PREVALENCE OF IRON DEFICIENCY ANEMIA (IDA) IN ADOLESCENT GIRLS

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Abstract

Background. Anemia is a condition when the number of red blood cells decreases to meet the physiological needs of the body. It is estimated that about 30% of the world's population suffers from anemia, and more than half of them are iron deficiency anemia. This review of various literatures intends to determine the prevalence of iron deficiency anemia in adolescent girls, which by knowing this we can determine more targeted prevention and treatment strategies.

Methods. The method used in this literature review is a literature search using keywords that match the topic through several databases such as PubMed, ScienceDirect and Google Scholar. The literature used is literature with a maximum publication year of 2019 or the last 5 years. The results obtained the prevalence of iron deficiency anemia in adolescent girls.

Discussion. All journals discussed the prevalence of iron deficiency anemia in adolescent girls with the majority using cross-sectional and NHANES methods. Key findings include that the prevalence of anemia varies based on factors such as age, nutrition, menstrual cycle, and level of knowledge. General strengths include valid and relevant data, while weaknesses include limited generalizability, lack of analysis of specific factors, and terms that are complicated for lay readers.

Conclusion. The prevalence rate of iron deficiency anemia in adolescent girls is still relatively low.

Keywords. Prevalence, Anemia, Iron deficiency, Iron, Hemoglobin, Adolescent girls.

Introduction

Anemia is a decrease in hemoglobin (Hb) or hematocrit (HCT) or the number of red blood cells.[1] Iron deficiency anemia is the most common cause of anemia worldwide, the cause of which varies by age, gender, and socioeconomic status. Iron deficiency can occur due to inadequate iron intake, decreased absorption, or blood loss.[2]

Anemia is a global public health problem that affects adolescent girls, women of childbearing age, pregnant women, and children in both developed and developing countries.[3] Anemia in adolescence can cause several adverse effects because adolescence is the formative years for development, anemia at this stage of life has several long-term consequences such as stunted growth, poor school performance, late onset of menstruation and irregular menstruation if it has already occurred.[4] Therefore, it is important to detect iron deficiency at the earliest stage by observing the prevalence of iron deficiency anemia.[5]

Methods

The methodology used by the author is a literature review using 5 internationally recognized academic journals that can be accessed through platforms such as PubMed, ScienceDirect, and Google Scholar. In terms of journal selection criteria, only publications released between 2019 and 2024 were selected to ensure that the information collected is relevant and up-to-date. During the literature search process, certain keywords were used, namely prevalence, anemia, iron deficiency, and adolescent girls. Furthermore, the selected journal must be in line with the topic symbolized by the specified keywords.

Discussion

From the five journals that the author has reviewed, there are various kinds of information obtained regarding the prevalence of iron deficiency anemia in adolescent girls.

Table 1. Literature Review of 5 Academic Journals About Prevalence of Iron Deficiency Anemia.

No.	Author and Year	Title	Research methods	Results
1.	Hibah, et al. (2023)	Prevalence of Undiagnosed Iron Deficiency	Cross-sectional observational study with data	The prevalence of iron deficiency anemia is relatively low. Based on

		Anemia and Associated Factors Among Female Undergraduate Medical Students in Makkah, Saudi Arabia	sources using primary survey, blood sampling, CBC and iron profiles, and statistical analysis.	the laboratory findings, the anemia group (13%) with hemoglobin (Hb) concentration <12 g/dL and non-anemia (84%) with Hb concentration ≥12 g/dL when compared showed significant differences in most RBC indices and iron profiles, p-value <0.05.
2.	Puspa, et al. (2022)	Iron Deficiency Anemia and Associated Factors Among Adolescent Girls and Women in a Rural Area of Jatinangor, Indonesia	Cross-sectional observational study with data sources using sociodemographic data, anthropometric measurements, and hemoglobin.	The prevalence of iron deficiency anemia among girls was 21.1% and 9.4% among women, with mean hemoglobin levels in adolescents of 10.75 g/dL (± 0.79) and in adults of 11.20 g/dL (± 0.61), while MCV was 74.49±8.22 fL in adolescents and 7.61±8.62 fL in adults. According to WHO, the prevalence of iron deficiency anemia in this study is a mild public health problem.
3.	Angela, et al. (2023)	Prevalence of Iron Deficiency and Iron-Deficiency Anemia in US Females Aged	National Health and Nutrition Examination Survey (NHANES) from 2003–2010 and	Based on the analysis, non-white race, Hispanic ethnicity, and menstruation were associated with iron deficiency and iron deficiency anemia. Lower

		12-21 Years, 2003-2020	2015–March 2020 (ferritin levels were not measured in 2011–2014) with data sources using interviews and physical examinations.	body mass index and poverty were also associated with iron deficiency. And food insecurity was associated with iron deficiency anemia.
4.	Nurhayati, et al. (2019)	Iron Deficiency Anemia and Current State of Knowledge Among Adolescent Girls, Lampung-Indonesia	Cross-sectional observational study with data sources using laboratory results to measure hemoglobin levels and knowledge of anemia with a questionnaire.	In this study, out of 87 female adolescents, 47 (54%) had poor knowledge about anemia and more than half, 44 (50.6%) had anemia. The results of the analysis using chi-square showed that there was a relationship between knowledge of anemia and cases of anemia with an Odd Ratio (OR) of 4.978, which means that female adolescents with good education will have a four times greater chance of not experiencing anemia than those with poor knowledge.
5.	Getachew, et al. (2019)	Iron Deficiency Anemia Among In-School Adolescent Girls in Rural	Cross-sectional observational study with data sources using structured	In this study, the prevalence of anemia was found to be 11.1%; of that number (95.8%) and (2.2%) experienced mild

		Area of Bahir Dar City Administration, North West Ethiopia	questionnaires covering sociodemographic characteristics, questions about knowledge, dietary practices, health, and nutritional status, blood sample research, Body Mass Index (BMI) calculation, and Dietary Diversity Score (DDS) calculation.	and moderate anemia. Anemia was found to be a mild public health problem in the study area.

Four of the five journals that have been reviewed used the same research method, namely a cross-sectional observational study and one journal that used a different research method, namely the National Health and Nutrition Examination Survey (NHANES). The first journal entitled "Prevalence of Undiagnosed Iron Deficiency Anemia and Associated Factors Among Female Undergraduate Medical Students in Makkah, Saudi Arabia" by Hibah, et al. (2023) identified the prevalence of undiagnosed iron deficiency anemia among young female students at the medical college of Umm Al-Qura University, Saudi Arabia.[6] Furthermore, the second journal entitled "Iron Deficiency Anemia and Associated Factors Among Adolescent Girls and Women in a Rural Area of Jatinangor, Indonesia" by Puspa, et al. (2022) examined iron deficiency anemia and associated factors in 95 adolescent girls and 85 healthy women, had lived in the study area for more than 1 year, were not pregnant, not breastfeeding, and had no history of thalassemia in any form during the study period in the rural area of Jatinangor, Indonesia.[7] Then the third journal entitled "Prevalence of Iron Deficiency and Iron-Deficiency Anemia in US Females Aged 12-21 Years, 2003-2020" by Angela, et al. (2023) examined the

prevalence of iron deficiency among 3490 adolescent girls with the aim of informing future screening strategies.[8] Next, the fourth journal entitled "Iron Deficiency Anemia and Current State of Knowledge Among Adolescent Girls, Lampung-Indonesia" by Nurhayati, et al. (2019) describes the relationship between iron deficiency anemia and current state of knowledge in 87 female adolescent students at SMPN 1 Mesuji.[9] And the fifth journal entitled "Iron Deficiency Anemia among In-School Adolescent Girls in Rural Area of Bahir Dar City Administration, North West Ethiopia" by Getachew, et al. (2019) assesses the prevalence of anemia and associated factors among school adolescent girls in rural towns of Bahir Dar City Administration, North West Ethiopia.[10]

Each journal has its own advantages and disadvantages, starting from the first journal which has the advantage of research targeting women of childbearing age who are susceptible to anemia and iron deficiency. Several biomarkers of anemia and iron status have been used and this study also examines biochemical, dietary, and anthropometric measurements with measures of anxiety and stress. The disadvantage is that sampling from only one university in the western region of Saudi Arabia limits the generalizability of the study to all women in the region or in Saudi Arabia. Self-reported data can result in errors due to either recall bias or social desirability bias.[6] The second journal has the advantage of research that presents many new findings, namely the prevalence of anemia in women is lower than in adolescents because education level affects the prevalence of anemia. Then the menstrual cycle, duration of menstruation, and use of sanitary napkins per day are not significantly related to anemia because menstruation is not the only cause of anemia. And this study can also explain why anemia in this study is more common in adolescents than in adults, one of which is inadequate nutritional intake. The disadvantage is that laboratory tests were not carried out for thalassemia which is one of the causes of microcytic anemia. Researchers did not examine the history of contraceptive use in adult women.[7] The third journal has the advantage of providing recommendations for appropriate screening strategies for the future and its disadvantages are the limitations of the study which include the limited granularity of racial and ethnic data and the potential for overfitting of the iron deficiency anemia model due to the small number of premenarche participants who experience iron deficiency anemia.[8] Then the fourth journal has the advantage of research results that are in accordance with the theory put forward by previous researchers, one of which is a study conducted by Caturiyantiningtiyas (2015) which shows a relationship between knowledge, attitudes, and behavior with the incidence of anemia in adolescent girls ($p = 0.03$) respondents who have less knowledge about anemia tend to

experience anemia and the disadvantage is that there has been no research on other factors related to cases of anemia from external and internal sources including parental income or adolescent diet.[9] The last journal has several advantages, including, the quality of data clarity is more guaranteed because training is provided to data collectors and supervisors regarding data collection procedures and techniques. Before the actual data collection, the questionnaire was first tested in schools outside the research area and several questions were modified to improve the clarity of the questions. And the completed questionnaires were reviewed and checked daily for completeness and consistency by the supervisor and principal investigator. This study describes the causes of iron deficiency anemia, then links its findings to previous studies in other regions and explains various possibilities as to why this may occur. For example, adolescent girls who menstruate ≥ 5 days are 2.4 times more likely to experience anemia compared to adolescent girls who menstruate < 5 days per cycle. This finding is in line with similar findings reported in the Tang ail region in Bangladesh, Guntur, Andhra Pradesh in India, rural district of Khordha, Odisha in India, and Western Kenya. This may be due to blood loss during menstruation. The researcher's unclear explanation reduces the clarity of the research results.[10] In general, the five journals have the same advantages and disadvantages. The advantages of each journal are supported by current research and valid and relevant data. The disadvantages of the five journals are the use of words or terms that are too complicated for lay readers, so they require a deeper understanding.

Conclusions

In this journal, the author raises the issue of the prevalence of iron deficiency anemia, where by knowing this we can determine more targeted prevention and treatment strategies. From the five journals that the author has reviewed, it can be concluded that the prevalence rate of iron deficiency anemia in adolescent girls is still relatively low. Although the prevalence rate is still relatively low, preventive measures are still important to be taken in order to maintain a healthy population by educating about iron deficiency anemia through counseling in schools and health communities, increasing iron intake from food or by consuming iron supplements if necessary, and conducting examinations and parasitic infections that may interfere with iron absorption. By taking these steps, the risk of anemia and iron deficiency in adolescent girls can be further minimized.

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