

THE RELATIONSHIP OF BREAKFAST HABITS WITH HEMOGLOBIN LEVELS IN CLASS XI STUDENTS AT SMA NEGERI 7 DENPASAR

I Gusti Agung Ayu Satwikha Dewi ^{1*}, Ni Made Sri Dwijastuti ¹, Ni Putu Senshi Septiasari ¹, Ni Putu Widianari ¹, Ni Putu Puniari Eka Putri ¹

¹ Medical Laboratory Technology D IV Study Program, Faculty of Health Sciences, Bali International University, Jl. Seroja Gg. Jeruk Tonja, North Denpasar, 80361, Bali-Indonesia

*Corresponding author, e-mail: ayusatwikha@iikmpbali.ac.id *

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Abstract

Introduction: Hemoglobin levels are a clinical parameter in routine hematology examinations which are used to determine whether there are health problems. Adolescents need to pay attention to hemoglobin levels because hemoglobin levels are crucial for supporting the physical, mental and academic well-being of adolescents during this important phase of their growth and development. **Method:** This research method is observational research with a cross sectional approach. This research was conducted at SMA Negeri 7 Denpasar, Wednesday 24 May 2023. The sampling technique used was purposive sampling with a sample size of 42 students in class XI of SMA Negeri 7 Denpasar. **Results:** There were 8 students in class Students who did not have breakfast had normal and high hemoglobin levels, while students who had breakfast had low, normal and high hemoglobin levels. The results of the analysis using the Somers'D test showed that there was no relationship between breakfast habits and hemoglobin levels with p value = 0.188 or $p > 0.05$. **Conclusion:** Breakfast habits do not directly affect hemoglobin levels.

Keywords : breakfast, hemoglobin, teenager

1.Introduction

Adolescent growth and development is a critical phase in human life that requires ideal nutrition (1). Hemoglobin, as an important parameter in blood function, plays a crucial role in transporting oxygen throughout the body (2). Hemoglobin is a complex protein found in human red blood cells. Hemoglobin is responsible for transporting oxygen from the lungs to the rest of the body and carrying carbon dioxide from the rest of the body to the lungs for excretion (3). Hemoglobin levels

are a clinical parameter in routine hematological examinations which are used to determine whether there are health problems in patients. Apart from that, checking hemoglobin levels is also useful for assessing the level of iron deficiency , response to frailty therapy , and knowing indications of anemia (4).

According to data from Riskesdas in 2013, 37.1% of young women in Indonesia experienced anemia. However, this figure has increased to 48.9% in Riskesdas 2018 (5). The proportion of anemia occurs in the

age groups 15-24 years and 25-34 years. Several factors that cause the high incidence of anemia in adolescents include low intake of iron and other nutrients such as vitamin A, vitamin C, folate, riboflavin, and vitamin B12.(6)

Teenagers need to pay attention to hemoglobin levels because healthy hemoglobin levels have a significant impact on their health and performance in various aspects of life. Sufficient and healthy hemoglobin levels are very important to maintain the physical and mental health of students at the secondary school level, especially in class XI which is a critical stage of education (7). Paying attention to hemoglobin levels is crucial for supporting the physical, mental and academic well-being of teenagers during this important phase of their growth and development (8). By understanding the importance of hemoglobin levels, teenagers can adopt healthy living habits, including a good diet, to maintain nutritional balance and support healthy hemoglobin production. optimal (9).

Breakfast as one of the main meals of the day has a significant impact on the daily nutritional intake and energy required to cope with students' learning and physical activity demands. (9). However, in the teenage stage, breakfast habits are often neglected, raising concerns regarding health and academic performance. Several studies

show that a lack of adequate nutritional intake can impact hemoglobin production and cause underlying health problems (10).

Although the scientific literature provides insight into the relationship between nutrition and hemoglobin levels, limitations of research specific to class XI students need to be addressed. Therefore, this study aims to investigate in depth the potential relationship between breakfast habits and hemoglobin levels in class XI students. It is hoped that the findings from this research will provide a better understanding of the interaction between nutritional intake through breakfast and students' blood health status, so that it can provide a basis for more targeted improvements in health and education policies. This research provides further information about this relationship, we can provide educators, parents, and students themselves with a better understanding of the importance of supporting breakfast habits.

2. Research Methods

This research method is observational research with a cross sectional approach. This research was conducted at SMA Negeri 7 Denpasar, Wednesday 24 May 2023. The sampling technique used was purposive sampling with a sample size of 42 people. Inclusion criteria were willingness to be a respondent, age range of teenagers 15-17 years, students of SMA Negeri 7 Denpasar class XI. The age range

is adjusted to the criteria of the Indonesian Ministry of Health (2009). Exclusion criteria are consuming certain drugs and being menstruating for female students. The data collection technique used was checking hemoglobin levels which were checked using the Point of Care Testing (POCT) method. The equipment used in this research was Easy Touch brand POCT, Easy Touch brand hemoglobin strips, lancets, soft clicks and the material was

capillary blood. The relationship between breakfast habits and hemoglobin levels was analyzed using the Gamma Somers'd test.

3. Results and Discussions

A. Respondent characteristics

The frequency distribution of respondent characteristics based on gender and age of students at SMA Negeri 7 Denpasar can be seen in table 1 below.

Table 1. Distribution Frequency Characteristics Respondent Based on Type Gender and Age

Characteristics Respondent	Amount (Person)	Percentage (%)
Type Sex		
• Man	16	38.1%
• Woman	26	61.9%
Total	42	100 %

Distribution frequency characteristics respondents based on with type sex dominated by women as much as 61.9% while men with a percentage of 38.1%. If you look at age, Respondents had an age range of 14-17 years.

B. Distribution of Hemoglobin Levels of Students at SMA Negeri 7 Denpasar

The distribution of hemoglobin levels of students at SMA Negeri 7 Denpasar can be seen in tables 2 and 3 below:

Table 2. Distribution of Hemoglobin Levels of Male Students at SMA Negeri 7 Denpasar

Parameter	Hemoglobin Level (g/dL)
Average	15.31 (g/dL)
Media	16.20 (g/dL)
Standard deviation	4.2 (g/dL)
Minimum	6.00 (g/dL)
Maximum	21.70 (g/dL)

Table 3. Distribution of Hemoglobin Levels of Female Students at SMA Negeri 7 Denpasar

Parameter	Hemoglobin levels
Average	12.97 (g/dL)
Media	13.70 (g/dL)
Standard deviation	3.13 (g/dL)
Minimum	7.00 (g/dL)
Maximum	17.00 (g/dL)

Male students at SMA 7 Denpasar had an average hemoglobin level of 15.31 g/dL. The lowest level among male students at SMA Negeri 7 Denpasar was 6.00 g/dL which was included in the low category

(table 2). Meanwhile, the highest level among male students at SMA Negeri 7 Denpasar was 21.70 g/dL which was included in the high category (table 3).

Table 4. Hemoglobin levels of students at SMA Negeri 7 Denpasar

Hemoglobin levels	Frequency	Percentage
Low	12	28.6%
Normal	21	50.0%
High	9	21.4%
Total	42	100.0%

Normal hemoglobin levels for students at SMA Negeri 7 Denpasar who have rate normal as many as 21 people (50.0%), below normal as many as 12 people (28.6%), and above normal as many as 9 people (21.4%). The lowest value for hemoglobin levels was 6 g/dL, while the highest value was 21.7 g/dL (table 4).

The number of respondents in this study was 42 people. All research respondents met the inclusion criteria. All respondents came from class XI of SMA Negeri 7 Denpasar with an age range of 14 to 17 years. Respondents were dominated by 26 women, while 16 were men. Hemoglobin levels are influenced by gender, normal levels for women range

from 12-15 g/dL while men range between 13-17 g/dL.

Most of the respondents' hemoglobin levels had normal levels as many as 21 people (50.0%), below normal as many as 12 people (28.6%), and above normal as many as 9 people (21.4%). The lowest value for hemoglobin levels is 6 g/dL, while the highest value is 21.7 g/dL. High and low hemoglobin levels are influenced by dehydration, location of residence, smoking habits, congenital heart disease, and radiation exposure (11). Dehydration or not drinking enough water can cause an increase in hemoglobin levels. When dehydrated, the volume of blood plasma decreases, and this automatically increases the amount of hemoglobin (12). At high

altitudes, oxygen levels are lower at altitude, so the body responds by producing more red blood cells (13). Smoking habits can affect hemoglobin levels. Smoking can speed up the production of red blood cells and increase hemoglobin levels. Congenital heart disease, pulmonary fibrosis, and polycythemia vera (a condition where the bone marrow produces too many red blood cells) also cause high hemoglobin levels. Exposure to radiation, large blood loss, and

deficiencies of important minerals and nutrients such as folic acid, iron, and vitamin B12 can also affect hemoglobin levels.

C. Breakfast Habits of Denpasar 7 Public High School Students

The frequency distribution of breakfast habits of students at SMA Negeri 7 Denpasar can be seen from table 5 below

Table 5. Breakfast Habits

Breakfast habits	Frequency	Percentage
No Breakfast	8	19.0%
Breakfast	34	81.0%
Total	42	100.0%

There were 8 students in class XI at SMA Negeri 7 who did not have breakfast (19.0%), while there were 34 students who did breakfast (81.0%).

There were 8 students in class XI at SMA Negeri 7 who did not have breakfast (19.0%), while there were 34 students who did breakfast (81.0%). This is not in line with Karyani's (2020) research that found that 83 students (49.11%) were used to breakfast and 86 students (50.89%) were not used to breakfast at the Avicenna Cileungsi Vocational School (SMKF) teenagers (2020). Research by Niswah (2014) (14) on teenagers from Bosowa Bina Insani Middle School, Bogor, found that around a third of the subjects (31.7%) admitted that they always had breakfast every day. Breakfast habits play an important role in the well-being and

concentration of teenagers. Therefore, it is important for teenagers to pay attention to their breakfast habits to support their health and study performance (15). **Teenage Female Students in Bogor Regency** ", it was found that approx **45.6% of teenage girls usually eat breakfast every day** (16).

D. Relationship Between breakfast habits and hemoglobin levels

The distribution of hemoglobin levels in the categories of low, normal and high based on breakfast habits in the categories shown in table 6

Table 6. Distribution of the Relationship between Breakfast Habits and Hemoglobin Levels

		Hemoglobin levels			
		Low	Normal	Tall	Total
Breakfast habits	No breakfast	0	7	1	8
	Yes	12	14	8	34
Total		12	21	9	42

Based on table 6, students who do not have breakfast have normal and high hemoglobin levels, while students who eat breakfast have low, normal and high hemoglobin

levels. The results of the analysis of the relationship between breakfast habits and hemoglobin levels using the Somers'D test are presented in table 7

Table 7. Results of Analysis of the Relationship between Breakfast Habits and Hemoglobin Levels

Directional Measures						
			Value	Asymp. Std. Error ^a	Approx. T ^b	Approx. Sig.
Ordinal by Ordinal	Somers' d	Symmetrical	-.132	,096	-1,316	,188
		Breakfast habits	-.098	,075	-1,316	,188
		Dependent Interpretation	-.199	.143	-1,316	,188

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

The results of analysis using the Somers'D test showed that there was no relationship between breakfast habits and hemoglobin levels with *p value* = 0.188 or $p > 0.05$ (Table 7).

Students who did not eat breakfast had normal and high hemoglobin levels. Students who had breakfast had low, normal and high hemoglobin levels. Based on the results of statistical tests, there is no relationship between breakfast habits and hemoglobin levels. This research is in line

with research (14)that there is no significant difference in nutritional status between those who eat breakfast and those who do not. The quality of life in the group who usually eat breakfast tends to be higher than the group who don't usually eat breakfast, although there is no statistically significant difference.

Research at SMP Negeri 13 Semarang found that there was no significant relationship between breakfast habits and the incidence of anemia.

Subjects in both groups had underweight nutritional status, with 48.15% in the group who had breakfast and 44.4% in the group who did not have breakfast. Both groups also had physical activity that was categorized as sedentary (low), namely 96.3%. Low hemoglobin levels were more common in the group that did not eat breakfast (22.2%) than the group that had breakfast (3.7%) (17).

Research at SMPN 5 Banjarmasin shows that there is no significant relationship between nutritional status and the incidence of anemia in female students. Although there is a relationship between knowledge and breakfast habits and the incidence of anemia, nutritional status does not significantly influence the incidence of anemia (18).

This research shows that breakfast habits do not directly affect hemoglobin levels (19). Several factors such as bleeding, chronic diseases, hemolysis disorders, and genetically inherited anemia such as congenital pernicious anemia, G6PD deficiency, congenital cephalos, sickle cell anemia can cause anemia. So breakfast habits do not directly affect a person's hemoglobin levels .

4. Conclusions

Based on results study Which done to 42 respondents in It was concluded that there were male and female students at

SMA Negeri 7 Denpasar had hemoglobin levels of 15.31 g/dL and 12.97 g/dL. There were 12 students at SMA Negeri 7 who had low hemoglobin levels, 21 people with normal hemoglobin levels, and 9 people with high hemoglobin levels. There were 8 students at SMA Negeri 7 Denpasar who had the habit of not having breakfast and 34 of the 42 students who were respondents often had breakfast. Based on the results of the analysis of the relationship between breakfast habits and hemoglobin levels in students at SMA Negeri 7 Denpasar using the Somers'D test, it was obtained that $p\text{ value} = 0.188$ or $p > 0.05$, meaning that there is no relationship between breakfast habits and hemoglobin levels in students at SMA Negeri 7 Denpasar. This research shows that breakfast habits do not directly affect hemoglobin levels. Several other factors such as bleeding, chronic diseases, hemolysis disorders, and genetic diseases can be determining factors in hemoglobin levels in the body. So it is necessary to carry out further examination regarding the factors causing hemoglobin levels in adolescents in future research

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