



HEMOGLOBIN SCREENING EXAMINATION IN ADOLESCENTS AT *SMK PGRI 2 TUBAN* AS EARLY DETECTION OF ANEMIA

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Article info	ABSTRACT
<p>Corresponding Author:</p> <p>Lilik Khoufah khoufah5791@gmail.com Faculty of Public Health, University of Kadiri</p>	<p>Anemia in adolescents is a serious public health problem because adolescence is an important developmental period in the life of every individual, where adolescence is experiencing biological, psychological and behavioral changes that affect their health. Factors that contribute to the incidence of anemia in adolescents include lack of iron intake in food, unbalanced diet, the habit of skipping breakfast, and lack of awareness of the importance of clean and healthy living behavior. Anemia is diagnosed with the examination of hemoglobin (Hb) in the blood. It is said to have Mild Anemia if Hb is 11 - 11.9 gr / dl, Moderate Anemia if Hb is 8 - 10.9 gr / dl and Severe Anemia if Hb <8 gr / dl. This anemia screening is carried out by examining Hemoglobin levels with the POCT method. The results of the screening carried out at <i>SMK PGRI 2 Tuban</i>, East Java, which were carried out on 70 female students showed that 4 (5.71%) female students were detected as having anemia.</p> <p>Keywords: <i>adolescents, hemoglobin, anemia.</i></p>
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INTRODUCTION

Anemia in adolescents is a serious public health problem because it can slow down psychomotor and cognitive development (Aulya, Siauta, and Nizmadilla 2022). The adolescent age group is a large group, around 23% of the total population. As the next generation, this group is the main asset or capital of human resources for national development in the future. A quality adolescent group plays an important role in achieving the continuity and success of national development goals. Adolescents during their growth period need more nutrients than other ages, especially iron. This is because sexual maturation occurs during adolescence (Ma Jie et al. 2024). Adolescent girls have a ten times greater risk of suffering from anemia compared to adolescent boys. This is because adolescent girls menstruate every month and are growing so they need more iron intake (Aulya, Siauta, and Nizmadilla 2022). In addition, an imbalance in nutrient intake is also a cause of anemia in adolescents. Adolescent girls usually pay close attention to their body shape, so many limit their food consumption and have many food restrictions.

The age that is susceptible to anemia, especially iron deficiency anemia, is adolescence. The prevalence of anemia in adolescents in Indonesia, according to the

World Health Organization (WHO), the prevalence of anemia in the world in 2023 is: 40% of children aged 6-59 months, 37% of pregnant women, 30% of women aged 15-49 years (WHO, 2023). According to the 2023 Indonesian Health Survey (SKI) data, it was reported that the prevalence of anemia in the 15–24-year age group was 15.5%.

There are three factors that underline the occurrence of anemia, the first is a direct cause, namely low iron levels in the blood and a body condition infected with disease. The second cause is an indirect cause, namely low family attention, heavy activity, and inappropriate food distribution patterns in the family. The third cause, namely the basic cause, consists of low education, low income, low social status and difficult geographical location of residence (Simamora et al., 2018). Factors that cause high rates of anemia in adolescents include low intake of iron and other nutrients such as vitamin A, vitamin C, folate, riboflavin and B12, errors in iron consumption such as consuming iron together with other substances that can interfere with the absorption of iron (Julaecha, 2020)

Symptoms of anemia that arise are loss of appetite, difficulty focusing, decreased immune system and behavioral disorders or lay people are more familiar such symptoms: weak, tired, lethargic, limp, pale face and fireflies. Anemia is one of the most serious micronutrient problems because it causes various complications in groups or newborns and women. Anemia in adolescents will have an impact on decreased concentration in learning, decreased physical fitness, and growth disorders so that height and weight do not reach normal (Herwandar & Soviyati, 2020)

The cause of anemia can be identified by taking a gradual diagnostic approach through clinical data collection, physical examination and laboratory tests. Early detection of anemia diagnosis can be done by measuring hemoglobin (Hb) levels with POCT (Point of Care Testing) equipment. The POCT method is a simple examination method using a small number of samples, easy, fast and effective to be carried out in areas with relatively few health facilities such as health centers and hospitals.

Anemia can cause fatigue, weakness and shortness of breath. Anemia is more at risk of occurring in adolescent girls than in adolescent boys. Factors causing anemia in adolescent girls are caused by having the wrong diet with the aim of losing weight, reducing animal protein consumption while protein consumption is very necessary for the formation of blood hemoglobin, the menstrual process experienced by adolescent girls who also experience menstrual disorders such as longer than usual menstrual periods or more blood loss than usual during menstruation. Another cause of adolescent girls experiencing anemia is because they are growing rapidly which is not balanced with their nutritional intake. (Ministry of Health of the Republic of Indonesia, 2021).

This hemoglobin (Hb) screening and examination activity aims to detect anemia early in students of *SMK PGRI 2 Tuban*. For students who are detected, they will be followed up by the health center. To prevent further anemia, counseling will be carried out to students about behavior that is at risk of anemia, the provision of blood-boosting tablets and routine screening every year.

METHOD

Hemoglobin (Hb) screening and examination carried out at *SMK PGRI 2 Tuban*, East Java was carried out on June 14, 2024, in the hall of *SMK PGRI 2 Tuban*, East Java, Health screening for all male and female students. For Hemoglobin (Hb) examinations only for female students. Instruments used in Hb screening and examination activities include: Tensimeter, Body scales, Height measuring instruments,

stationery, screening sheets, alcohol swabs, gloves, blood lancets, POCT (hemoglobinometer) devices, Hemoglobin Strips.

This activity includes 2 stages

1. Health Screening

Students are carried out before the hemoglobin (Hb) examination including vital signs, weight measurement, height measurement, blood pressure measurement and simple physical examinations including eye, ear, teeth and mouth, lungs and heart examinations. For students who have abnormalities will be consulted to the Community Health Center.



Figure 1. Health Screening

2. Hemoglobin Level Examination

Hemoglobin level examination is carried out only on female students. The implementation technique is carried out by taking capillary blood, then measuring it with a hemoglobinometer.



Figure 2. Hemoglobin Examination

The data collected in this activity includes data on the results of screening hemoglobin levels of female students in grade 10 of *SMK PGRI 2 Tuban*. The data was then analyzed descriptively.

RESULT AND DISCUSSION

Finding

Activities carried out at *SMK PGRI 2 Tuban* include screening carried out on 156 students and hemoglobin (Hb) examinations carried out on 70 female students. The results of this activity showed significant results in efforts to prevent and detect anemia early in adolescents.

Table 1. The Result Data of The Examination of Female Students' Hemoglobin

Category	Amount	Percentage	Description
< 12 gr/dl	4	5,7 %	Anemia
12-17 gr/dl	66	94,3%	Normal
Total	70	100%	

The evaluation result was shown in table 1. This examination used capillary blood samples from female students. Based on the results of the examination, it was shown that out of 70 female students, 66 (94.3%) had normal hemoglobin levels, while 4 (5.7%) had hemoglobin levels below normal.

Discussion

Based on the examination conducted on 70 female students of *SMK PGRI 2 Tuban*, most of them did not experience anemia. This is because normal hemoglobin levels in adolescents indicate that their bodies are functioning well in producing healthy red blood cells.

Several factors that contribute to normal Hb levels in adolescents include adequate nutritional intake, a healthy lifestyle such as adequate rest is also important for red blood cell health, healthy bone marrow function and no underlying medical conditions such as adolescents who do not have chronic diseases or genetic disorders that affect red blood cell production tend to have normal Hb levels. (Izzara et al, 2023). Hemoglobin is one of the most important proteins in the human body because of its ability to carry oxygen and carbon dioxide. Therefore, hemoglobin levels in the body must be normal. Several factors that underlie the development of low hemoglobin or anemia due to lack of nutrition in the body. which leads to the body's nutritional needs not being met. The body, especially those who like iron, is one of the most important elements in the formation of hemoglobin. Adolescent nutritional problems involve knowledge and awareness to meet individual nutritional needs. Knowledge influences attitudes and behavior in choosing food. Iron deficiency in the body reduces the number of substances that form red blood cells, making them unable to supply oxygen, which causes anemia. (Arifin et al, 2023).

In cases of anemia in adolescents and children, the main cause is a lack of iron in the blood or is termed iron deficiency anemia. Some factors that cause iron deficiency anemia include: 1. Low intake of iron-rich foods, especially if the body is unable to absorb iron properly (meat, chicken, fish, liver, green leafy vegetables such as spinach, kale, broccoli, and nuts). 2. Worms, because there are hookworms that suck blood through the intestines. 3. Losing a lot of blood, especially in those who have

surgery, experience bleeding due to illness or accidents, and natural conditions such as menstruation or childbirth for women. 4. Malaria (especially in endemic areas) because it causes red blood cells to rupture so that there is a risk of red blood cell deficiency. 5. Increased need for blood in the body, for example due to pregnancy. (Sriatmi et al, 2020).

The impact of anemia cannot be seen immediately, but in the long term it will affect the lives of adolescents later. Anemia in adolescent girls has a long-term impact on them and the children they give birth to later. Therefore, it must be ensured that the iron needs of adolescents are met to achieve optimal growth. The direct impact can be felt in moderate and severe anemia with decreased ability and concentration in learning, disrupting the growth of both body cells and brain cells, causing symptoms of a pale face, tired, lethargic, and tired quickly, which can reduce fitness and learning achievement.

Anemia in adolescents can be prevented by regulating a proper and balanced diet. One of them is by consuming foods high in iron. Iron can be obtained from daily foods such as meat, fish, poultry, vegetables such as spinach, nuts, and fortified foods. In addition to foods rich in iron, anemia can also be prevented by consuming lots of foods containing folic acid such as liver, and green vegetables, such as spinach. Foods rich in vitamin B12 such as milk, dairy products, meat are also very good for people with anemia.

Adolescent health is very important, because adolescents are a productive age group who will later develop into the next generation of the nation. However, adolescents, especially adolescent girls, have a risk of health problems in the form of anemia ten times greater than suffer from anemia compared to adolescent boys (Arifin et al, 2023).

Regular Hemoglobin checks are important to monitor red blood cell health and detect anemia early. Although many adolescents have normal hemoglobin levels, it is still important to maintain a healthy lifestyle to prevent anemia. In this activity, for participants who are detected as having anemia, we provide iron supplements. Providing iron supplements routinely for a certain period aims to increase iron stores in the body. The hemoglobin examination is needed to determine the level of hemoglobin in the blood. In addition, this examination is also used as anemia screening.

CONCLUSION

Hemoglobin screening for adolescents is an important activity to detect anemia in adolescents early. Hemoglobin screening for 10th grade students at *SMK PGRI 2 Tuban* found cases of anemia in 5.7% (4 students) out of 70 students examined. This illustrates that not many adolescents experience anemia, but this cannot be allowed to continue. There must be intervention and prevention activities so that all students are free from anemia. It is hoped that this examination will be carried out routinely every year covering all female students, not only in 10th grade. Improve coordination and collaboration between health centers and schools so that the health of adolescents in schools is properly monitored.

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