

The Influence of Anemia Education Media on Increasing Self-Awareness and Compliance in Consuming Iron Supplements in Adolescent Girls: A Systematic Review

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Abstract: Anemia is a significant global health issue affecting adolescent females. Since 2011, the World Health Organization (WHO) has advocated for iron supplementation as the preferred intervention to prevent and mitigate adolescent anemia. Adherence to the consumption of iron supplement tablets remains inadequate, primarily due to adolescents' insufficient knowledge and self-awareness. Education is essential for enhancing self-awareness and adherence to iron supplement pills. This literature review examines the influence of health education media on anemia prevention, particularly in improving self-awareness and adherence to Iron Supplement Tablet (IST) use among adolescent females. Studies were chosen according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. A thorough search across various databases generated 2129 papers: Google Scholar= 2260, PubMed= 130, ScienceDirect= 236, and Scopus= 100. Of these, 597 were discarded for irrelevance, two were inaccessible, and 14 articles were included in the study following the eligibility assessment. The review findings indicate that health education media using Print Media (brochures, flip charts), Media Technology (audiovisual, animated videos), Telephone calls and text messages, Social Media (WhatsApp, TikTok), Game Media (Monopoly), and peer groups substantially increase self-awareness and adherence to iron supplement consumption in preventing anemia among adolescent girls.

Keywords: anemia, health education, self-awareness, iron supplement tablet adherence, adolescent girls

Introduction

Anemia is a critical health issue globally and nationally, strongly associated with rising morbidity and mortality rates, and it adversely affects a nation's economy. Anemia is a condition characterized by a decreased hemoglobin level in the blood, impairing the body's capacity to transport oxygen. Insufficient oxygen can impair concentration, productivity, and stamina.^{1,2}

Among the global population of 7.8 billion, approximately 1.9 billion individuals are afflicted with anemia, with women of reproductive age (15–49 years) constituting 31.2% of this demographic.^{3,4} The World Health Organization (WHO) indicates that the global prevalence of anemia among adolescent females varies between 40–88%, with an estimated 50% attributable to iron deficiency.⁵

Adolescent girls are at significant risk of anemia of iron deficiency due to heightened iron demands from fast growth and elevated activity levels. Moreover, menstrual blood loss contributes to a reduction in iron levels.² A study indicated that adolescent girls aged 10–14 years were 1.98 times more predisposed to developing anemia than those aged 15–19 years.⁶



Anemia in adolescent females can adversely impact long-term physical growth and development, diminish cognitive function, and jeopardize a healthy life cycle in women. Anemia in adolescent girls is linked to health worsening during pregnancy, labor, and the postpartum period, as well as an increased risk of delivering low birth weight and stunted children.^{7,8}

The prevalence of anemia in women aged 15–49 years is indicator 2.2.3 in the Sustainable Development Goals (SDGs), aiming for a 50% reduction by 2030, in line with the 65th World Health Assembly (WHA) worldwide target action plan for 2025.¹

Since 2011, the World Health Organization (WHO) has advocated weekly iron supplementation as the preferred intervention to prevent and mitigate adolescent anemia. The adherence of adolescent girls and women of reproductive age to iron tablet consumption is a metric for evaluating the efficacy of the anemia prevention and control program targeting this demographic. The compliance of adolescent females in taking iron tablets is intrinsically linked to their information and understanding of these supplements.^{9–11}

Enhancing awareness or self-awareness and adherence to iron tablet intake among teenagers can be achieved through educational initiatives. Health education is the process of assisting individuals in improving their health. According to the WHO, health education seeks to improve the community's capacity to sustain and advance their physical, mental, and social well-being, fostering economic and social productivity.^{12–14}

Health education is crucial for the effective dissemination of information. Media enhances the process by facilitating clear and efficient message delivery to individuals and groups, thus playing a crucial role in health promotion. The utilization of appropriate educational tools and resources enhances the effectiveness of health education and yields improved outcomes. Learning entails the acquisition and integration of responses through repeated exposure to stimuli; increased frequency and engagement of stimuli correlate with a stronger learning response.¹⁵

To date, no comprehensive review has systematically mapped the existing literature on the development or evaluation of health education media that are specifically designed to enhance self-awareness and adherence to iron supplementation among adolescent girls. We aimed to acquire prior research that was used in the study in order to propose general anemia health education media that can improve the self-awareness and adherence to Iron Supplement Tablets among adolescent females.

Methods

This literature review employs a scoping review methodology, an approach for analyzing and describing research data. Utilized the Preferred Reporting Items for Systematic Review or Meta-Analysis for Scoping Reviews (PRISMA-ScR) criteria and implemented the PRISMA flowchart for search stages.

Research Question

This study seeks to review the influence of health education media on anemia prevention, particularly in enhancing self-awareness and adherence among adolescent girls about iron pill consumption. The review investigated: “Is there an impact of health education media on enhancing self-awareness and adherence to iron tablet consumption among adolescent girls?”

Eligibility Criteria

This study was confined to low- and middle-income countries. Anemia was found to be highly prevalent in low- and middle-income countries.^{3,16} The study concentrates on adolescent females. The article's publishing term was restricted to 2018 to 2024. Articles must satisfy the following requirements for eligibility: (1) Original articles in all languages, (2) peer-reviewed journals, (3) nationally and internationally indexed journals, and (4) full-text articles in journals. The authors additionally eliminated duplicate articles, review articles, undergraduate/graduate dissertations, books, blogs, articles centered on pregnancy, and those that did not explicitly address the correlation between health education media and self-awareness and adherence to iron supplement tablet consumption, as well as articles with inconsequential results or absent statistical analysis, and articles necessitating payment for full text access.

Search Strategy

After creating the study queries, the PEO framework terminology was modified utilizing MeSH phrases to obtain search outcomes pertinent to the research objectives. After converting the MeSH phrases into the Boolean format, keywords were produced in the subsequent manner: “Health Education” AND “Anemia” AND (“Self Awareness” OR “Awareness”) AND (“Compliance with Iron Supplement Tablets” OR “Iron Supplementation”) AND “Adolescent Girls.”

Selection Process

We searched the Google Scholar, PubMed, ScienceDirect, and Scopus databases. The PRISMA Flowchart 4 (Figure 1) was modified to identify articles. This flowchart comprises three phases: identification, screening, and inclusion. In the Identification stage, the number of articles obtained from the database search and the count remaining after the

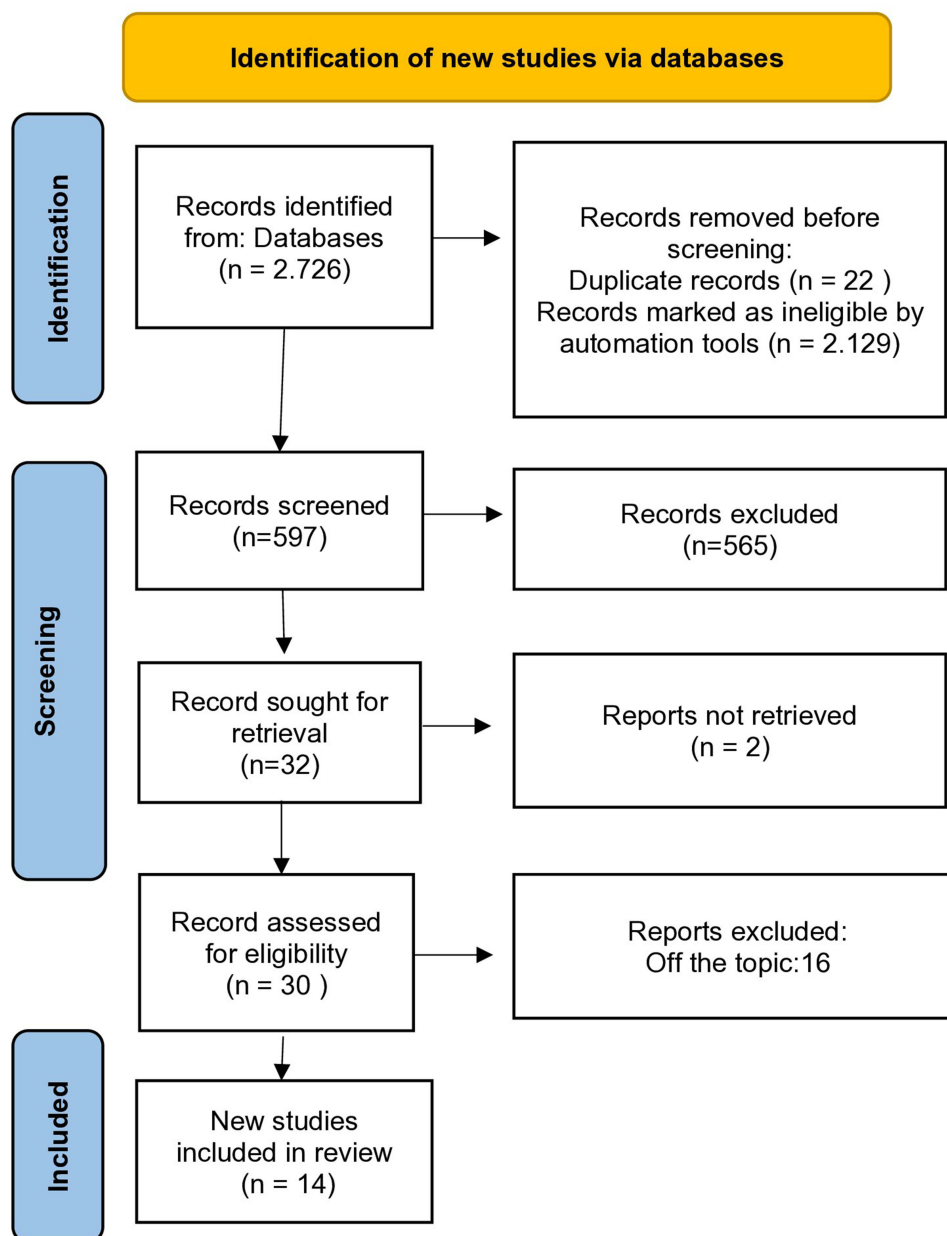


Figure 1 PRISMA flowchart of the articles selection process from 2018–2024.

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elimination of duplicates is ascertained. At this stage, automation methods filter articles according to criteria like, full-text availability, classification as research papers, and open-access status. The screening stage entails categorizing articles according to the study topic and eligibility criteria, explicitly utilizing keywords, titles, and abstracts. In the inclusion phase, articles are assessed by a comprehensive review of their whole text. At this step, authors evaluate articles that qualify for review. The literature sources must fulfill specific criteria, including publication in indexed journals, peer review, possession of an ISSN number, and a discernible journal reputation indicated by its issue and volume number. Only journal papers that fulfill these criteria are included in the final stage of the review process.

Results

This research report presents findings from a study investigating the impact of anemia health education on enhancing awareness and adherence to iron supplement tablet use. We select articles based on profiles, characteristics, demographic data, and conclusions from the study design presented in the article.

The Study Profile Counts

A total of 2726 publications were located following a comprehensive search across various databases (Google Scholar= 2260, PubMed= 130, ScienceDirect= 236, and Scopus= 100). Twenty-two duplicate articles and 2129 records deemed unsuitable according to automated criteria were eliminated. After evaluating titles and abstracts, 565 articles were removed for being irrelevant to the subject matter. Furthermore, two papers were inaccessible from the databases due to limited access. After evaluating 32 papers for eligibility, 14 published publications from the databases were identified as appropriate for inclusion in the study.

The Study Demographic Profiles

The results showed that most of the selected articles on demographic characteristics came from Indonesia, Iran, Palestine and India (Figure 2) because the focus of the articles reviewed only came from low middle income countries. High prevalence of anemia was found in low middle income countries.^{3,16} Health education serves as a preventive measure against anemia.¹⁷

Characteristics of the Studies

We discerned attributes based on the author's name and publication year, the country of the study, title, objectives, participant information, research methodologies, finding Statistical Results, categorical Media Education, and Outcome. The research characteristics incorporated in this scoping review are delineated in Table 1. The participant count ranged from 30 to 424 respondents. The initial study participants exclusively comprised adolescents. The majority of the

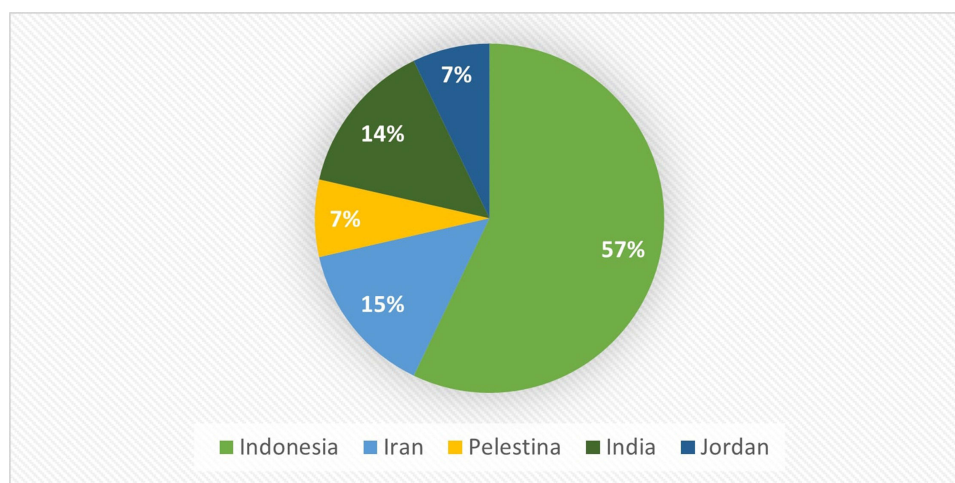


Figure 2 Characteristics of selected articles by country (n = 14).

research articles employed quantitative methodologies utilizing quasi-experimental designs, except the study by Nadila Yanti Septi Putri et al, which utilizes Pre-experimental designs, Those using randomized control trial design are Marwan Jalamb et al, Md Jiaur Rahman et al and Omid Sabet Ghadam et al. While the study using Mixed-methods methodology is Shumona Sharmin Salam et al. We also identified the analytical approach employed in this investigation. All studies employed bivariate analysis. The particular analysis differs based on the data type. Research has examined various instructional media affecting self-awareness and compliance with consumption of iron supplements.

Substantial Statistical Results

We outlined characteristics according to the author's name and publication year, the study's country, as well as the title, objectives, participant data, research techniques, findings, statistical results, categorical media education, and outcomes. The research profiles included in this coverage review are presented in [Table 1](#). The number of participants varied from 30 to 455 responses. The subjects of this investigation were only adolescents. The majority of research articles utilize quantitative methodologies employing Experimental quasi-experimental designs, with the exception of the study by Nadila Yanti Septi Putri et al (2024), which employs Pre-experimental designs. The studies utilizing randomized control trial designs include those by Marwan Jalamb et al (2018), Md Jiaur Rahman et al (2023), and Omid Sabet Ghadam et al (2022). The study employing a mixed-methods approach is by Shumona Sharmin Salam et al (2023). This inquiry employed a bivariate analytical technique, as indicated in [Table 1](#). A multitude of studies have investigated different instructional media that affect self-awareness and compliance with the intake of blood supplement pills. This method produces significant statistical data.

Synthesis of the Results

[Table 1](#) presents the findings of a study that correlates anemia health education media with self-awareness and adherence to blood supplement usage. Media innovations have been identified as effective tools for delivering education. A statistical study was conducted using the bivariate approach to assess the impact of health education media on self-awareness and adherence to blood supplement usage.

Discussion

Anemia constitutes a significant public health issue among adolescent females. Common causes of anemia include deficiencies in vitamin A, B12, folate, and iron, chronic inflammation, infections, and congenital disorders. Iron insufficiency is seen as a significant global issue, arising from insufficient iron levels required for the production of red blood cells.^{4,32} The World Health Organization (WHO) underscores the necessity of prioritizing health promotion initiatives and preventive measures to address anemia in teenage girls and women of reproductive age. Health education is the process of empowering individuals to enhance their well-being.^{14,17}

The transformation in health services prioritizes promotive and preventative measures, highlighting the significance of health promotion over curative therapy, with the expectation that young women will embrace a healthy lifestyle to foster a supportive atmosphere.³³

Adolescence, a transitional phase from childhood to adulthood, entails substantial physical, psychological, and socio-emotional transformations. At this juncture, appropriate education can assist adolescents in discovering their identities. Education enhances awareness, fosters good perceptions, and stimulates motivation.³⁴⁻³⁶ Self-awareness encompasses comprehending and evaluating oneself and others, facilitating an improved perception. It also promotes the capacity to acknowledge the consequences of actions and facilitates a more informed decision-making process.^{37,38}

Three studies investigating the impact of health education on enhancing self-awareness demonstrated that the health education program might elevate self-awareness in adolescent females and mitigate anemia.¹⁸⁻²⁰ Health education has improved teenagers' knowledge, augmenting their self-awareness. Adolescents possessing comprehensive knowledge regarding the prevention and treatment of anemia will exhibit enhanced self-awareness that influences behavioral modification.^{29,37,39} The limited comprehension of anemia prevention and iron-folic acid supplementation among adolescents results in a lack of awareness among adolescent girls.⁴⁰

Table 1 Summarize the Findings the Characteristics of Selected Studies (n = 14)

No	Author/ Year	Country	Title	Objectives	Participation	Method and Design	Findings	Statistical Results	Media Education	Outcome
1	Ni Komang Tri Agustini et al (2024) ¹⁸	Indonesia	Increasing Adolescent Self-Awareness to Prevent Anemia through the Structured Education Peer Counselor Program in Denpasar City	Analyzing the influence of Structured Education Peer Counselors on adolescents' self-awareness in preventing anemia.	Sample of 70 Adolescent Female Respondents at Junior High School Dharma Wiweka	Quantitative Research, Quasi-experimental one-group pretest-posttest Design.	This study demonstrates the impact of the Structured Education Peer Counselor program on enhancing self-awareness in teenagers to prevent anemia (p<0.001).	Significance	Peer Counselor	Self Awareness
2	Siti Aisa et al (2022) ¹⁹	Indonesia	Animated educational video using health belief model on the knowledge of anemia prevention among female adolescents: An intervention study	This study examined the effects of animated educational videos on the knowledge of anaemia prevention among female adolescents using the Health Belief Model (HBM).	A sample of 161 female students was recruited from two high schools and assigned to intervention (n=78) and control (n=83) groups. Senior high schools from in Semarang City, Central Java, Indonesia	Quantitative Research, Quasi-experimental pretest-posttest with control group design	Three times of animated educational video significantly increased knowledge and nine indicators of Health Belief Model (HBM) in the intervention group, including perceived susceptibility, severity, benefits, barriers, self-efficacy, and health motivation (P=0.001). In contrast, the increase in the control group was not significant. The intervention group showed a significantly higher mean score than the control group (P=0.05), indicating the effectiveness of animated video in increasing knowledge and awareness of anemia prevention.	Significance	Technology Media (Animation Video)	Self Awareness
3	Shumona Sharmin Salam et al (2023) ²⁰	India	Impact of a school-based nutrition educational intervention on knowledge related to iron deficiency anaemia in rural Karnataka, India: A mixed methods pre-post interventional study	To understand the extent to which adolescent awareness about anaemia and anaemia prevention can be changed by nutrition messages received at school.	The sample consisted of 455 female students from three government schools in Bagalkot, Belagavi and Raichur districts of Karnataka, India.	Mixed-methods pre-post intervention study.	Educational interventions led by teachers significantly improved adolescents' knowledge, awareness, and attitudes toward anemia prevention, with increased supplement demand and message sharing.	Significance	Print media (illustrative)	Self Awareness
4	Ade Damayanti Raihani et al (2024) ²¹	Indonesia	The Effectiveness of Educational Media on Knowledge, Dietary Patterns, and Compliance with Iron Supplement Consumption in Anemic Adolescent Girls	Analyzing the effectiveness of flipchart and leaflet educational media on knowledge, diet, and compliance with iron supplement consumption in anemic adolescents at State Vocational School 15 Samarinda	Sample of 30 Adolescent Female respondents at State Vocational School 15 Samarinda	Quantitative Research, Quasi-experimental pre-test, and post-test with control group design.	Educational media influences knowledge (p 0.008) and the adherence of anemic teenagers to iron supplement consumption (p 0.028). Educational media had little impact on the dietary choices of adolescents with anemia on animal protein sources (p 0.217), vitamin C (p 0.217), and iron inhibitors (p 0.217). This study concludes that teaching utilizing flipcharts and pamphlets influences adherence to iron supplement intake (p 0.028).	Significance	Print Media (Leaflet and Flip Chart)	Compliance in Consuming Iron Supplements

5	Nadila Yanti Septi Putri et al (2024) ²²	Indonesia	The Influence of Tiktok Media Education on Compliance in Consuming Blood-Boosting Tablets in Adolescent Girls	Evaluating the effect of education using TikTok media on TTD consumption compliance in adolescent girls	Sample of 34 adolescent female respondents at State Junior High School 35 Pekanbaru	Quantitative Research, Pre-experimental one-group pre-test post-test design.	Before school, all respondents exhibited low compliance (100%); however, after education, 73.5% attained moderate compliance, and 20.6% reached high compliance. Post-intervention statistical analysis revealed a significant enhancement in adherence to iron supplement intake, with an average score rising from 2.50 in the pre-test to 6.82 in the post-test, accompanied by a p-value < α 0.05. The influence of TikTok media education on adherence to iron supplement intake among adolescent females is significant.	Significance	Social Media (Tiktok)	Compliance in Consuming Iron Supplements
6	Dhita Noverina et al (2020) ²³	Indonesia	The Effect of Explanation Video on Knowledge and Compliance with the Consumption of Blood Supplement Tablets at SMPN 65 North Jakarta	Analyzing the Effect of Explanation Video in the Prevention of Anemia in Adolescent Girls on Knowledge and Compliance with the Consumption of Blood Supplement Tablets	Sample of 215 adolescent females at State Junior High School 65 North Jakarta	Quantitative Research, Quasi-Experimental pretest-posttest control group design.	The research revealed a disparity in knowledge and compliance regarding consuming blood-boosting tablets within the intervention group ($p \leq 0.0001$). The control group has shown no variation in knowledge and adherence to blood-boosting tablet consumption before and after the intervention ($p > 0.083$). The study concluded that the film elucidating media's impact on avoiding anemia in adolescent girls influenced knowledge and adherence to the intake of Blood Supplement Tablets at State Junior High School 65 in North Jakarta.	Significance	Technology Media (Video)	Compliance in Consuming Iron Supplements
7	Wulan Febry Dwistika et al (2023) ²⁴	Indonesia	The effect of anemia education with animated videos on adherence to the consumption of blood supplement tablets and hemoglobin levels of adolescent girls at SMPN 17 Samarinda	Knowing the effect of anemia education with animated videos on adherence to the consumption of blood-boosting tablets and hemoglobin levels of adolescent girls	Sample of 36 adolescent female respondents at State Junior High School 17 Samarinda	Quantitative Research, Quasi-experimental pretest-posttest with control group design.	The experimental group that saw the animated movie showed a substantial difference in adherence to blood-boosting tablet use ($p=0.000$) and hemoglobin levels ($p=0.000$). The control group receiving leaflets exhibited an increase in consumption compliance ($p=0.000$); however, no significant variation in hemoglobin levels was observed ($p=0.112$). A notable mean difference in adherence to blood-boosting tablet use ($p=0.002$) and hemoglobin levels ($p=0.001$) was seen between the experimental and control groups.	Significance	Technology Media (Animation Video)	Compliance in Consuming Iron Supplements

(Continued)

Table I (Continued).

No	Author/ Year	Country	Title	Objectives	Participation	Method and Design	Findings	Statistical Results	Media Education	Outcome
8	Andini Fatima Rima et al (2022) ²⁵	Indonesia	The Effectiveness of Digital-Based Nutrition Education Through Peer Groups in Preventing Anemia in Adolescents	Identifying the effectiveness of digital-based peer-group nutrition education through Whatsapp groups and video conferences on knowledge, attitudes, and compliance with Fe tablet consumption in adolescent girls	A sample of 70 adolescent female respondents was from State Junior High School 1 and State Islamic Junior High School 3 Arjawanangun.	Quantitative Research, Quasi-experimental with control group design.	The findings indicated a disparity in the intervention group's mean teenage knowledge score ($p = 0.001$; mean value: 21.7) and compliance with the intake of blood-boosting tablets ($p = 0.008$; mean value: 0.2). There was no significant difference between the control group and the intervention on knowledge scores ($p=0.127$), attitudes (constant variance value), and adherence ($p=0.306$).	Significance	Social Media (Whatsapp)	Compliance in Consuming Iron Supplements
9	Nurannisa Fitria Aprianti et al (2024) ²⁶	Indonesia	The Effectiveness of MONOGAMIA (Monopoly to Prevent Anaemia) on Female Adolescent Knowledge about Anaemia Prevention and Consumption of Iron Supplement	To analyze the effectiveness of MONOGAMIA (Monopoly to Prevent Anaemia) on adolescent girls' knowledge level.	Sample of 96 adolescent female respondents at East Lombok State High School	Quantitative Research, Quasi-experimental pre-post test with control group design.	The two groups exhibited a substantial difference in knowledge on anemia prevention both prior to and following education ($p<0.001$). A substantial disparity in knowledge regarding anemia prevention was seen between the two groups following education ($p = 0.000$). A notable disparity in iron supplement intake was seen between the intervention and control groups following instruction ($p = 0.028$).	Significance	Games Media (Monopoly)	Compliance in Consuming Iron Supplements
10	Marwan Jalamb et al (2018) ²⁷	Palestine	Effects of iron supplementation and nutrition education on haemoglobin, ferritin and oxidative stress in iron-deficient female adolescents in Palestine: randomized control trial	This study evaluated the effectiveness of iron supplementation and nutrition education on improving the levels of haemoglobin and ferritin, and decreasing oxidative stress among iron-deficient female adolescents.	Sample of 145 female adolescents aged 15–19 years was drawn from secondary schools across Gaza.	This randomized control trial (RTC)	This study showed that nutrition education and iron supplementation significantly increased hemoglobin (Hb) and ferritin levels, and decreased MDA levels in adolescent girls aged 15–19 years. Significant changes occurred after 3 months of intervention in the education and supplementation group, while the control group showed no changes. After 6 months, the increase in Hb and ferritin remained in the nutrition education group, and MDA levels decreased, while in the supplementation only group, Hb and ferritin levels actually decreased at follow-up.	Significance	Technology Media (videos), Print media (posters, booklets, and brochures)	Compliance in Consuming Iron Supplements

11	Ali Khani Jeihooni et al (2021) ²⁸	Iran	The effect of nutrition education based on PRECEDE model on iron deficiency anemia among female students	This research aim was to evaluate the effectiveness of the PRECEDE model nutrition education on iron deficiency anemia among female students of Fasa City, Fars Province, Iran.	A sample of 160 students (80 experimental group and 80 control group) was selected using random sampling method in Fasa City, Fars Province, Iran, in 2018–2019.	Quantitative Research, Quasi-experimental	Based on results, the nutrition intervention education base on PRECEDE model has a positive effect to improve iron deficiency anemia preventive behaviors in female students. Te results of the present study showed that the PRECEDE model could increase the ferritin level in adolescent girls by improving the mean score of knowledge, attitude, self-efficacy take iron supplements once a week, reinforcing factors, enabling factors, and nutritional behaviors.	Significance	Technology Media (Video), Print Media (booklets)	Compliance in Consuming Iron Supplements
12	Nesrin N AbuBaker et al (2021) ²⁹	Jordan	The impact of nutrition education on knowledge, attitude, and practice regarding iron deficiency anemia among female adolescent students in Jordan	The aims of this study were (1) assessing hemoglobin levels of female adolescent students, (2) examining their knowledge, attitude, and practice regarding IDA, and (3) evaluating the effect of a nutrition education program on the same.	A sample of 363 female students from four Jordanian public high schools	Quantitative Research, Quasi-experimental with pretest control group	As many as 44.5% of female adolescents experienced mild anemia and 10% moderate anemia. After the intervention, the knowledge, attitude, and practice (KAP) scores of the intervention group increased significantly compared to the control group ($p \leq 0.05$). Structured education has been shown to be effective in increasing KAP related to iron deficiency anemia.	Significance	Videos and brochures	Compliance in Consuming Iron Supplements
13	Md Jiaur Rahman et al (2023) ³⁰	India	Impact of eHealth education to reduce anemia among school-going adolescent girls in rural Bangladesh: Study protocol of a randomized controlled trial	The aim of this study was to evaluate the impact of health education and changes in knowledge, attitudes and practices of adolescent girls regarding anemia.	The sample consisted of 138 school-going adolescent girls in rural Bangladesh, intervention group ($n = 69$) and control group ($n = 69$).	Randomized control trial (RTC)	The results of the study showed that eHealth education is effective in increasing knowledge and changing healthy behavior, which can reduce the burden of anemia in adolescent girls.	Significance	eHealth (mobile phone calls and text messages)	Compliance in Consuming Iron Supplements
14	Omid Sabet Ghadam et al (2022) ³¹	Iran	Evaluating the effect of digital game-based nutrition education on anemia indicators in adolescent girls: A randomized clinical trial	This study aims to determine the effect of nutritional education through digital games on markers of iron deficiency anemia in adolescent girls.	Sample of 176 randomly selected female adolescent students aged 10 to 19 years in the city of Sarava	This randomized clinical trial (RTC)	Nutrition education significantly increased the level of knowledge, attitude, and practice of adolescent girls regarding their diet ($p < 0.05$). Hemoglobin level was also significantly raised ($p < 0.05$). However, no significant effect was observed on other markers of iron-deficient anemia, such as serum iron, TIBC, and hematocrit, in the intervention group compared with the control group ($p > 0.05$). The results of this study indicated the positive impact of nutrition education based on digital game on knowledge, attitude, and practice scores, as well as a significant difference in hemoglobin.	Significance	Print Media (pamphlets)	Compliance in Consuming Iron Supplements

Knowledge is a significant aspect that might influence behavioral changes in individuals when using blood supplement pills. A deficiency in understanding regarding anemia among adolescents will diminish compliance with the intake of blood-enhancing substances.⁴¹

Compliance arises from education, particularly within health psychology, denoting behaviors that align with the suggestions provided by the information source. Behavior is shaped by information and attitudes, so health promotion is essential for enhancing both. Health promotion seeks to inform individuals of the significance of positive behaviors in illness prevention. Educational institutions are pivotal for health promotion, as a significant portion of the population comprises students, and these environments facilitate the acquisition of health knowledge, attitudes, and behaviors from a young age.²⁴

Eleven studies examining the impact of Health Education on enhancing adherence to blood supplement tablet consumption indicated that anemia health education significantly improved compliance with the intake of Blood Supplement Tablets.^{21–31}

The adolescent is a pivotal target for health education aimed at preventing anemia in girls, as this age group is still engaged in the learning process, facilitating knowledge acquisition. Cognition is essential for shaping an individual's actions.³⁷

When supplying anemic educational materials, it is essential to employ media or methods that facilitate the learning process, as media is a key instrument for disseminating knowledge. Analysis of fourteen publications revealed that research studies identified several health education methods to address anemia. A health education program for adolescent females aimed at enhancing self-awareness and adherence to iron tablet consumption as a preventive strategy against anemia.⁴²

Utilizing health promotion media, such as illustrative print media (posters, booklets, brochures, flipcharts and pamphlets) has shown efficacy in increasing self-awareness and compliance in consuming iron tablets among female adolescents. Illustrative media has several advantages in health education, especially in conveying complex information visually and easily understood. The use of images, posters, or flipcharts can increase appeal, help information retention, and is very effective for audiences with low literacy. In addition, this media is economical, easy to use in various environments, and can encourage interactive discussions, making it a practical and efficient educational tool in increasing adolescent understanding of anemia prevention.^{20,43,44} Research indicates that this instructional media substantially enhances understanding ($p = 0.008$) and compliance with iron supplements ($p = 0.028$) among teenagers suffering from anemia. The findings highlight the efficacy of straightforward media in communicating critical information on the use of Blood Supplement Tablets, which can be implemented as a strategic approach in public health initiatives to mitigate anemia in adolescent females.²¹

Alongside illustrative print media, Health education can be disseminated via video media, which is becoming increasingly favored as an informational, instructive, and instructional resource. As an audio-visual medium, video engages two senses concurrently, specifically sight and hearing, enhancing message transmission's efficacy.^{45–47} The research demonstrated a substantial disparity in knowledge and compliance about consuming Blood Supplement Tablets among the group that received the video intervention ($p < 0.0001$). The control group exhibited negligible outcomes ($p > 0.083$) in preventing anemia among adolescent girls.⁴⁸ Using animated videos in health education, particularly with anemia, has enhanced learning efficacy and knowledge retention. Animated movies are essential for enhancing comprehension and increasing adherence to health initiatives among adolescent females due to their visual appeal and capacity to elucidate complicated information.⁴⁹ Animated video media can have an impact on increasing self-awareness of anemia prevention.¹⁹

Presently, technology in the context of globalization is advancing swiftly, facilitating communication among youngsters, Phone calls and short messages via mobile phones are used as educational media to convey health messages about preventing anemia. The results of the study showed that eHealth education is effective in increasing knowledge and changing healthy behavior, which can reduce the burden of anemia in adolescent girls.³⁰ The use of technology through internet-based social media is also a primary choice in health education media.⁵⁰ Social media serves as a communication platform and a medium for digital learning and information exchange. Incorporating technology in health education, particularly with anemia, might expedite the dissemination of knowledge related to its prevention and treatment.⁵¹ Utilizing social media platforms like TikTok and WhatsApp to educate individuals on the significance of Blood Supplement Tablets can effectively enhance health awareness and improve adherence to their consumption.^{51,52} Research conducted at State Junior High School 35 in Pekanbaru indicates that instruction via the TikTok platform has effectively enhanced adherence to Blood Supplement Tablets, with an average score rising considerably from 2.50

(pre-intervention) to 6.82 (post-intervention) and a p-value of less than 0.05.²² The inclusion of WhatsApp has demonstrated efficacy in enhancing adolescents' comprehension and adherence to iron pill usage. These findings highlight the significant potential of social media as an instructional instrument capable of promoting health behavior modification among adolescents.²⁵

Alongside digital education, an effective strategy for anemia education may incorporate gamification techniques to enhance interactivity and engagement in the learning process. The monopoly on anemia prevention effectively enhances awareness regarding anemia prevention and consuming iron supplements among adolescent females.²⁶

Peer education also increases awareness. The tendency of adolescents to imitate group members, encourages the exchange of information and mutual assistance. Individual behavior in adolescence is greatly influenced by peers and the surrounding environment. Adolescents seek acceptance in their social groups, and education from peers increases self-confidence and openness in expressing thoughts. This reduces fear and physical separation that often occur in interactions. A study found that the Structured Education Peer Counselor program was able to increase self-awareness in adolescents to prevent anemia.⁵³ Peer-group education through digital platforms is also effective in increasing knowledge and compliance with iron tablet consumption among adolescents.²⁵

Conclusion

A study of 14 articles revealed that most studies employed quasi-experimental designs, demonstrating that educational media interventions possess significant potential as preventative and promotional techniques to address anemia in adolescent females. The study results indicated that health education media, including print media (brochures, flip charts), media technology (audiovisual, animated videos), phone calls and text messages, social media (WhatsApp, TikTok), game media (Monopoly), and peer groups, significantly enhanced self-awareness and adherence to iron supplement intake for anemia prevention among adolescent girls. Consequently, researchers and health practitioners are urged to thoroughly advance and assess the efficacy of each media type, taking into account technological accessibility and actively engaging adolescents in the media development process to enhance its relevance, attractiveness, and enduring impact.

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