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Factors Influencing Attitude Making in The Prevention of Anemia in Female Adolescent: A scoping review

Isti Sulistyana Djati[1*], Sri Achadi Nugraheni[2], Ayun Sriatmi[3]
Universitas Diponegoro Semarang, Indonesia
Email: istisulistyanadjati77@gmail.com
*Correspondence

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ABSTRACT

Anemia is a significant health issue among adolescent girls, particularly in developing countries. This study aims to explore the relationship between nutritional knowledge and attitudes toward anemia prevention in adolescent girls through a scoping review. The research methods included a literature search from databases such as PubMed, SINTA, and ScienceDirect, with inclusion criteria comprising articles in English or Indonesian published between 2019-2024. Fifteen studies were selected for analysis based on these criteria. The results show that increasing nutritional knowledge, particularly regarding iron intake and balanced diets, can enhance positive attitudes toward anemia prevention. School-based nutrition education programs and innovative media have proven effective, although socioeconomic challenges and access to nutritious food remain obstacles. In conclusion, sustainable nutrition education interventions are essential to reducing the prevalence of anemia among adolescent girls.

Introduction

Anemia is a global health problem that deserves attention, especially in developing countries such as Indonesia. It is estimated that about 1/3 of the world's population suffers from anemia. The proportion of anemia in women is higher than in adolescent boys, so adolescent girls are one of the populations that are vulnerable to anemia problems. Anemia is defined as a reduced concentration of hemoglobin in erythrocytes. Anemia is measured by looking at a person's haemoglobin levels. Normal hemoglobin levels for women over the age of 15 years are >12.0 g/dl (>7.5 mmol) (Kusnadi, 2021).

The adolescent phase is a phase that is vulnerable to health risks, this is because in the adolescent phase, rapid body development occurs, so sufficient sources of nutrition are needed. However, nutritional needs are often ignored by adolescents, so there will be several health problems such as the incidence of anemia in adolescents.

Young women have a variety of activities, both inside and outside of school. This makes it difficult for teenagers to think about their meal schedules as well as the composition and nutritional content of the food they consume. As a result, teenagers often feel tired, weak, lethargic and powerless. Conditions that are quickly tired and lethargic can also be caused by anemia or lack of blood. Adolescent girls have a greater risk of developing anemia compared to adolescent men. This is because every month adolescent

girls experience menstruation. Where adolescent girls who experience heavy menstruation for more than five days are worried that they will lose more iron so they need replacement iron. Often young women maintain their appearance, want to be thin so they diet and eat less. A diet that is not balanced with the body's needs will cause the body to lack important substances in the body such as iron (Muthmainnah et al., 2021).

Adolescent girls have a greater risk of developing anemia compared to adolescent men. Anemia is found in developed and developing countries such as Indonesia (Muthmainnah et al., 2021).

Anemia is said to be a public health problem if the prevalence is above 20% (Eka Safitri, 2021). According to WHO (2021), the prevalence of anemia women is 29.9% in fertile women, equivalent to more than half a billion with an age range of 15-49 years in 2019. Based on Riskesdas 2018 data, the prevalence of anemia in adolescents is 32%, meaning that 3-4 out of 10 adolescents suffer from anemia and the prevalence of adolescent girls who receive blood-boosting tablets (TTD) at school is 76.2% of the total adolescent girls in Indonesia (Ministry of Health, 2022).

Anemia in adolescents has a serious impact and is almost entirely a consequence of iron deficiency which is strongly related to the severity of anemia (Kusuma, 2022). The most common cause of anemia is iron deficiency caused by a lack of iron intake, inadequate iron absorption and increased iron needs, as well as increased iron loss such as during menstruation (Utama et al., 2020).

Adolescents are a range group experiencing nutritional problems. The most common nutritional problem is SEZ. KEK (Chronic Energy Deficiency) adolescents tend to develop anemia due to unbalanced diet and food consumption during growth. Nutrition greatly affects a person's nutritional status. If the Ramajas do not consume balanced macronutrients and micronutrients during their growth, they are at risk of malnutrition or chronic energy deficiency, which can lead to anemia. Anemia in KEK is a complication of iron and other nutrient deficiencies and is associated with infection (Telisa & Eliza, 2020).

Nutrition education is one of the interventions that is believed to be able to reduce the prevalence of anemia in adolescent girls. Providing nutrition education aims to increase adolescents' knowledge about the importance of proper nutrition, such as iron intake, folic acid, and vitamin C, which can support hemoglobin (Hb) production and prevent anemia (Sahalessy & Zurimi, 2020).

Therefore, understanding the relationship between nutritional knowledge and anaemia prevention in adolescent girls is crucial to guide health policies and evidence-based interventions.

Method

The method used is a scoping review consisting of stages, namely: conducting a focusing review with the PEOS framework (Population, Exposure, Outcome and Study Design), conducting literature searching using relevant databases. Selecting relevant studies using inclusion and exclusion criteria; conducting critical appraisal to assess the

quality of literature, conducting data extraction, analyzing and reporting results (Rahayu et al., 2020).

Eligibility Criteria

Table 1
displays inclusion and exclusion criteria

Inclusion Criteria	Exclusion Criteria
An article that discusses the relationship between nutrition knowledge education in adolescents and the reduction of the prevalence of anemia	Articles that are not related to the relationship between nutrition knowledge education in adolescents and the reduction of the prevalence of anemia
Scientific and research articles	Non-scientific and non-research articles
Documents in English or Indonesian	Documents are not in English or Indonesian
Published in 2019-2024	Published outside 2019-2024
Available in full text	Not available in full text
Open access	Access not open
Quantitative, qualitative, experimental, and other research methods	Systematic review methods, literature reviews, or non-research methods

Search Strategy

The electronic search was carried out using the final keyword: the relationship between nutritional knowledge in adolescents and the decrease in the prevalence of anemia. The data sources are PubMed, SINTA, ScienceDirect. Using a combination of keywords: Adolescent Anemia, Nutritional Knowledge, Attitudes, Adolescent Women, Iron Deficiency, Nutrition Education.

Selection of the Study

The results obtained from the previous phase are collected and stored in a database to assist authors in researching titles and abstracts to ensure qualified articles. Eligible articles are then re-evaluated to eliminate any duplicates identified. Furthermore, the remaining articles are carefully reviewed to ensure that they meet the inclusion requirements

Data Extraction

After that, data is collected from papers that are eligible for inclusion in the research findings. This data includes information such as the author and year of publication, research objectives, data collection instruments, research techniques, and results. The extracted data is displayed descriptively without any additional analysis. Information was obtained from 15 articles that met the inclusion criteria.

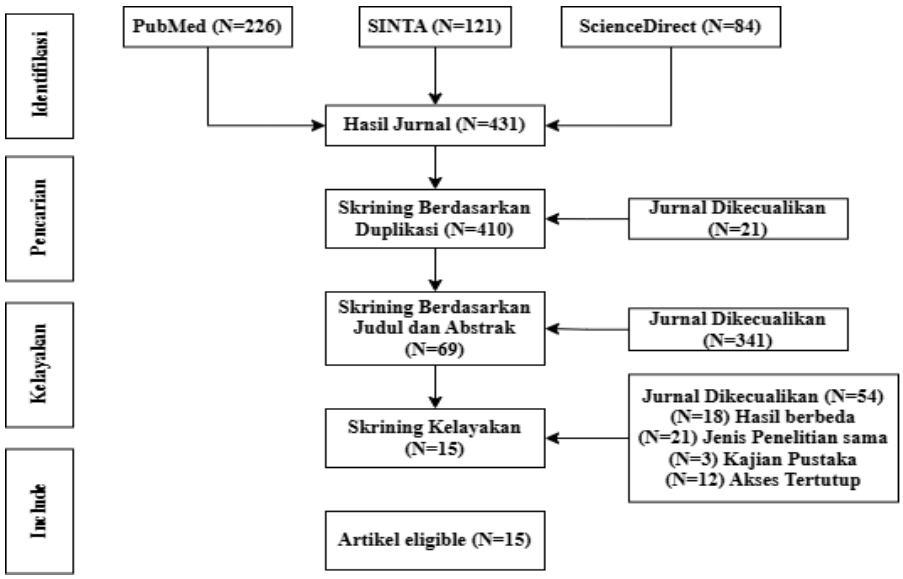

Figure 1
Article Screening Process

Results and Discussion

Based on a search from three databases (PubMed, SINTA, ScienceDirect) found 431 articles, after reviewing 21 articles were excluded due to duplication, another 341 articles were excluded because they were adjusted to the title and abstract, and 54 articles were excluded because of non-conformity with the required criteria, as well as journals with almost the same title. The study obtained 15 articles related to the relationship between the relationship between nutrition knowledge education in adolescent girls and the prevalence of anemia. The details of the content of the article can be seen in the following table.

Table 2
Factors Influencing Attitude Taking in the Prevention of Anemia in Adolescent Girls

Title, Author, Year	Aims	Sample Size	Methods	Result
The Effect of Nutrition Education Through Comics and Leaflets on Increasing Knowledge Related to Anemia in Adolescent Girls at SMA	to find out the effect of nutrition education through comics and leaflets on increasing knowledge related to anemia in adolescent girls	126 X & XI students	The research design used, namely *quasy experimental* with a *pre-post test group design*	There was a difference in respondents' knowledge on the influence of the use of nutrition education media through comics (p=0.000) and leaflets (p=0.000) with an alpha of 0.05. There is an

Title, Author, Year	Aims	Sample Size	Methods	Result
Negeri 14 Jakarta (Hannanti et al., 2021)	at SMA Negeri 14 Jakarta			influence of nutrition education through comics and leaflets on increasing anemia knowledge in adolescent girls at SMA Negeri 14 Jakarta.
Increasing Adolescent Girls' Nutrition Knowledge Related to Anemia Through Nutrition Education (Triatmaja, 2019).	Increasing the knowledge of young women related to the prevention and treatment of anemia	31 students	Educational counseling activities	The average nutritional knowledge of adolescent girls related to anemia before education was 52.9% and increased after education, which was 90.3%. Conclusions and Suggestions: Nutrition education is considered quite effective in increasing participants' nutritional knowledge.
The Effect of Nutrition Counseling with Original Food Demonstration Media 'My Plate' and Leaflet on Anemia Knowledge in SMAN 3 Cimahi Students (Safira et al., 2020)	This study aims to determine the effect of nutrition counseling using the original food demonstration media 'my plate' and leaflet media on anemia knowledge in SMAN 3 Cimahi students.	17 samples	Quasi experiment with pre-test and post-test control group design model	The results of this study showed that there was an increase in anemia knowledge after being given counseling using the original food media 'my plate' and leaflet media (p=0.000).
The Effect Of Nutrition Education On Knowledge And	Knowing effect of Providing Nutrition Education on	The sample consisted of 27 treatment	This study uses the True Experiment method design with a mixture of pre test	There was an effect of providing nutrition education on

Title, Author, Year	Aims	Sample Size	Methods	Result
Attitude About Anemia In Aldolescent (Putra et al., 2019)	Knowledge and Attitudes Regarding Anemia in students SMP N 31 Semarang.	groups and 27 control groups	post test control group design.	female students' knowledge of anemia (p = 0.000) and there was an influence on the provision of nutrition education on female students' attitudes about anemia (p = 0.000). he provision of nutritional education affects the knowledge and attitudes about anemia in Semarang City 31 Junior High School Students.
The Effect of Nutrition Education Through Snake and Ladder Games and Booklets on Knowledge, Attitudes, and Practices of Anemia Prevention in Adolescent Girls (Hisanah et al., 2023)	The purpose of this study is to analyze the influence of nutrition education through snake and ladder games and booklets on the improvement of knowledge, attitudes, and practices of anemia prevention in adolescent girls	34 female students	Quasi experimental research with pre-post group design	There were differences in the average knowledge ($p<0.001$), attitude ($p<0.001$), and practice ($p<0.001$) about anemia prevention before and after nutrition education through snake and ladder games and booklets. However, knowledge (p = 0.179), attitudes (p = 0.231), and practices (p = 0.179) about the prevention of anemia between the two groups had no differences. There is an influence of nutrition education through snake and ladder

Title, Author, Year	Aims	Sample Size	Methods	Result
				games and booklets that are equally effective in increasing knowledge, attitudes, and practices of anemia prevention in adolescent girls.
The Relationship between Knowledge and the Application of Balanced Nutrition Messages in Adolescents in the Prevention of Iron Nutrient Anemia (Agustina & Permatasari, 2019)	To determine the prevalence of the incidence and classification of anemia, the relationship between iron nutrition anemia knowledge, balanced nutrition knowledge and the application of balanced nutrition messages with anemia in adolescent girls	The sample of students of SMA Negeri 6 Depok amounted to 394 people.	Quantitative method, cross-cectional design.	This study shows that the prevalence of anemia is 46.4%, the classification of severe anemia is 8.6%, moderate anemia is 20% and mild anemia is 17.8%. Knowledge of iron deficiency anemia in the category is sufficient 67.3%, knowledge of balanced nutrition in the category is sufficient 51.3%. The application of balanced nutrition messages that are not in accordance with PGS 64%, There is a significant relationship between balanced nutrition knowledge, the application of balanced nutrition messages and iron nutrient anemia,
Impact of nutrition education on knowledge, attitudes and practices related	The purpose of this study is to assess the hemoglobin levels of adolescent	363 students	A quasi-experimental design (pretest-posttest control group)	This study shows that structured nutrition education interventions can effectively

Title, Author, Year	Aims	Sample Size	Methods	Result
to iron deficiency anemia among adolescent girls in Jordan (Abu-Baker et al., 2021)	female students, examine their knowledge, attitudes, and practices related to IDA, and evaluate the impact of nutrition education programs on hemoglobin levels.			improve knowledge, attitudes, and practices (KAP) related to iron deficiency anemia among adolescent girls. This underscores the importance of nutrition education programs implemented in schools to overcome the problem of anemia in this group.
Determinants of Anemia Among Adolescent Women (Pareek et al., 2022)	To assess the relative significance of various factors contributing to anemia in adolescent girls with low socioeconomic status.	100 sample of young women	Questionnaire	The prevalence rate of anemia is 30% and among them, 95% of girls who suffer from anemia are iron deficient. The average iron intake is 9.4 mg per day, mostly from the consumption of cereals, nuts, and vegetables. The intake of different nutrients was almost inadequate among the participants. Blood hemoglobin is significantly correlated with Body Mass Index, intake of fat, protein, iron, folic acid, and riboflavin. Serum ferritin is related to vitamin B12.
Impact of nutrition	This study aims to study the	115 students	Structured questionnaires	This nutrition education resulted

Title, Author, Year	Aims	Sample Size	Methods	Result
education on knowledge, attitudes and practices related to anemia among school children in Belgaum, India (Sasmita et al., 2022)	impact of nutrition education on knowledge, attitudes, and practices related to anemia in school children.			in increased knowledge and attitude changes regarding anemia as well as increased consumption of iron-rich foods. Therefore, nutrition education is one of the cost-effective and sustainable methods to reduce anemia cases.
School Feeding Reduces the Prevalence of Anemia in Adolescent Girls and Other Vulnerable Household Members in a Group Randomized Controlled Trial in Uganda (Adelman et al., 2019)	This study tested whether foods fortified with various micronutrients provided in the FFE program can reduce the prevalence of anemia in primary school-age adolescent girls, adult girls, and preschool children.	1,032 samples	Through the use of clustered randomized controlled trials with individual-level repetitive cross-sectional data	The FFE program reduces anemia and moderate-severe anemia in primary school-age adolescent girls and reduces moderate-severe anemia in adult girls and preschoolers.
The Effect of Mobile Health Education (m-Health) Based on the WANTER Application on Knowledge, Attitudes, and Practices (KAP) Regarding Anemia in Female Students in Rural Areas of Indonesia (P. Sari et al., 2022)	This study aims to analyze the influence of health education through mobile applications, namely the WANTER application, on the increase in KAP.	177 students	This study is a quasi-experiment with *a pretest-posttest design*	Adolescent knowledge and attitudes improved significantly in three months after the WANTER and booklet intervention on the prevention of anemia with a $p < 0.001$; however, there was no significant difference in KAP between the control group and the intervention. In addition, there was no

Title, Author, Year	Aims	Sample Size	Methods	Result
				improvement in practice, either in the control group or the intervention. Knowledge, attitudes, and practices to prevent anemia need to be continuously improved. Health education through the right media for adolescents is essential to make interventions more effective.
The impact of eHealth education on reducing anemia among school girls in rural Bangladesh: Protocol of a randomized controlled trial study (Rahman et al., 2023)	Evaluate the impact of eHealth education and changes in the knowledge, attitudes, and practices of adolescent girls regarding anemia.	138 mild anemia	1:1 parallel random control trial	Two-way variance analysis will assess the outcome variables at the beginning, 4 months, and 8 months. The 8-month intervention was designed from May 2022 to February 2023. The age range of participants 10-14 years was 60.9% in the intervention group and 56.5% in the control group. Among the participants, 89.9% and 88.4% had mild anemia; 11.11 (SD ± 0.80) and 11.06 (SD ± 0.96) were the mean hemoglobin in the intervention and control groups. eHealth education is expected to be an effective way to

Title, Author, Year	Aims	Sample Size	Methods	Result
				increase knowledge and change healthy behaviors, which can reduce the burden of anemia among adolescent girls.
Evaluating the effect of digital game-based nutrition education on indicators of anemia in adolescent girls: A randomized clinical trial (Ghadam et al., 2023)	The aim was to determine the impact of nutrition education through digital games on markers of iron deficiency anemia in adolescent girls.	176 young women	Randomized clinical trials	The results of this study show that there is a positive impact of digital game-based nutrition education on knowledge scores, attitudes, and practices, as well as significant differences in hemoglobin levels. It is recommended that educational games be designed for future students to promote health and nutrition information.
Impact of school-based nutrition education interventions on iron deficiency anemia-related knowledge in rural areas of Karnataka, India: A mixed methods study before and after the intervention (Salam et al., 2023)	To understand the extent to which adolescents' awareness of anemia and anemia prevention can be changed through nutritional messages received at school.	447 samples	Educational interventions are jointly developed by school teachers and nutritionists using locally adapted materials consisting of lectures, role-playing, and practical demonstrations.	The average knowledge score increased by 3.67 ± 0.17 ($p < 0.01$). During the interviews, teachers and students highlighted high acceptance of the intervention and the material provided, increased awareness, positive attitudes towards diet-related behavior changes, increased demand for iron and folic acid

Title, Author, Year	Aims	Sample Size	Methods	Result
				supplements, and increased dissemination of the learned message to peers and family. Challenges expressed included the need for further training, time constraints, and doubts in teaching about menstruation and pregnancy. Educational interventions carried out for adolescents by teachers in schools are effective in increasing awareness and attitudes related to anemia and its prevention.
School Lunch Program and Nutrition Education Improve Knowledge, Attitudes, and Practices and Reduce the Prevalence of Anemia: A Pre-Post-Intervention Study in a Pesantren in Indonesia (Rimbawan et al., 2023)	This study created a school food program consisting of dietary and educational interventions and evaluated their impact on encouraging sustainable eating behavior improvement among junior and senior high school students in Indonesia.	319 students	All participants were assessed based on Knowledge, Attitude, and Practice (KAP/Knowledge, Attitude, Practice)	KAP test scores for nutrition and hygiene showed significant improvement for all students and undernourished groups post-intervention. Protein, iron, and vitamin C intake increased significantly. Although there was no significant improvement in nutritional status, there was a significant increase in hemoglobin levels and a decrease in

Title, Author, Year	Aims	Sample Size	Methods	Result
				the prevalence of anemia from 42.6% to 21.7%. Thus, school meal programs that combine dietary and educational interventions can effectively improve anemia in malnourished students as well as improve knowledge, attitudes, and practices related to health, nutrition, and hygiene in middle and high school students.
The effect of education through video and modification of iron tablet packaging on the behavior of adolescent girls in iron supplementation intake at SMPN 2 and SMPN 1 Parigi (Madestria et al., 2021)	The purpose of this study is to reveal the effect of providing education through videos and modification of iron tablet packaging on the behavior of adolescent girls in iron supplementation intake at SMPN 2 and SMPN 1 Parigi.	62 respondents	This study is a quasi-experimental research with a pretest-posttest control group design with stratified random sampling.	In the analysis of the Wilcoxon Signed Ranks Test, the Intervention group (video + modification of iron tablet packaging) obtained a value of $p=0.001 < 0.05$. This means that there are differences in knowledge, attitudes, and intentions of students in the pretest-posttest, while in the control group (video), a value of $p=0.001 < 0.05$ was obtained which indicates that there are differences in knowledge, attitudes, and

Title, Author, Year	Aims	Sample Size	Methods	Result
				intentions of students in the pretest-posttest. The development of educational media on iron tablet intake through videos along with modification of iron tablet packaging has a significant influence on the knowledge, attitude, and intention of adolescent girls in iron supplementation intake.
Effect of nutrition Education Based on the PRECEDE Model on iron deficiency anemia among Female Students (Khani Jeihooni et al., 2021)	This study aims to evaluate the effectiveness of nutrition education of the PRECEDE model on iron deficiency anemia among female students in Fasa City, Fars Province, Iran.	160 students	random sampling method in Fasa City, Fars Province, Iran	In the experimental group, the average age of the students was 13.85 + 1.72 years and in the control group was 13.60 + 1.81 years. In addition, there were no significant differences in the PRECEDE construct and the nutritional behaviors that prevented iron deficiency anemia before the intervention in both study groups. However, the experimental group showed a significant improvement 4 months after the intervention. In

Title, Author, Year	Aims	Sample Size	Methods	Result
				addition, there was no significant difference in the mean values of hemoglobin, hematocrit, and ferritin levels between the two groups before the intervention. However, in ferritin levels, a significant increase was shown at 4 months after the intervention in the experimental group. Based on the results of the study, nutrition intervention education based on the PRECEDE model has a positive effect in improving iron deficiency anemia prevention behavior in female students.
The Effect of Nutrition Education on Anemia Using Video Media on the Knowledge and Attitude of Adolescent Girls at SMAN 1 Nganjuk (N. N. Sari et al., 2022)	To study and find out the influence of nutrition education about anemia with video media on the knowledge and attitude of adolescent girls about anemia at SMAN 1 Nganjuk.	30 samples	This study is a quasi-experimental research with a non-equivalent control group design.	The results showed that there were differences in knowledge and attitudes before and after counseling in the treatment group (p less than 0.05). There were differences in knowledge and attitudes between the treatment group and the control group. There were differences in knowledge and

Title, Author, Year	Aims	Sample Size	Methods	Result
				attitudes between the treatment group and the control group.
Effectiveness of nutrition education and counseling programs in iron deficiency anemia among adolescents: Research protocols from randomized trials (Wiafe et al., 2022)	This study aims to investigate the effect of nutrition education and counseling on iron intake and iron status in early adolescents.	126 samples	The research protocol of randomized trials	The effectiveness of the developed iron dietary guidelines will serve as a guide to help, prevent and manage iron deficiency anemia as well as reduce the prevalence of anemia in the long term in Ghana.
Effectiveness of Community-Based Interventions of Nutrition Education and WASH/Malaria in Reducing Anemia in Preschool-Age Children in Bengo, Angola: A Study Protocol from a Randomized Controlled Trial (Fançony et al., 2019)	This paper describes a group randomized controlled trial design that aims to compare the effectiveness of two complex community-based interventions: (1) nutrition education in reducing nutritional anemia, and (2) WASH/malaria education in reducing infection-induced anemia, both of which are combined with a test-and-treat therapeutic approach.	974 children	Study Protocol of a Randomized Controlled Trial	Therapy plus educational nutrition strategies. This will make it possible to clarify key questions that can help improve control strategies targeting infection-related and nutrition-related anemia in the country.

Characteristics of Studies by Country

Studies come from different regions, with the main concentration in developing countries such as Indonesia, India, and some countries in Africa. Developed countries such as the United States and the United Kingdom have also contributed to this study.

Study Characteristics Based on Study Type

The majority of studies were cross-sectional with a focus on primary data surveys and analysis. Young women (ages 12-18) were the main target group in all studies. Some studies also included teachers or parents as support respondents.

Characteristics Based on Quality

A total of 10 studies met the criteria for high quality based on assessment scores (>80%). Some studies (3 out of the total) had potential biases, such as small sample sizes, incomplete data, or non-random sampling methods.

Research Theme

The relationship between nutritional knowledge and attitudes in the prevention of anemia in adolescent girls.

Discussion

Analysis of the Relationship between Nutritional Knowledge and Decreased Incidence of Anemia

Almost all of the studies in the table show that increased nutritional knowledge significantly affects the attitude of adolescent girls in the prevention of anemia. Example:

1. Hannanti et al. (2021) found that nutrition education using media such as comics and leaflets can significantly increase knowledge related to anemia ($p = 0.000$), which contributes to a change in attitudes towards balanced nutritional intake.
2. Research by Putra et al. (2019) also highlighted that nutrition education directly increases positive attitudes towards the consumption of iron-rich foods and adherence to blood-boosting tablets (TTD).

Interactive nutrition education, such as snake and ladder games (Hisanah et al., 2023), as well as digital media such as the WANTER application (P. Sari et al., 2022), are also effective in increasing knowledge and attitudes. Good knowledge helps adolescents understand the importance of a nutritious diet, which is a major factor in preventing anemia.

Factors Influencing Knowledge and Attitudes

In the delivery of educational knowledge, the use of delivery methods, education using innovative media such as leaflets, booklets, and videos is more effective than traditional methods, as shown by Safira et al. (2020) and Madestria et al. (2021). M

Community-based intervention methods that are adapted to local culture (Salam et al., 2023) increase acceptance and understanding of educational messages. Based on access to information, research in rural areas shows challenges in the effective distribution of nutritional information (Telisa & Eliza, 2020).

The Relationship between Knowledge and Behavior: Nutritional knowledge alone may not be enough to reduce anemia if it is not accompanied by positive changes in eating behavior. Therefore, programs that target behavior change should be carried out in conjunction with nutrition education, such as improving diets through practical recommendations that are affordable and accessible. A study by Gitawati et al. (2023) at SMK Negeri 1 Campaka Cianjur found that there was a significant relationship between

diet, nutritional status, and the incidence of anemia. Adequate nutritional knowledge allows teens to choose healthier foods according to their body's needs.

A study by Safira et al. (2020) shows that nutrition education through the demonstration of "My Eating Plate" is effective in increasing the consumption of iron-rich foods such as red meat and green vegetables. Abu-Baker et al. (2021) noted that increased knowledge contributes to the practice of regular iron supplement consumption. The WANTER app-based program (P. Sari et al., 2022) has succeeded in improving adolescent adherence to taking blood-boosting tablets even though further approaches are needed to influence long-term practice.

Conclusion

This study highlights the close relationship between nutritional knowledge and attitudes and behaviors of anemia prevention in adolescent girls. Increased nutritional knowledge has been shown to promote positive changes in attitudes and behaviors, including the consumption of iron-rich foods, adherence to supplementation, and balanced dietary practices. School-based nutrition education programs, digital media, and community-based local approaches have proven effective in increasing knowledge and attitudes.

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