

Level of Haemoglobin and Knowledge Regarding Anemia and Its Prevention Among Adolescent

Desi Oktariana^{1*}, Evi Lusiana², Nia Savitri Tamzil², Gita Dwi Prasasty³

¹ Department of Clinical Pathology, Faculty of Medicine, Universitas Sriwijaya, Palembang, Indonesia

² Department of Pharmacology, Faculty of Medicine, Universitas Sriwijaya, Palembang, Indonesia

³ Department of Parasitology, Faculty of Medicine, Universitas Sriwijaya, Palembang, Indonesia

Email: desioktariana@fk.unsri.ac.id

ABSTRACT

Anemia is a condition in which hemoglobin (Hb) concentration being lower than a specific threshold. The prevalence of anemia among adolescents is varies among country and its proportion is higher in developing countries. In Indonesia, the proportion of anemia in the 15-24-year age group was 32%. Anemia in adolescents has a negative impact on decreased immunity, impaired physical growth and mental development, concentration, learning achievement, adolescent fitness and productivity. Knowledge of the extent and causes of anemia in adolescence is very important because it is a window of opportunity for interventions to improve adolescent health. This study aims to describe level of Hb and knowledge regarding anemia and its prevention among adolescents. This research is a descriptive study with a cross sectional method using Hb meter to assess Hb level and questionnaire to assess knowledge regarding anemia and its prevention among adolescents, conducted in November 2019. The respondents were 42 adolescents in SMPN 9 Palembang. The ages of respondents in this study ranged from 12-13 years, consisting of 36% boys and 64% girls. The mean value of Hb level in all adolescent was 13.78 g/dL with 12% of respondents had anemia. A total of 76% adolescents had poor knowledge, while 24% adolescents had good knowledge. The mean value of Hb level in all adolescent was normal, only few adolescents had anemia. This study also shows majority of the adolescents have poor knowledge about anemia and its prevention.

Keyword: adolescent, anemia, knowledge

1. Introduction

Anemia is a condition in which there is insufficiency of oxygen-carrying capacity to meet the body's physiologic needs, caused by hemoglobin (Hb) concentration being lower than a specific threshold.¹ Physiologic needs vary among people and could be influenced by age, gender, residential elevation above sea level (altitude), smoking behavior, and different stages of pregnancy.² There are several factors affecting the state of anemia, including nutritional deficiencies like iron deficiency (most common cause), folate, vitamin B12 and vitamin A, acute and chronic inflammation, parasitic infections, and inherited or acquired disorders that affect hemoglobin synthesis, red blood cell production or red blood cell survival, it all can cause anemia with the signs and symptoms including fatigue, weakness, dizziness, and drowsiness.³

Anemia is a global public health problem affecting both developing and developed countries with major consequences for human health as well as social, intellectual, psychological and economic development. Globally, anemia affects 1.62 billion people which corresponds to 24.8% of the population. The highest prevalence is in preschool-age children (47.4%), and the lowest prevalence is in men (12.7%), while the prevalence of school-age children is 25.4%.⁴ Anemia affects approximately a third of the world's population, 50% of them are due to iron deficiency. In females, the highest prevalence of iron deficiency anemia is between 12-15 years old when requirements are at a peak.⁵ In Indonesia, the proportion of anemia in women (23.9%) was higher than men

(18.4%). The proportion of anemia in the 15-24-year age group was 18.4% in 2013.⁶ While in 2018, the proportion of anemia in women (27.2%) was still higher than men (20.3%), and the proportion of anemia in the 15-24-year age group was 32%.⁷

Adolescent children are one of the major risk groups for anemia. The prevalence of anemia among adolescents is 27% in developing countries, and 6% in developed countries.⁸ Children and adolescents are particularly susceptible to iron deficiency anemia and iron deficiency because of their rapid growth and puberty. Teenage girls are at risk because of chronic blood loss from menstruation. Low socioeconomic status in children and adolescents is also a strong risk factor for experiencing iron deficiency because of low iron intake and food low in bioavailable iron, which can be worsened by chronic blood loss due to parasitic infections and malaria. Other factors such as iron malabsorption from gastrointestinal problems can cause anemia in older children and adolescents.⁹

Teenagers need adequate supply of iron as there is an increase of nutrient requirements for growth compared to other age groups. The consequences of anemia in adolescents vary based on the severity of anemia. Studies showed that even the early stage of iron deficiency can affect motor and cognitive abilities. It also causes behavior disturbances in children that may be irreversible.^{10,11,12} Iron deficiency anemia in adolescence also has a wide range of consequences, such as impaired physical and mental growth and development as well as

reduced physical fitness, work capacity, and school performance, as it can affect concentration of learning.^{9,13}

Therefore, it is important to prevent anemia at its earliest stage. To prevent anemia in teenagers, knowledge and education about anemia become essential. Poor knowledge can affect eating behavior and sanitation, which ultimately can affect food intake containing adequate iron and parasitic infections. In Indonesia, there are several studies in different city regarding knowledge about anemia among adolescents. One of them conducted in Surakarta, this study showed 76% adolescents have poor knowledge about anemia.¹⁴ Study in Lampung also showed 54% adolescents have poor knowledge about anemia.¹⁵ This research aims to describe level of Hb and knowledge regarding anemia and its prevention among adolescents in Palembang.

2. Methods

The type of this research is a descriptive study with a cross-sectional method. This study held on November 2019. The respondents consisted of 42 adolescents who were studying in SMPN 9 Palembang, selected by simple random sampling technique. All respondents took informed consent before fulfilling the questionnaire. The variable under study was Hb level and knowledge level of adolescents regarding anemia and its prevention. For Hb level, data were collected by direct examination of Hb using Hb meter. Blood is drawn from the capillaries of the fingers and immediately examined using a Hb meter. For knowledge level, data were collected using self-questionnaire.

Respondents filled a total of ten multiple choice questions related to anemia and its prevention. One point will be added for the right answer and zero points for the wrong answer, score 60 as a cut-off point. Respondents that have score ≤ 60 classified as poor knowledge, while score > 60 classified as good knowledge. The pilot study was conducted with 10 adolescents. The reliability of tool was established by Karl Pearson's technique and the reliability was calculated to be 1.03. Collected data was analyzed using descriptive statistics including frequency and percentage.

3. Result

The age of the respondents ranged from 12-13 years-old, consisting of 15 (36%) boys and 27 (64%) girls. Most of the participants are 13 years-old (62%), while 38% are 12 years-old. The mean value of Hb level in all adolescent was 13.78 g/dL, with minimum value of Hb level was 11.1 g/dL and a maximum value Hb level was of 15.7 g/dL. Based on Table 1, it can be seen that the mean value of hemoglobin levels for adolescent boys was 14.04 g/dL with minimum value of Hb level was 11.7 g/dL and a maximum value Hb level was of 15.6 g/dL. The mean value of hemoglobin levels for adolescent girls was 13.64 g/dL with minimum value of Hb level was 11.1 g/dL and a maximum value Hb level was of 15.7 g/dL.

Table 1. The mean, minimum, maximum hemoglobin levels in adolescents based on gender

Gender	Mean	Min	Max
Male	14.04	11.7	15.6
Female	13.64	11.1	15.7

Table 2 shows the distribution of anemia by gender. It appears that anemia is more common found in boys than girls. Anemia is categorized if the Hb level is less than 13 g/dL in male, while in female less than 12 g/dL. All respondents with anemia were categorized as mild anemia with an Hb level of more than 10 g/dL.

Table 2. Distribution of anemia by gender

Gender	Anemia (%)	Normal (%)	Total (%)
Male	4 (10)	11 (26)	15 (36)
Female	1 (2)	26 (62)	27 (64)
Total	5 (12)	37 (88)	42 (100)

For knowledge level, the results showed that 32 (76%) adolescents had knowledge score ≤ 60 which mean poor knowledge, while 10 (24%) adolescents had scores > 60 which mean good knowledge.

However, this study did not analyze the association between knowledge level and anemia level. It is necessary to carry out further research with a different research design with an appropriate number of samples.

4. Discussion

This study showed majority of the respondents have poor knowledge regarding anemia and its prevention. Several studies showed significant association between knowledge and prevention of anemia. Study by Karmakar et al. (2014) showed that providing proper knowledge on the healthful diet, improved lifestyle, and harmful effect of anemia can prevent anemia in the students.¹⁶ Similarly, a study by Alaofe et al. (2009) found that nutrition education can increased iron

uptake.¹⁷ Gracy (2017) showed in her study that knowledge score regarding prevention of anemia related to demographic variable such as religion, educational status, and socio-economic status. That study showed 53% majority of respondents were not having knowledge regarding anemia.¹⁸ Inadequate knowledge regarding prevention of anemia also can be caused by the lack of health promotion or health education from environment and also limited resources from mass media.¹⁵

In the other hand, study by Ahwal (2016) showed that the prevalence of anemia was quite high, but not related to knowledge, implying that there are numerous factors other than knowledge could lead to increased prevalence of anemia among adolescents. Similarly, significant positive associations were also found between Hb concentration and educational levels.¹⁹ Study by Johnson (2016) also showed that knowledge score regarding prevention of anemia not related to demographic variable, majority of the respondents have adequate knowledge of anemia.²⁰

Knowledge related anemia and its prevention can be improved by several educational program and health promotion. Study by Sari (2018) showed significant improvement in respondents' knowledge level from 20% to 90%, which considered as good level, in intervention group after counselling program.²¹

5. Conclusion

This study has found that the mean value of Hb level in all adolescent was 13.78 g/dL with 12% of respondents had anemia. This study also concludes

that majority (76%) of the study sample had poor knowledge on prevention of anemia so it is advisable to provide educational programs for the adolescent regarding prevention of anemia. Efforts related to health education, especially regarding anemia in adolescents, need to be done, so that the incidence of anemia in adolescents can be prevented.

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