RESEARCH ARTICLE **Open Access**

Gema Lingkungan Kesehatan
Vol. 23, No. 2 (2025), pp 197-202
e-ISSN 2407-8948 p-ISSN 16933761
Doi: https://doi.org/10.36568/gelinkes.v23i2.252 *Journal Hompage: https://gelinkes.poltekkesdepkes-sby.ac.id/*

Factors influencing the prevalence of anaemia in teenage girls in the workplace of Abiansemal III Community Health Center, Bali

Luh Putu Widiastini*, I Gusti Agung Manik Karuniadi

Study Program of Midwifery, STIKES Bina Usada Bali, Bali, Indonesia

*Correspondence: enick.dilaga@gmail.com

ABSTRACT

Anemia is a global health problem that has a serious impact, especially on children, adolescent girls, menstruating women, and pregnant and postpartum women. Approximately 30% of women aged 15-49 years in the world experience anemia. Efforts to prevent anemia are focused on vulnerable groups, including adolescent girls, one of which is through the provision of Blood Addition Tablets, although its implementation still faces various obstacles. In addition, other factors such as lack of knowledge, attitudes, and poor menstrual patterns also contribute to the high incidence of anemia. The purpose of this study was to analyze the factors that influence the incidence of anemia in adolescent girls. A quantitative research methodology with a cross-sectional approach was used. The sample selection technique was non-probability sampling, namely, purposive sampling. A total of 85 adolescent girls who attended adolescent posyandu were selected as the samples. The young women completed a questionnaire and had their hemoglobin levels measured. Spearman's rho test and logistic regression were used for the analysis. Based on the results of Spearman's rho analysis, 12 respondents were anemic, 9 respondents had a fair attitude, and 3 respondents had a good attitude. Logistic regression analysis showed that attitude was the dominant variable (p = 0.000). Based on the OR value obtained of 18.492, then the poor attitude of adolescent girls has an 18.492 times greater chance of causing anemia in adolescent girls

Keywords: Anemia, Attitude, Hemoglobin, Teenage girls

INTRODUCTION

A disease known as Anemia occurs when the quantity of red blood cells or the amount of hemoglobin present in them is less than usual. Since hemoglobin is necessary for the transport of oxygen to the body's tissues, an abnormally high or low red blood cell count reduces the blood's ability to transport oxygen. Shortness of breath, weakness, exhaustion, and light-headedness are some of the symptoms that this illness may produce. According to WHO estimates, anemia affects 30% of women globally between the ages of 15 and 49 (World Health Organization (WHO), 2023). In Indonesia, the prevalence of anemia remains high. According to the 2018 Riskesdas data, 32% of adolescents have anemia, which means that 3–4 out of 10 of them are anemic (Kementerian Kesehatan Republik Indonesia, 2021). This is affected by patterns of inadequate dietary consumption and inactivity (Widyawati, 2023). Adolescent girls have a higher risk of anemia due to rapid physical growth and the onset of menstruation, which can increase the risk of iron deficiency (Janah & Ningsih, 2021; Seyoum et al., 2019). The longer a woman menstruates, the more blood she bleeds, and the more iron she loses (Sepduwiana & Sianipar, 2018).

Adherence to blood supplement tablets (BST) is linked to the high incidence of anemia; 8.3 million of the 12.1 million teenage females do not take BST (Kementrian Kesehatan Republik Indonesia, 2022). Anemia is a risk factor for cognitive impairment and has a negative impact on cognitive function (Anisa et al., 2019), productivity, immunity, focus, learning success, and fitness. Teenage females with anemia are susceptible to developing anemia during pregnancy. Pregnant women with anemia may experience persistent lack of energy. Pregnant women who experience chronic energy deficiencies may experience pregnancy and delivery problems, which may increase the risk of low birth weight (LBW) infants, stunting, and maternal and infant mortality (Direktorat Jenderal Kesehatan Masyarakat, 2018).

Efforts to overcome nutritional anemia are prioritized in vulnerable groups, namely, pregnant women, toddlers, school-age children, women of childbearing age, including adolescent girls, and female workers. In 2020, Badung district recorded the achievement of the provision of Blood Addition Tablets to overcome anemia in adolescent girls, which is routinely provided by the government once a week by 99.7% (Dinas Kesehatan Provinsi Bali, 2020).

Based on research conducted by Febianingsih et al. (2019), the prevalence of iron deficiency anemia among adolescent girls at SMAN I Abiansemal in 2019 was 71.3%.

The unsuccessful Blood Addition Tablet program conducted by the government to prevent anemia in adolescents is only one of the factors supporting the occurrence of anemia in adolescent girls. Other factors causing anemia are the low knowledge of adolescent girls about anemia and iron deficiency in the body. Adolescent girls also have a higher risk of anemia because they experience monthly menstruation. In addition to the above factors, supporting factors for anemia in adolescent girls can also be seen in attitudes and menstrual patterns.

From preliminary studies conducted by researchers in June 2023 in the work area of Abiansemal III Community Health Center, especially in Darmasaba Village, Sibanggede Village and Sibang kaja out of 360 adolescents, 68 adolescent girls experienced mild anemia. Based on the aforementioned rationale, researchers are interested in investigating the causes of anemia in teenage girls and determining how attitudes, menstrual patterns, and knowledge of anemia relate to its prevalence in teenage girls. The specific specifications of this study related to the research scheme are that this research is in the form of basic research in the form of proof of concept with cross-sectional methods, which are expected to produce new information about the factors that cause anemia in adolescent girls, which are used for scientific development so that it becomes the basis for implementing interventions related to these problems.

RESEARCH METHODS

In order to identify the factors that affect the incidence of anaemia in teenage girls, this study used a quantitative approach with an analytical cross-sectional design, measuring or observing all dependent variables (adolescent girls) with independent variables (Hb results, nutritional status, knowledge, attitudes, and menstrual patterns) carried out simultaneously (Sugiyono, 2017)

This study will be conducted in the Working Area of Abiansemal III Community Health Center for three months, namely, March to May 2024. The population in this study included all adolescent girls who visited the adolescent posyandu, with 368 respondents. The sample selection technique was non-probability sampling, namely purposive sampling, with the following criteria:

Inclusion criteria: Adolescent girls who had a check-up at the adolescent health center and were well aware and able to communicate. Exclusion criteria: Adolescent girls who were not willing to respond. This research has passed the ethical test from KEPK STIKES Bina Usada Bali with Ethical Approval No. 081/EA/KEPK-BUB-2024.

The number of samples was determined using the Slovin formula: 84.63, rounded up to 85 respondents.

Primary data were collected by filling out a questionnaire containing a list of questions about nutritional status, knowledge, attitudes, and menstrual patterns submitted to respondents to be answered in writing, while Hb results were obtained through Hb examination. Data analysis in this study was used to describe the characteristics of each variable, bivariate analysis using the Spearman rho statistical test, and Multivariate Analysis using Exploratory Factor Analysis (EFA) and logistic regression with SPSS version 17.

RESULTS AND DISCUSSION

1. Univariate Analysis

Table 1

Characteristics of Respondents based on Age, Weight, Height, Haemoglobin Check Result, Nutritional Status, Menstrual Pattern, Knowledge, Attitude

No	Variable		Mean	Std. Deviation	N	%
1	Age	12 years	12.47	0.502	45	52.9
		13 years			40	47.1
2	Weight	26-45 Kg	46.62	9.585	41	48.2
		46-65 Kg			41	48.2
		66-85 Kg			3	3.5
3	Height	121-145	153.4	7.216	9	10.6
		146-160			64	75.3
		161-175			12	14.1
4	Haemoglobin Check Result	Anemia (1)	1.72	0.453	24	28.2
		Normal (2)			61	71.8
5	Nutritional Status	Undernourished (1)	2.29	0.614	2	2.4
		Adequate Nutrition (2)			61	71.8
		Good Nutrition (3)			17	20
		Obesity (4)			5	5.9
6	Menstrual Pattern	Not normal (1)	1.96	0.186	3	3.5
		Normal (2)			82	96.5
7	Knowledge	Less (1)	2.69	0.535	3	3.5
		Fair (2)			20	23.5
		Good (3)			62	72.9
8	Attitude	Less (1)	2.52	0.750	13	15.3
		Fair (2)			15	17.6
		Good (3)			57	67.1

Total			**85**	**100**

According to Table 1. As can be observed from the 85 respondents, 45 (52.9%) were 12 years old adolescent girls, the average body weight (BB) was 47 kg, the average height (TB) was 153 cm, 24 suffered from anemia, 61 had an average nutritional status, 82 had normal menstrual patterns, 62 had good knowledge, and 57 had good attitudes. Adolescents often experience anemia due to an increase in iron demand due to growth and menstruation (Deivita et al., 2021). In most poor nations, two of the main risk factors for iron deficiency anemia in adolescents are the growing ages of teenage females and their low educational attainment (Ocktariyana et al., 2024).

2. Bivariate Analysis

Table 2
Analysis using Spearman's rho on factors influencing the incidence of anemia in adolescent girls in the Working Area of Abiansemal III Community Health Center

Variable		**Haemoglobin Check Result**		**Sig**
		Anemia	**Normal**	
Nutritional Status	Undernourished	0	2	0.167
	Adequate Nutrition	21	40	
	Good Nutrition	2	15	
	Obesity	1	4	
Menstrual Pattern	Not normal	1	2	0.844
	Normal	23	59	
Knowledge	Less	2	1	0.002
	Fair	10	10	
	Good	12	50	
Attitude	Less	12	1	0.000
	Fair	9	6	
	Good	3	54	
Total		24	61	

Based on 2, the results of the descriptive analysis of 85 respondents, the characteristics of respondents based on age in this study were 12 years as many as 45 people (52.9%), while those aged 13 years were 40 people. This is in line with the statement from the Ministry of Health of the Republic of Indonesia (Kemenkes RI, 2022) that adolescents are the age group between 10 years and before 18 years of age. The average body weight (BB) of adolescent girls was 47 kg, and the average height (TB) was 153 cm. Based on this, the average body weight of adolescent girls was included in the ideal category, with an average result of adequate nutritional status of 61 people. This is in accordance with the statement from the Directorate General of Health Services of the Indonesian Ministry of Health regarding the calculation of nutritional status in adolescent girls (Direktorat Jendral Pelayanan Kesehatan 2022). Of the 85 adolescent girls, 24 experienced anemia, based on the results of a literature study conducted by Saraswati et al. (2022), which found that adolescent girls have a higher risk of anemia due to rapid physical growth and the onset of menstruation, which can increase the risk of iron deficiency. normal

infectious agents as triggers have a direct impact on anemia (Shariff & Akbar, 2018). Although many studies

menstrual patterns as many as 82 people, good knowledge as many as 62 people and good attitudes as many as 57 people based on the characteristics above this study is in line with research (Astuti, 2023; Elisa & Oktarlina, 2023; Sari et al., 2022) that there are several factors that influence the incidence of anemia in adolescent girls such as body weight, nutritional status, menstrual patterns, knowledge and attitudes of adolescent girls.

Based on the results of the analysis using the Spearman's rho test, it is known that adolescent girls who have undernutrition are two people with normal conditions (not anemic), with good nutrition as many as 61 people, experiencing anemia as many as 21 people, overnutrition as many as 17 people, with anemic conditions two people, and obesity five people with anemic conditions one person, with a sig value of 0.167, which means that there is no relationship between the incidence of anemia and nutritional status. This is in line with the study conducted by Gore et al. (2024), which revealed no discernible link between dietary status and the prevalence of anemia. In essence, regularly consuming foods low in iron and being exposed to

have linked the incidence of anemia to nutritional status, it should be noted that a good nutritional status does not

guarantee the absence of anemia. The most common causes of anemia are deficiencies in iron, folic acid, and vitamins B12 and A. This problem can be exacerbated by conditions of impaired absorption of nutrients caused by celiac disease or Crohn's disease. Several chronic conditions, such as chronic kidney disease, liver disease, and cancer, can also cause anemia through various mechanisms, such as reduced production of erythropoietin (a hormone that stimulates the formation of red blood cells) or the toxic effects of treatment (World Health Organization, 2021).

According to the published data, three respondents had monthly pattern disorders, one had anemia, two had normal conditions, 82 did not have menstrual pattern disorders, and 23 had anemia. According to the Spearman rho test results, the p-value was 0.844, indicating that there was no correlation between the incidence of anemia in teenage females in the UPTD Puskesmas Abiansemal III Working Area and monthly patterns. This is in line with research conducted by Nugraheni et al. (2023), who showed that individuals with normal and atypical menstrual cycles do not differ in their adherence to taking iron supplements.

There was a correlation between knowledge and the incidence of anemia in teenage girls in the UPTD Working Area, as indicated by the Spearman's rho analysis results, which showed that 12 respondents with anemia had inadequate knowledge and 12 respondents with good knowledge. The p value was 0.02. This research is in line with that conducted by Abu-baker et al. (2021), who found that good knowledge can prevent the incidence of anemia. This is also supported by research conducted by Oktariana et al. (2021), who found that most adolescents with less knowledge about anemia and its prevention have low hemoglobin (anemia). Knowledge is a key parameter for changing attitudes and practices to prevent anemia. Knowledge level affects the prevalence of anemia in adolescent girls. The majority of adolescent girls have a low level of knowledge which can increase the prevalence of anemia (Kaur & Chatterjee, 2021)

Based on the results of the Spearman's rho analysis, it is known that respondents who experienced anemia with a poor attitude were less than 12, with a sufficient attitude as many as 9, and with a good attitude as many as 3, with a p-value of 0.000, which means that there is a relationship between attitude and the incidence of anemia in adolescent girls in the Working Area of UPTD Puskesmas Abiansemal III. Increasing school-based health education is effective in improving knowledge, attitudes, and behavior in preventing anemia, which can make a real contribution to overcoming priority public health problems (Ariana & Fajar, 2024).

3. Multivariate Analysis

a. Exploratory Factor Analysis (EFA)

The factor analysis in this research can proceed as it satisfies the conditions, as indicated by the result above, hich shows that the KMO MSA value is 0.512>0.5, and the Bartlett's Test of Sphericity (Sig) value is 0.00<0.05.

Table 3

KMO and Bartlett's Test about the factors that influence the incidence of anemia in adolescent girls in the Working Area of Abiansemal III Community Health Center

KMO and Bartlett's Test	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.552
Bartlett's Test of Sphericity (Sig.)	0.00

b. Logistic regression analysis

Table 4

Logistic regression analysis of factors influencing the incidence of anemia in adolescent girls in the Working Area of Abiansemal III Community Health Center

Variabel	Exp(B)	Sig
Knowledge	0.424	0.315
Attitude	18.492	0.000

According to the analysis's findings, there is only one dominating variable—the attitude variable, with a p-value of 0.000 < 0.05—among all the independent factors that are believed to influence the frequency of anemia in teenage females in the UPTD Puskesmas Abiansemal III Working Area. The highest OR value was 18.492, indicating that teenage girls in the UPTD Puskesmas Abiansemal III Working Area have an 18.492-fold increased risk of developing anemia. This research is in line with the research conducted by Agustina et al. (2021), which showed that strategies to reduce the risk of anemia in this population should incorporate improvements in Knowledge, Attitude, and Practices (KAP) with other nutritional interventions that are known to be effective. Adolescent girls' improved attitudes, subjective norms, perceived behavioral control, and intentions further improved their behavior in preventing anemia. Therefore, in order to increase the promotion of anaemia prevention, educate people about early identification of anaemia, particularly in teenage girls, and conduct more research to identify efficient health promotion strategies, cooperation from a variety of parties is required (Zaqiyah & Puspitasari, 2022)

CONCLUSIONS

According to the Spearman rho test analysis, only knowledge and attitudes were linked to the occurrence of anemia, with a p-value of 0.000 <0.05. According to the findings of the logistic regression, attitude was the dominant variable (p-value 0.000 <0.05), indicating a correlation between attitude and the prevalence of anemia in teenage females in the UPTD Puskesmas Abiansemal III Working Area. The highest OR value was 18.492, indicating that teenage girls in the UPTD Puskesmas Abiansemal III Working Area have an 18.492-fold increased risk of developing anemia.

SUGGESTION

Effective education is needed not only to improve knowledge and attitudes about things that need to be considered in the prevention of anemia.

REFERENCES

Abu-baker, N. N., Eyadat, A. M., & Khamaiseh, A. M. (2021). The impact of nutrition education on knowledge , attitude , and practice regarding iron de fi ciency anemia among female adolescent students in Jordan. *Heliyon*, *7*(2), e06348. [Crossref], [Publisher]

Agustina, R., Wirawan, F., Sadariskar, A. A., Ked, S., Setianingsing, A. A., Nadiya, K., Prafiantini, E., Asri, E. K., Purwanti, T. S., Kusyuniati, S., & Karyadi, E. (2021). Associations of Knowledge , Attitude , and Practices toward Anemia with Anemia Prevalence and Height-for-Age Z-Score among Indonesian Adolescent Girls. *Sagepub*, *42*(6). [Crossref], [Publisher]

Anisa, N., Wahyuni, S., Rahayu, S., Choirunnisa, A., & Martanti, listyaning eko. (2019). Effect of moringa leaves and vitamin c capsule combinations in increaseing hemoglobin levels of young women with anemia. *Journal Proceedings of International Conference on Applied Science and Health*, *4*(4), 565–570. [Publisher]

Ariana, R., & Fajar, N. A. (2024). Analysis of Anemia Risk Factors among Adolecsent Women : Literature Review. *Journal of Community Health*, *10*(November 2022), 133–140.

Astuti, E. R. (2023). Literature Review: Faktor-Faktor Penyebab Anemia pada Remaja Putri. *Jambura Journal Of Health Science And Research*, *5*(2), 550–561. [Crossref], [Publisher]

Deivita, Y., Syafruddin, S., Andi, U., & Aminuddin, A. (2021). Overview of Anemia ; risk factors and solution offering. *Gaceta Sanitaria*, *35*, S235–S241. [Crossref], [Publisher]

Dinas Kesehatan Provinsi Bali. (2020). *Laporan Kinerja Dinas Kesehatan Provinsi Bali*. [Publisher]

Direktorat Jendral Pelayanan Kesehatan. (2022). *Indeks Massa Tubuh Remaja*. Kemenkes RI.

Direktur Jenderal Kesehatan Masyarakat. (2018). *Pedoman Pencegahan dan Penanggulan Anemia pada Remaja Putri dan Wanita Usia Subur (WUS)*. Kementrian Kesehatan Republik Indonesia. [Publisher]

Elisa, S., & Oktarlina, R. Z. (2023). Literature Review : Faktor Penyebab Kejadian Anemia pada Remaja Putri. *Agromedicine*, 2018–2021.

Febianingsih, N. P. E., Putra, K. A. D., Putra, G. Y., C, I., & Pujana, W. (2019). Prevalensi Dan Faktor Risiko Anemia Pada Remaja Putri Di Sman I Abiansemal Badung. *Bali Health Published Journal*, *1*(1), 52–62. [Crossref], [Publisher]

Gore, M. N., Gore, M. N., Drozd, M. E., & Patil, R. S. (2024). Anemia Prevalence and Socioeconomic Status among Adolescent Girls in Rural Western India : A Cross-Sectional Study. *Ethiop J Health Sci*, *34*(1). [Crossref], [Publisher]

Janah, M., & Ningsih, S. (2021). Hubungan Antara Status Gizi Dengan Kejadian Anemia Pada Remaja Putri The Correlation Between Nutritional Status With The Incidence Of Anemia In Adolescent Girls. *IJMS-Indonesian Journal On Medical Science*, *8*(1), 39–44. [Crossref], [Publisher]

Kaur, V., & Chatterjee, A. (2021). A Study to Assess the Prevalence of Anemia and Knowledge Regarding Anemia among Adolescent Girls of Selected Schools of Gurugram , Haryana. *Indian Journal of Forensic Medicine & Toxicology*, *15*(4), 1522–1529. [Crossref], [Publisher]

Kemenkes RI. (2022). *Remaja 10-18 Tahun*. Kemenkes RI. [Publisher]

Kementerian Kesehatan Republik Indonesia. (2021). *Remaja sehat komponen utama pembangunan sdm indonesia*. Kementerian Kesehatan Republik Indonesia. [Publisher]

Kementrian Kesehatan Republik Indonesia. (2022). *Remaja Bebas Anemia_ Konsentrasi Belajar Meningkat, Bebas Prestasi*. Kementerian Kesehatan RI. [Publisher]

Nugraheni, A. N., Latifah, E., Wijayatri, R., & Magelang, U. M. (2023). Influence of Knowledge Level about Anemia and Menstrual Patterns on Adherence to Consumption Iron Supplement in Adolescents at A Public Senior High School in Magelang. *Pharmacon*, *XX*(X), 68–77. [Crossref], [Publisher]

Ocktariyana, Flora, R., Yuliastuti, M. E., Zulkarnain, & Lasepha, A. (2024). Risk Factors For Iron Deficiency Anemia Among Adolescents In Developing Countries: Study Literature Review. *Indonesian Journal of Global Health Research*, *6*(3), 1343–1354. [Crossref], [Publisher]

Oktariana, D., Lusiana, E., Tamzil, N. S., & Prasasty, G. D. (2021). Level of Haemoglobin and Knowledge Regarding Anemia and Its Prevention Among Adolescent. *Sriwijaya Journal of Medicine*, *4*(2), 117–122. [Crossref], [Publisher]

Saraswati, P. A. D., Widiastini, L. P., & Karuniadi, I. G. A. M. (2022). Studi Literatur Manfaat Moringa Oleifera Terhadap Anemia Pada Remaja Putri. *Jurnal Media Keperawatan: Politeknik Kesehatan Makassar*, *13*(1), 24–29. [Crossref], [Publisher]

Sari, P., Marhaeni, D., Herawati, D., Dhamayanti, M., & Hilmanto, D. (2022). Anemia among Adolescent Girls in West Java , Indonesia : Related Factors and Consequences on the Quality of Life. *Nutrients*, *14*, 1–13. [Crossref], [Publisher]

Sepduwiana, H., & Sianipar, R. (2018). Hubungan Lama Menstruasi Terhadarp Kadar Hemoglobin Pada Mahasiswi Di Prodi D-III Kebidanan Universitas Pasir Pengaraian. *Maternity and Neonatal*, *2*(5), 318–324.

Seyoum, Y., Humblot, C., Nicolas, G., Thomas, M., & Baye, K. (2019). Iron deficiency and anemia in adolescent

girls consuming predominantly plant-based diets in rural Ethiopia. *Scientific Reports*, *9*(1), 6–11. [Crossref], [Publisher]

Shariff, S. A., & Akbar, N. (2018). Hubungan Antara Status Gizi Dan Pola Menstruasi Dengan Kejadian Anemia Pada Mahasiswi 34 | Penerbit : Pusat Kajian dan Pengelola Jurnal Fakultas Kesehatan Masyarakat Universitas Muslim Indonesia Window of. *Window of Health*, *1*(1), 34–39. [Crossref], [Publisher]

Sugiyono. (2017). *Metode Penelitian Kuantitatif, Kualitatif, dan R & D* (26th ed.). Alfabeta.

Widyawati. (2023). *Remaja Sehat Komponen Utama Pembangunan SDM Indonesia*. Kementrian Kesehatan RI. [Publisher]

World Health Organization. (2021). *Anaemia*. World Health Organization. [Publisher]

World Health Organization (WHO). (2023). *Anaemia*. WHO. [Crossref], [Publisher]

Zaqiyah, H., & Puspitasari, G. (2022). Anemia prevention behavior in female adolescents and related factors based on Theory of Planned Behavior : A cross-sectional study. *Ners*, *17*(1), 25–30. [Publisher]