ambon bananas, hemoglobin levels after consuming ambon bananas and the differences in hemoglobin levels before and after consuming ambon bananas in female students at Prodi Kebidanan Metro.

This research is an intervention research with quasi experiment design with The One Group Pretest – posttest design. The population in this study were students in the first and second grade in Prodi Kebidanan Metro who lived in the dormitory as many as 149 female students. A sample of 49 people will take a portion of the population using simple random sampling technique. Data analysis used dependent sample t tests to test the mean increase in Hb levels before and after consuming ambon bananas.

The results showed an average Hb level before consuming bananas at 12.51 g/dl and an the average hb level after consuming bananas was 12.89 g/dl, so the average increase in Hb levels was 0.39 g/dl. The results of the analysis using the t-test dependent test obtained p value = 0.000, which means that there are significant differences in Hb levels of students before and after consuming ambon banana.
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Introduction

Based on the results of the 2004 World Health Organization[1] survey, the estimated incidence of anemia in the whole world is around two billion. Iron deficiency is the main cause of anemia in the world at 50–80%. MOH Report the prevalence of anemia among Indonesian teenagers (aged 15–19 years) 26.5%, and women of childbearing age (26.9%.

Based on the age grouping of the 2013 Riskesdas,[2] it was found that anemia in adolescents was quite high at 18.1%, Anemia in women is 23.9%. The anemia cut-off point for women of childbearing age 15–49 years is Hemoglobin (Hb) levels below 12.0 g/dl. This indicates that anemia in adolescent females is still high despite a decline (Ministry of Health, 2013). The prevalence of female adolescent anemia in Metro City is 2 groups: 10–14 years age group of 49% and 15–19 years age group of 67% (Metro City Health Office, 2016).

Adolescent nutrition problems need special attention because of their great influence on the growth and development of the body and its impact on nutritional problems as adults. At present the population of adolescents in the world has reached 1200 million. Teenage is a transition period for children and adults. During adolescence hormonal changes accelerate growth. Growth is faster than other phases in life, except the phase of the first year of life (baby).[3]

The results of various anemia surveys in several regions in Indonesia indicate that the incidence of anemia in young women in Indonesia is still quite high. The survey at SMAN 2 Semarang found that the prevalence of anemia among young women was 36.7%.[4] Another survey in Bekasi of junior and senior high school students aged 10–18 years showed an anemia prevalence of 38.3%.[5] Research on young women at SMAN 1 Brebes showed anemic prevalence of 52.9%.[6]

The prevalence of anemia in adolescents from 2001 in Lampung Province is recorded as the third stage after West Sumatera and North Sumatera is 25.9% (Ministry of Health and Development of Depkes RI, 2008),[7] and in 2010 found the results of the incidence of anemia 25.9% in Adult women ($\geq$15 years). The prevalence of juvenile anemia in Kibang based on Sukmawati research in 2011 was obtained 65% from 142 Junior high school students Kibang suffering from anemia (Sukmawati, 2011:48).[8] Research at MAN 1 Metro 2014 found that there were 40% of young women experiencing anemia.[9]

One type of food that contains iron is a banana with an iron content of 0.5 mg per 100, in addition to its relatively inexpensive price, the taste is sweet and easy to get it and its texture that makes it easy to consume it, if Compared to other vegetable types, mineral bananas, especially iron can almost completely absorbed by the body. In addition to the content of banana iron contains vitamin C which is high enough to facilitate the absorption of iron in the body.[10]

Based on a preliminary survey conducted by researchers at the college student Prodi Kebidanan Metro as much as 10 people obtained the highest Hemoglobin (Hb) level is 14 mg/dl and the lowest Hb level is 10.3 mg/dl. The level of Hb below normal as much as 60%. These results show that there are still many teenagers in this college student Prodi Kebidanan Metro which has a Hemoglobin level below the normal limit.

Research methods

This research is a type of quantitative study with the design of a quasi experiment with The One Group Pretest – posttest. The population of this study were Level I and II Metro Midwifery Study Program students who lived in dormitories of 149 female students. The sample is 49 people, the sampling technique is Simple Random Sampling. The study was conducted at Prodi Kebidanan Metro in July to November 2016. In this study the researchers used two variables, namely the dependent variable is Hemoglobin level, the independent variable is consumption of ambon banana by eliminating several other variables that are closely related to increased hemoglobin levels by controlling or reducing consumption of other foods that contain lots of iron (Fe) such as meat. Data collection using hemoglobin measurements before and after the intervention of administration of ambon banana.

Research step implementation: (1) Researchers gather all the sorority that will be the subject of research. (2) Explain to respondents/sorority the course of research, benefits as well as impact of research. (3) Uniformity of respondents with BMI measurement, further measuring the initial hemoglobin level before the administration of banana ambon and making an introduction to the research consent. (4) In the measurement of hemoglobin, which is selected to be the sample is the level of hemoglobin under 13 mg/dl. After the measurement of hemoglobin is done routinely grant intervention of banana ambon to respondents every day as much as 100 g of banana ambon (about 2 medium banana fruit) for 30 days (1 month). The awarding was done before breakfast and before the lunch coordinated through the dorm kitchen. Assisted by enumerators as well as monitoring banana consumption daily and monitoring other food consumption every 2 days by the enumerator. One enumerator controlled 9–10 respondents. (5) Giving banana ambon regularly every day for 30 days at 0.5 h before breakfast and before lunch. (6) If the student stays outside the dormitory then the student is presented with as many bananas how long he is not in the dorm and students are required to stay abreast of the research rules by avoiding foods containing high Fe levels. (7) Measuring hemoglobin back after 30 days of banana administration. (8) Data of research results are emulated and conducted analysis.

Result and discussion

Based on the results of studies that have been conducted against 49 students Prodi Kebidanan Metro then obtained data as listed in following Tables 1 and 2.

Of the 49 respondents measured by of the 49 respondents measured by hemoglobin before consuming ambon banana with the lowest hemoglobin level was 10.4 g/dl and the highest hemoglobin level was 13.7 g/dl and the mean hemoglobin level of the respondents was 12.5 g/dl. After consuming ambon bananas the lowest hemoglobin level 10.4 g/dl, the highest was 14.8 g/dl with an average of 12.9 g/dl. The average increase in hemoglobin levels before and after consuming ambon banana was 0.3857 g/dl. There were differences in hemoglobin levels before and after consuming ambon banana on Prodi Kebidanan Metro students of 0.39 g/dl with p value = 0.000 which means there were significant differences in the hemoglobin level of student before and after consuming ambon banana.

The results of this research in accordance with the statement Sentana (2013)[10] stating that the banana fruit contains a relatively high iron so that the fruit is able to help the function of hemoglobin in the body. For anemia sufferers

Table 1 The average distribution of hemoglobin levels before and after giving ambon bananas.

Hemoglobin levels	Minimum	Maximum	Average	SD
Before intervention	10.40	13.70	12.51	0.73
After intervention	10.50	14.80	12.89	1.01

Table 2 The enhancement distribution hemoglobin levels before and after giving ambon bananas.

Variable	Average	SD	*p* value	CI 95%	
				Upper	Lower
Hemoglobin before and after	0.39	0.57	0.000	0.54809	0.22334

are advised to consume banana fruit on a regular basis, it is very good to restore blood pressure in the body and help to stabilize hemoglobin. Another statement mentioning the benefits of iron or Fe in banana ambon which is high enough to help cope with the disorder of anemia, namely by the way of increasing red blood cells in the body. Iron contained in bananas, almost 100% can be absorbed by the body.[11] In addition to iron, the banana fruit contains vitamin B6 which plays a role in the neurotransmitter that turns out to be able to increase the growth of hemoglobin in the body.[12]

Based on research in India stating that the banana fruit contains high levels of iron, the banana fruit can stimulate the production of hemoglobin in the blood and help overcome anemia. Bananas are also a good source of Vitamin C in immune system. Bananas are also relatively digestible compared to other foods. Both of these banana health benefits make it suitable for people with anemia or related blood problems.[13]

Putra (2014)[14] and Kumar (2012)[13] mention clinically, the benefits of banana fruit ambon or commonly called green bananas are very diverse one of which is overcoming anemia. Banana fruit has a high enough iron content that is suitable for people with anemia. Consume 2 bananas ($\pm$100 g). Every day routinely can overcome the deficiency of red blood cells or anemia.

Researchers assumed differences in Hemoblobin levels before and after consuming banana ambon, because banana ambon contains many energy including: carbohydrates, proteins, fats, vitamins, and minerals, especially iron. Iron Works to increase Hemoglobin level. This is in accordance with the theory that the iron contained in banana ambon is quite high and consume it can help increase the level of hemoglobin in the blood.

Why banana ambon is given because banana ambon contains complete nutrients, especially minerals and vitamins, and contains iron 0.5 mg in each of 100 g of bananas. Moreover, banana ambon is relatively inexpensive and easy to get it both in the traditional market as well as in the modern market. Thus, banana ambon is very good at raising the level of Hemoglobin or preventing anemia. However, it is undeniable that the iron content remains higher on foods containing animal proteins. Preferably in the provision of daily food menu still available animal proteins that contain iron, coupled with the gift of fruit ambon banana to increase

and facilitate the absorption of iron that can later serve to increase the level of hemoglobin.

Furthermore, for food managers for students who reside in the dormitory the fruit menu to be given more often banana ambon. Students who are domiciled outside the hostel so that they can add fruit in the daily menu, especially banana ambon. This is because in addition to the cheap price, it feels good, the nutrient content is very complete include: carbohydrates, proteins, fats, vitamins and minerals, especially iron. It is not less important that banana ambon is a fruit that is easily obtained both in the traditional market and in the modern market.

Conclusion

The results showed an average Hb level before consuming bananas at 12.51 g/dl and an the average hb level after consuming bananas was 12.89 g/dl, so the average increase in Hb levels was 0.39 g/dl. The results of the analysis using the *t*-test dependent test obtained *p* value = 0.000 which means that there are significant differences in Hb levels of students before and after consuming ambon banana.

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Conflict of interest

The authors declare no conflict of interest.

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