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Analysis of Factors Related to the Rate of Anemia in Adolescent Girls in Mtsn 1 Blitar City

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ABSTRACT

Adolescents frequently suffer from anemia, which can impair their ability to learn, stay physically fit, work, have a healthy immune system, and regulate their body temperature. Using a quantitative cross-sectional methodology, this study examined variables linked to the degree of anemia in female students at MTsN 1 Blitar City. Using the Slovin formula as a guide, 44 students were chosen by purposive sampling out of 50 who had mild anemia at the March hemoglobin screening. Iron consumption, knowledge, nutritional condition, and menstrual duration were all assessed using a standardized questionnaire. Ordinal regression was used to analyze the data. The findings showed no significant correlation between the degree of anemia and menstrual duration (Wald=0.879, p=0.348) or nutritional condition (Wald=0.231, p=0.631). However, iron consumption (Wald=11.575, p=0.001) and knowledge (Wald=4.407, p=0.021) demonstrated significant correlations, indicating that dietary and cognitive characteristics may be more directly related to this cohort than anthropometric status or menstrual cycles. These results highlight the value of dietary and educational approaches in the treatment of teenage anemia. Implications include discouraging inhibitors such excessive tea or coffee and promoting school-based activities that increase understanding about anemia, iron-rich meals, and absorption enhancers. Peer education, individual or group counseling, and teacher-facilitated modules included into health curriculum are all realistic choices. Institutions may test healthy-lunch programs with iron-dense menus and vitamin C pairings, backed by monitoring, feedback, and adherence checks, to supplement instruction. Future studies should examine contextual barriers to dietary change, use controlled designs to assess the efficacy of these interventions, and combine objective biomarkers with questionnaires. Improving iron intake and expanding understanding may provide long-term, scalable solutions to lessen the severity of anemia in teenage girls.

Keywords: Anemia, Adolescent Girls, Factors, menstrual period, Zinc.

INTRODUCTION

A condition known as anemia occurs when the blood's hemoglobin (Hb) content is below normal. Because anemia is a shortage of red blood cells, or erythrocytes, it is known as a lack of blood. Adolescent girls between the ages of 12 and 15 typically have a hemoglobin level of 12 g/dl (Taufiqa, 2020). Adolescent girls who suffer from anemia experience

stunted growth, a body that is more susceptible to infection during the growing stage, a drop in fitness and freshness, and a diminished desire to learn or succeed (Apriyanti, 2019). According to World Health Organization (WHO) data from 2018, the incidence of anemia among adolescent girls in underdeveloped nations is approximately 53.7% of all adolescent girls, with the prevalence of anemia among adolescents worldwide ranging from 40 to 80% (Alfaridh et al., 2019). The prevalence of anemia in Indonesia among those aged 5 to 14 is 26.8%, while among those aged 15 to 24, it is 32%, according to Riskesdas statistics from 2018. Anemia affects 50–60% of East Javan adolescent girls, according to data from the East Java Provincial Health Office (Asrina et al., 2021).

The incidence rate of anemia in teenage girls in Blitar City is approximately 46.01%, with mild cases being classified as 30.72%, medium cases as 14.98%, and severe cases as 0.30%, according to statistics from the city's health office in 2023. Drawing from the initial research conducted at MTSN 1 Blitar City, the findings of teacher interviews.

Blood supplement pills (TTD) are administered once a week by the Person in Charge of the School Health Unit (UKS) at MTSN 1 Blitar City, who is connected to the Blitar City Health Office via the Sukorejo Health Center UPT. Students in the 7th, 8th, and 9th grades often take these blood-boosting tablets on Tuesdays, Wednesdays, and Thursdays, respectively. Additionally, a nutritious lunch menu and information regarding anemia and blood supplement tablets have been given to the students. However, the Sukorejo Health Center's preliminary assessment of Hb level examination findings from 119 children on March 21, 2023, revealed that 50 children fell into the moderate anemia category and 69 children fell into the mild anemia category.

Adolescent girls' level of knowledge about anemia, iron intake, nutritional status, menstrual length, BMI (body period index), housing category (rural vs. urban), eating habits, and the presence of infections like malaria are all factors that are linked to the incidence of anemia in adolescent girls (Suandana et al., 2023).

According to the findings of a study by Listiana (2016), body mass index, knowledge, iron supplement consumption, and menstruation status all have an impact on iron deficiency anemia in teenage girls, with an incidence rate of 60.8%. According to the study's findings (Martini, 2015), 40% of 115 individuals had anemia in their teenage years. Maternal education, anemia awareness, and dietary status are factors that raise the incidence of anemia in teenage girls.

Both typical and non-typical signs and symptoms of anemia include: (1) Angularis stomatitis, dysphagia glossitis, hypodidia, coilonicia, and pagophagea are characteristic signs and symptoms of anemia. (2) Fatigue, anorexia, increased susceptibility to infections, specific behavioral abnormalities, poor cognitive function, and diminished job capacity are not common signs and symptoms of anemia (Ii & Pustaka, 2014).

Anemia is caused by a number of factors, including body mass index, knowledge, iron supplementation, and menstrual conditions, according to numerous research that have been conducted. In the meantime, schools and teenagers have taken a number of steps to prevent teenage anemia. In actuality, though, the examination results still show people with mild to moderate anemia.

Research Methods

This study uses a cross-sectional methodology and quantitative, correlational descriptive research to explain the factors associated with the anemia rate among teenage girls in MTsN 1 Blitar City. The study's population consisted of all 50 adolescent females who had mild anemia and had their hemoglobin levels checked in March at MTsN 1 Blitar City. There were

forty-four young ladies in the samples. Purposive sampling was used to collect the samples. The following are the sample's inclusion criteria: 1) Teenage girls who have gone through menstruation. 2) Young ladies suffering from anemia. The following are the exclusion criteria: 1) Adolescent females with blood problems diagnosed. The dependent variable is anemia in teenage girls, while the independent factors are the length of menstruation, nutritional status, iron consumption (Fe), and degree of knowledge.

The instrument in this study is a questionnaire to find out the length of menstruation is assessed abnormally if the menstrual length is 0 = > 8 days and 1 = normal if ≥3 days ≤8 days.weight scales, meters, and questionnaires for evaluating nutritional status in accordance with Ministry of Health BMI recommendations The questionnaire evaluates knowledge and yields a score of 0 = Very thin: <17, 1 = Skinny: 17- <18.5, 2 = Normal: 18.5 – 25.0, 3 = Fat: > 25 –27, and 4 = Obesity: > 27. A score of 1 is assigned for the right response on this knowledge test, while a score of 0 is assigned for the incorrect response. With a minimum score of 0 and a maximum score of 10, the score assessment is completed by adding up the respondents' results. The right number of respondents divided by the maximum score multiplied by 100% is then used to get the percentage of the respondents' results. Knowledge of good 70–100%, sufficient knowledge 50–70%, and knowledge less than 50% were the criteria used to characterize the results of the knowledge percentage. The scale for this iron intake inquiry was 0 = less if AKG was less than 100% and 1 = sufficient if AKG was greater than 100%. NutriSurvey2007 was used to conduct this iron assessment. A score of three indicated mild anemia (11.0–11.9 mg/dl), two indicated moderate anemia (8.0–10.9 mg/dl), and one indicated severe anemia (<8.0) With number 06/PHB/KEPK/175/10. 23, the Stikes Patria Husada Blitar Health Research Ethics Commission has evaluated this study.

Results and Discussion

Table 1. General age data of respondents.

Yes	Age	Frequency (f)	Present (%)
1	12	18	40.9
2	13	21	47.7
3	14	4	9.1
4			
5	15	1	2.3
	Total	44	100.0

Table 1 shows that the age distribution is lowest at 15 years old (one respondent, 2.3%), and highest at 13 years old (21 respondents, 47.7%).

Table 2. Analysis of anemia rates in adolescent girls

Yes	Anemia Rate	Frequency (f)	Present (%)
1	Severe anemia	4	9,1
2	Moderate anemia	19	43,2
3	Mild anemia	21	47,7
	Total	44	100.0

There were 21 respondents (47.7%) with mild anemia, 19 respondents (43.2%) with moderate anemia, and 4 respondents (9.1%) with severe anemia, according to the results of the hemoglobin level examination in adolescent girls, data collected by the Sukorejo Health Center UPT for 36 respondents, and examination data collected by researchers for 8 respondents.

Table 3. Analysis of the relationship between menstrual length and anemia rates in adolescent girls

Yes	Length of Menstruation	Anemia Rate						Total	
		Severe Anemia		Moderate Anemia		Mild Anemia			
		F	%	F	%	f	%	f	%
1	Abnormal	4	9	13	30	9	20	26	59
2	Usual	0	0	6	14	12	27	18	41
	Total	4	9	19	44	21	47	44	100

Table 3 shows that 13 respondents (30%) had the longest menstrual period, whereas 4 respondents (9%), who had the lowest levels of moderate and severe anemia, respectively, had the lowest levels. The Wald value (t) and its significance value are used to determine the outcomes of statistical analysis using the ordinal regression test. that the menstrual variable length is 0.879, with a significance level of 0.348 (> 0.05). This demonstrates that there is no correlation between teenage females' anemia and the length of their periods.

Table 4. Analysis of the relationship between nutritional status and anemia rates in adolescent girls

Yes	Nutritional Status	Anemia Rate						Total	
		Severe Anemia		Moderate Anemia		Mild Anemia			
		F	%	f	%	f	%	f	%
1	Very skinny	3	7	0	0	1	2	4	9
2	Thin	1	2	4	9	2	5	7	16
3	Usual	0	0	14	32	17	39	31	71
4	Fat	0	0	0	0	1	2	1	2
5	Obesity	0	0	1	2	0	0	1	2
	Total	4	9	19		21		44	100

Table 4 indicates that the nutritional status findings were above normal, with 17 responders (39%) having mild anemia. In the meantime, 1 respondent (2%), who was thin with severe anemia, very thin with mild anemia, obese with mild anemia, and obese with moderate anemia, had nutritional status. The Wald value (t) and its significance value are

used to determine the outcomes of statistical analysis using the ordinal regression test. that the sig. 0.631 (> 0.05) value for the nutritional status variable is 0.231. This demonstrates that there is no correlation between teenage females' anemia and their dietary state.

Table 5. Analysis of the relationship between knowledge level and anaemia rate in adolescent girls

Yes	Knowledge Level	Anemia Rate						Total	
		Severe Anemia		Moderate Anemia		Mild Anemia			
		F	%	f	%	f	%	f	%
1	Less	1	2	2	5	2	5	5	12
2	Enough	3	7	8	18	5	11	16	36
3	Good	0	0	9	20	14	32	23	52
	Total	4	9	19	43	27	48	44	100

Based on table 5, the study's findings demonstrated that the knowledge level with the greatest degree of anemia was at the knowledge level, while as many as 14 respondents (14%), had mild anemia. The knowledge level of one responder (1%), who has severe anemia, has the lowest score. The Wald value (t) and its significance value are used to determine the outcomes of statistical analysis using the ordinal regression test. The value of sig. 0.021 (< 0.05) indicates that the variable level of knowledge is 4.407. This implies that teenage females' anemia and their level of education are related.

Table 6. Analysis of the relationship between iron intake and the rate of anemia in adolescent girls

Yes	Iron Intake	Anemia Rate						Total	
		Severe Anemia		Moderate Anemia		Mild Anemia			
		f	%	f	%	f	%	f	%
1	Less	4	9	17	39	6	14	27	61
2	Enough	0	0	2	5	15	34	17	39
	Total	4	9	19	43	21	48	44	100

Table 6 shows that the greatest iron intake value was low, with 17 respondents (39%) having mild anemia. In contrast, two respondents (5%), with a mild anemia rate, had the lowest iron intake value, which was sufficient. The Wald value (t) and its significance value are used to determine the outcomes of statistical analysis using the ordinal regression test. that the iron intake variable has a value of 11.575 and a significance level of 0.001 (< 0.05). This indicates that iron consumption and anemia in teenage girls are related.

Identification of the analysis of factors of menstrual length related to the occurrence of anemia rates in adolescent girls

The average duration of abnormal menstrual periods was 26 students (59.1%) with anemia, according to the study's results, which examined factors related to the prevalence of anemia rates in teenage girls in MTsN 1 Blitar City. The Wald value (t) of 0.879 with a sig. 0.348 (>0.05) allowed for the conclusion that Ho was accepted and H1, indicating that there is no correlation between the length of menstruation and the degree of anemia in teenage girls in MTsN 1 Blitar City.

Research conducted by (Memorisa et al., 2020), teenage females at SMK PGRI 3 Kediri did not have a correlation between the length of their menstrual cycle and the prevalence of anemia. This research is in line with research conducted by (Pramesti & Permana, 2023), investigation, which found no connection between anemia and menstrual length.

An iron shortage may be the outcome of an excessive menstrual cycle, which often lasts longer than eight days and involves greater bleeding. Dizziness, fatigue, pale face, and firefly eyes are symptoms of low iron and red blood cell levels during menstruation, which can cause our organs and tissues to not receive enough oxygen. As a result, adolescents may find it harder to focus on their daily activities and learning (Nuraini 2014) in (Memorisa et al., 2020).

Women typically experience a menstrual cycle of 21–35 days, and only 10–15% experience a 28-day cycle with a duration of 3–5 days, with some reaching 7-8 days (Proverawati & Misaroh, 2009) in (Dwi Prayuni et al., 2018). Because it's possible that teenage females made the effort, researchers contend that the length of menstruation has no bearing on the prevalence of anemia in adolescent girls. Furthermore, the amount of menstrual blood produced does not always correlate with the length of the menstrual cycle. Therefore, it can be said that the length of the menstrual cycle is independent of the total amount of blood spent during the menstrual cycle.

Identification of the analysis of nutritional status factors related to the occurrence of anemia rates in adolescent girls

With a Wald value (t) of 0.231 and a sig. 0.631 (>0.05), the study's findings analyzed factors associated with the occurrence of anemia rates in teenage girls in MTsN 1 Blitar City. Based on these findings, it can be concluded that Ho was accepted and H1 was rejected, indicating that there is no relationship between nutritional status and the occurrence of anemia rates in teenage girls in MTsN 1 Blitar City.

Research conducted by (Nurazizah et al., 2022), discovered no significant correlation between teenage females' anemia incidence and their dietary state. This is due to the fact that the majority of the participants have normal nutritional status. This research is in line with (Adiyani et al., 2020), The incidence of anemia in teenage females attending SMK PGRI 4 Banjarmasin in 2017 did not significantly correlate with dietary status.

According to (Adiyani et al., 2020), It is important to evaluate nutritional status during adolescence. Measuring BMI (Body Time Index) is one method used to evaluate teenagers' nutritional status. The balance of nutrient intake, absorption, and use is known as nutritional status.

A poor diet, bad eating habits, and an overwhelming hatred of some foods are the main causes of poor or emaciated nutritional status. Teenagers, especially adolescent females, frequently aspire to have a thin body, which frequently contributes to nutritional inadequacies because they improperly implement dietary restrictions to preserve their slimness, failing to meet their nutritional demands (Adriani & Wirjatmadi, 2012).

Because nutritional status is determined by the body age index, which describes macronutrients, the researcher contends that there is no correlation between it and the prevalence of anemia in adolescents. In the meanwhile, micronutrient status describes anemia. Additionally, there was no correlation between the rate of anemia in teenage girls with the overall nutritional status of adolescents in this study.

Identify knowledge level factor analysis associated with the occurrence of anemia rates in adolescent girls

There was a factor of knowledge level of anemia, according to the findings of the factor analysis study on the prevalence of anemia rates

in teenage girls in MTsN 1 Blitar City. The Wald value (t) of 4.407 with a sig. 0.021 (< 0.05) indicated that Ho was rejected and H1 was accepted, indicating that there is a relationship between the level of knowledge and the prevalence of anemia levels in teenage girls in MTsN 1 Blitar City.

Research conducted by Lksmita and Yenie (2018), claimed that knowledge of anemia and anemia diseases are significantly correlated. Young women who know very little about anemia are at risk of developing anemia twice as frequently (Noor Kusnad, 2021).

This research is in line with (Permanasari et al., 2020), This study uses a cross-sectional methodology. Adolescent girls' hemoglobin levels at SMAN 05 Pekanbaru are linked to the findings of the study on the subject. Adolescent girls' attitudes and activities around preventing anemia will be influenced by their knowledge of the condition (Permanasari et al., 2020). Knowledge can influence a person's behavior, including their food and lifestyle choices, which can influence the incidence of anemia. Teenagers who are unaware about anemia's symptoms, effects, and prevention end up eating foods low in iron, which prevents them from getting the recommended amount of iron. (Martini, 2015).

In order to prevent anemia in teenage females in MTsN 1 Blitar City, the researcher believes that, in accordance with the theory and findings of the research that has been conducted, the more knowledge teenagers possess, the lower their anemia level. Young women's level of anemia will be impacted by their education since it influences their eating and lifestyle choices.

Identification of iron intake factors related to the occurrence of anemia rates in adolescent girls

According to the study's findings, which examined factors associated with the prevalence of anemia rates in teenage girls in MTsN 1 Blitar City, iron intake was found to be a factor in anemia rates. With a Wald value (t) of 11.575 and a sig. 0.001 (< 0.05), it was determined that Ho was rejected and H1 was accepted, indicating a relationship between iron intake and the prevalence of anemia rates in teenage girls in MTsN 1 Blitar City.

This research is in line with (Nabilla et al., 2022), The findings of the investigation into the connection between iron source consumption patterns and anemia status revealed a significant correlation between the occurrence of anemia among students at Al-Mizan Islamic Boarding School and iron source consumption patterns.

Adolescence is a critical period for development. The body cannot meet its iron needs if the food we eat does not include enough iron. This is because the food we eat does not contain enough iron, either in terms of quality or quantity. Iron anemia risk will rise if fruits, vegetables, and side dishes are not consumed.

According to (Waryana, 2010; Andriani, 2016) in (Setianingsih, 2023), Poor eating habits resulting from unhealthy family eating habits from infancy, adolescents' misconceptions of nutrition, such as restricting food intake to sustain weight loss, and a predilection for particular foods, such as just eating junk food, are some of the factors that contribute to nutritional issues in adolescents. Adolescent nutritional issues will have a detrimental effect on public health since they can reduce academic focus, physical freshness, and the likelihood of giving birth to BBLR babies.

According to the hypothesis and the research, the high incidence of anemia may be caused by inadequate consumption of foods high in iron, which lowers hemoglobin levels in the body, according to the researcher. Teenage girls in MTsN 1 Blitar City dislike vegetables with a lot of iron and frequently eat junk food.

Conclusion

The study found that iron consumption and knowledge level were associated with the degree of anemia in teenage girls, however

menstrual length and nutritional status were not associated with the degree of anemia.

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