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LITERATURE REVIEW
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Acceptance of Iron Supplementation Program among Adolescent Girls in Indonesia: A Literature Review

Penerimaan Program Tablet Tambah Darah pada Remaja Putri di Indonesia: Studi Literatur

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ABSTRACT

Background: *Anemia poses a significant challenge to the health and productivity of adolescent girls. This has prompted the Indonesian government to initiate a program to distribute iron and folic acid (IFA) supplements. Therefore, it is necessary to address the level of acceptance of or compliance with IFA supplementation among adolescent girls.*
Objectives: *This study aims to assess the acceptance level of the program among adolescent girls in Indonesia.*
Methods: *A PRISMA-guided literature search was conducted in the NCBI, PubMed, Scopus, ScienceDirect, and Garuda databases for experimental or observational research published in Scopus-indexed journals from Q1 to Q4 or in Sinta 1 to Sinta 3 from 2013 to 2023.*
Discussion: *Eight studies conducted in five provinces in Indonesia showed that the coverage of IFA supplement distribution programs was less than 50%, with acceptance levels between 0% and 25.2% according to the Indonesian standard. The majority of IFA supplement distribution programs were not implemented in accordance with the standard. In addition, the supplements were not consistently provided every week, nor were they taken immediately at school. Factors that influence the consumption of IFA supplements among adolescent girls included knowledge, motivation, self-efficacy, attitude, parental influence, peer pressure, school policies and commitments, and the IFA supplements provided. Positive factors encouraged consumption, while negative factors discouraged consumption.*
Conclusions: *The acceptance level of the IFA supplement distribution program remains low. To improve this, it is essential to increase the knowledge of adolescent girls and their parents about anemia, including its definition, causes, side effects, and symptoms, as well as the benefits and risks of not taking IFA supplements. Other necessary measures include improving the distribution system and providing supporting facilities.*

INTRODUCTION

Anemia is a major public health challenge. It particularly affects children, women of childbearing age, and pregnant women[1]. In 2019, approximately 30% of women aged 15-49 years worldwide suffered from anemia[2]. In Indonesia, the prevalence of anemia among adolescents is 32%, which means that three to four out of 10 adolescents suffer from this condition. Adolescence is a period of optimal growth and development with significant physical and psychological needs. Therefore, anemia during adolescence can impair growth development as well as cognitive and physical abilities, which can negatively impact work productivity[3].

Anemia is a medical condition characterized by low red blood cell counts or a hemoglobin level that is below the normal range[2]. This condition reduces the ability of blood cells to carry oxygen to the cells and tissues of the body. Common symptoms include fatigue, tiredness, lethargy, dizziness or headache, and shortness of breath. According to the 2014 World Health Organization (WHO) guidelines, adolescent girls are considered anemic if their red blood cell count is less than

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4.2 million/µl and their hemoglobin levels are less than 12 mg/dL[2]. Anemia can be caused by several factors, including nutritional deficiencies, such as iron, folate, and B12, inadequate intake or impaired absorption of nutrients, infections, inflammation, chronic diseases, gynecological and obstetric conditions, and abnormalities in red blood cells[4]. Anemia can cause fatigue and shortness of breath, which is often associated with premenopausal conditions such as menstruation, gastrointestinal bleeding, impaired absorption of iron, and medications[5].

Since 2014, the Indonesian government has implemented a program known as Weekly Iron and Folic Acid Supplementation (WIFAS/WIFS) to prevent and treat anemia in adolescent girls. Iron and folic acid (IFA) supplements are a nutritional supplement that contains 60 mg of elemental iron and 400 micrograms of folic acid. The supplements are provided free of charge through community health centers (*pusat kesehatan masyarakat/Puskesmas*) or sub community health centers (*pusat kesehatan masyarakat pembantu/Pustu*) and schools. They can also be obtained independently from the nearest pharmacy. The administration of IFA supplements can be considered successful if one tablet is consumed every week for 52 weeks. This program is supported by several regulations, including the Regulation of the Minister of Health Number 88 of 2014 regarding the Standards of Iron Supplement Tablets for Fertile and Pregnant Women, Circular Letter Number HK.03.03/V/0595/2016 regarding the Provision of Iron Supplement Tablets for Adolescent Girls and Fertile Women, and the Regulation of the Minister of Health Number 51 of 2016 regarding the Standards for Nutritional Supplement Products[6].

Adolescence is defined by the WHO as a transitional period from childhood to adulthood, typically between the ages of 10-19 years[7]. During this phase, adolescent girls are particularly vulnerable to anemia[8]. Adolescent girls are primary targets for the provision of IFA supplements due to the double risk of anemia caused by rapid growth followed by an increase in red blood cell mass, and an increase of iron requirements due to menstrual blood loss[9]. Ideally, the IFA supplementation program in schools is implemented for adolescent girls aged 12-18 years. It should be carried out through the school/*madrasa* health unit (*unit kesehatan sekolah/madrasah* or UKS/M) in educational institutions. The consumption of IFA supplements should be scheduled on a specific day each week as agreed upon in each region. The recommended dose is one tablet per week throughout the year. In addition to providing IFA supplements, schools also play a role in educating and promoting balanced nutrition, early detection of anemia, and other related activities in an effort to combat anemia among adolescent girls[6].

Given the importance of anemia prevention in adolescent girls, the level of acceptance of or compliance with the IFA supplementation program is a critical issue to understand. According to the 2018 Indonesia Basic Health Research (*Riset Kesehatan Dasar/Riskesdas*), 76.2% of adolescent girls accepted IFA supplements, with 80.9% receiving them from schools and 19.1% from other sources. In addition, among 34 provinces in Indonesia, Bali had the highest percentage of IFA supplementation at 92.6%, while West Kalimantan had the lowest percentage at 9.6%. The Regulation of the President of Indonesia Number 72 of 2021 regarding the Acceleration of Stunting Reduction targets a minimum of 58% adolescent girls to consume IFA supplements in 2024. Based on this phenomenon, this study aims to assess the acceptance level of the IFA supplementation program among adolescent girls in Indonesia.

METHODS

This study is a literature search and review using a narrative method. The literature search was conducted in November 2023 on literature published between 2013 and 2023. The literature search followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines and was conducted in international databases, including NCBI, PubMed, Scopus, ScienceDirect, as well as a national database called Garuda. The search terms used were *iron AND supplementation AND program AND adolescent AND (anemia OR anaemia) AND indonesia* in the international database, or *tablet tambah darah AND program AND remaja AND anemia AND indonesia* in the national database. The results of the literature search were collected and reviewed for inclusion criteria as presented in Figure 1. The article inclusion criteria for the articles were that they had to be original articles with experimental or observational research designs, conducted on an Indonesian population, written in Indonesian or English, consistent with the research objective, and from a Q1 to Q4 Scopus-indexed journals or from Sinta 1 to Sinta 3.

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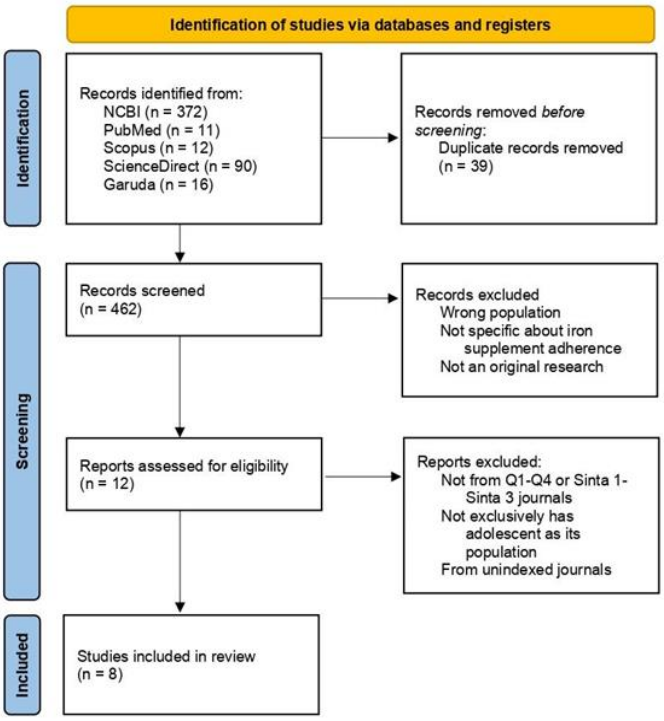

Figure 1. PRISMA flowchart of the literature search

DISCUSSION

The literature search yielded eight articles on the acceptance level of the IFA supplementation program in Indonesia, as presented in Table 1. The articles discuss the coverage and implementation of the IFA supplementation program, acceptance of IFA supplementation among adolescent girls, and factors influencing the acceptance of IFA supplementation in several provinces in Indonesia, namely West Java[10], Central Java[11,12], East Java[13–17], West Nusa Tenggara[11], and East Nusa Tenggara[13,14].

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Table 1. General characteristics of the studies

No	Author, Title	Study Design	Age of Participants	Sample Size	Research Site (Junior/Senior High School, Province)	Study Details	Study Results
1	Alfiah *et al.* 2020[13] Research Title: *Coverage and Adherence of Weekly Iron Folic Acid Supplementation among School Going Adolescent Girls in Indonesia*	Cross-sectional survey study	15-19 years	n = 934 (East Java) n = 922 (East Nusa Tenggara)	Senior High Schools/Madrasah Aliyah/Catholic Senior High Schools in East Java and East Nusa Tenggara	- An initial study of the implementation of the WIFAS program to determine the coverage and compliance of the WIFAS program. - The number of IFA supplement tablets consumed in the last six months was obtained using the recall method.	- Participants were 17 years old on average. - The number of schools implementing the IFA program was 46.7% in East Java and 36.7% in East Nusa Tenggara. - The number of girls who received at least one tablet of IFA supplement was 31% in East Java and 10% in East Nusa Tenggara. - In East Java, only 1.2% of girls received at least 24 tablets of IFA supplements in six months and 2.9% of girls received at least 12 tablets of IFA supplements in six months. Meanwhile, in East Nusa Tenggara, there were none for both. - The average number of IFA supplement tablets received by adolescent girls in the last six months varied between 0.4-1.4 tablets. - The IFA program system was still not yet implemented consistently across schools and regions. Only 58-66% of schoolgirls were exposed to the ideal system (once a week), and the program lasted only for a few weeks. - The majority (>90%) of the adolescent girls received IFA supplements in tablet form according to the national recommendation. - The compliance of IFA supplement consumption was very low. The proportion of adolescent girls taking the recommended amount (24 tablets in six months) was only 1% in East Java and 0% in East Nusa Tenggara. - The average number of IFA supplement tablets consumed by adolescent girls in East Java and East Nusa Tenggara in the last 6 months was 0.4-0.7 tablets. - Adolescent girls reported not taking IFA supplements because they forgot (36-41%), experienced side effects (10-29%), and felt unnecessary (7-19%).
2	Apriningsih *et al.* 2020[10] Research Title: *Determinant of Highschool Girl Adolescent' Adherence to Consume Iron Folic*	Cross-sectional study	14-18 years	n = 274	Senior High Schools/Vocational High Schools in Depok Regency, West Java	- A study to determine the factors that influence compliance among Senior High School/Vocational High School students in participating in the WIFAS program. - Compliance was calculated based on the consumption	- Most students were aged 14-16 years (54.9%) and were from private vocational high schools (40.8%). Most parents of the adolescent girls had never participated in anemia education (94.2%). - Most of the adolescent girls had low knowledge about anemia and the benefits of IFA supplements (54.7%). However, they had a positive attitude towards the IFA supplementation program (51.8%) and good self-efficacy in taking IFA supplements (60.2%).

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	Acid Supplementation in Kota Depok					of IFA supplements at school.	- A total of 21.9% girls took IFA supplements regularly at schools, while 15.3% others took them at home. - A total of 62.8% of the respondents who were not compliant in taking IFA supplements were non-compliant primarily because they felt it was unnecessary to take them (36.1%). - The factors that most influenced the decision to take IFA supplements were the knowledge about anemia and the benefits of IFA supplements (37.2%). - A total of 51.1% the girls had tested their Hb levels, but 44.5% did not know or had forgot the results. - Only 36.5% of the schools implemented IFA supplementation once a week at school regularly. - A total of 50.4% of the adolescent girls said that teachers had talked about anemia and the benefits of IFA supplements, 39.8% said there were health education sessions from primary healthcare facility staff. However, there were only 6.2% of schoolgirls who said that the school had health education media about anemia and IFA supplements. - The factors most associated with adolescent girls' adherence to taking IIFA supplements were schools organizing simultaneous consumption at school (OR = 7.2, CI = 3.5-14.6, p = 0.000), their motivation (OR = 5.3, CI = 2.5-11.3, p = 0.000), and teachers educating them about anemia and IFA supplements (OR = 2.3, CI = 1.2-4.6), while knowledge, self-efficacy, and baseline Hb levels were confounding factors.
3	Nurjanah dan Azinar. 2023[12] Research Title: Kepatuhan Konsumsi Tablet Tambah Darah pada Sekolah Percontohan Kesehatan Reproduksi dan Seksualitas	Cross-sectional study	11-15 years	n = 438	Semarang 22 Junior High School	A study to determine the factors associated with the compliance with IFA supplement consumption among adolescent girls.	- The compliance level of IFA supplement consumption among adolescent girls was low, 25.2% of the target of 58%. - The number of adolescent girls who had good knowledge about IFA supplements was only 38.1%. This is due to the lack of dissemination from schools and health workers and the unavailability of health media about IFA supplement. - The positive attitude formed to comply with taking IFA supplements was 72.9%. Students already knew that IFA supplements are beneficial for health. - IFA supplements could be easily accessed at school for free (99%). Other than at school, adolescent girls could obtain IFA supplements at the nearest adolescent integrated health post (*pos pelayanan terpadu/posyandu remaja*), community health center, and pharmacy. - Half of the adolescent girls had full support from their parents to consume IFA supplements by reminding and supervising them to consume the supplements. - A total of 67.6% of the adolescent girls reported that teachers had supported the IFA supplementation program.

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							- As many as 45.7% of the adolescent girls reported that the school had not supported the IFA supplementation program, as evidenced by the lack of supervision and follow-up if they did not consume IFA supplements and the absence of health media and water dispensers for consuming IFA supplements. - The role of health workers was absent, as evidenced by dissemination activities that were still not evenly distributed to adolescent girls.
4	Oddo *et al.* 2022[11] Research Title: *Evidence-Based Nutrition Interventions Improved Adolescents' Knowledge and Behaviors in Indonesia*	Quantitative study with pre-post design	12-18 years	n = 540	Junior High Schools and Senior High Schools in Klaten Subdistrict, East Java and West Lombok Subdistrict, West Nusa Tenggara	Program interventions included: - WIFS program and bringing breakfast to school to monitor IFA supplement consumption once per week. - Nutrition education program outside the school curriculum. Nutrition education sessions were held weekly for 30 minutes, facilitated by teachers. Topics included nutrition and health, sexual and reproductive health, sanitation and personal hygiene, noncommunicable diseases, mental health, addiction, and injury/violence. - Social behavior change communication (SBCC) program. This program includes the implementation of anemia prevention, a healthy diet, and physical activity. - The duration of the intervention was 15 months.	- Most of the adolescent girls who participated in the study were 15 years old. - There was a 24,7% increase in the number of adolescent girls answering ≥ 15 questions correctly after the intervention. - Almost 75% of the adolescent girls showed positive attitudes and behaviors towards healthy eating, both at the beginning and end of the study. Schoolgirls had consistently performed physical activity at the beginning and end of the study. - Types of food eaten were already very diverse, with more than five types of food, both staple foods and animal protein sources. - There was an increase in the consumption of vitamin A-rich vegetables and fruit by 8.4%. - The consumption of sugary foods/beverages, snacks, and sweets was very high at the beginning of the study. At the end of the study, there was a decrease in consumption of sweets (23.4 %) and snacks (17.4%), while candy consumption increased (4.5%). - Physical activity among adolescent girls increased to 41.1%, with at least 60 minutes of activity per day for one week. - Almost all of the girls had consumed IFA supplement tablets. At the beginning of the study, they consumed IFA supplement tablets before going to school. At the end of the study, IFA supplement tablets were consumed at school after breakfast. - Towards the end of the study, there was a COVID pandemic, which made taking IFA supplement tablets initially perceived as inconvenient and dangerous. By the end of the study, this perception had decreased. - Overall, knowledge of diet, physical activity, and anemia improved significantly compared to the beginning of the study.
5	Seminar *et al.* 2020[14] Research Title: *Awareness about Anaemia and Weekly Iron-Folic Acid Supplementation (WIFAS) among*	A qualitative study with focus group discussions and in-depth interviews	15-19 years (senior high school students)	n = 174 (FGD with senior high school students) n = 20 (IDI with senior high	Senior High Schools in East Java and East Nusa Tenggara	The qualitative study is an initial study of the implementation of the WIFAS program for adolescent girls aged 15-19 years to determine local perspectives on anemia and the WIFAS program as well	- Adolescent girls and parents had a very poor understanding of anemia (causes, consequences, and preventive measures) and foods that increase or inhibit iron absorption. This was influenced by the sociocultural environment and food availability. However, knowledge related to food and beverages did not affect local eating habits.

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	School-Going Adolescent Girls and Parents in East Java and East Nusa Tenggara			school students) n = 66 (FGD with parents of senior high school student) n = 10 (IDI with parents of senior high school student)		as the role of the sociocultural environment in adolescent girls and parents was discussed under 5 themes: the understanding of anemia; experiences related to anemia; the understanding of the WIFAS program; experiences related to the WIFAS program; and the sociocultural environment, local eating habits, and living conditions.	- Adolescent girls and parents still had difficulties in identifying the symptoms of anemia and considered the symptoms as causes for serious illnesses. The follow-up of anemia symptoms was influenced by the sociocultural environment. Implementing the WIFAS program did not guarantee a better understanding of anemia. - Adolescent girls and parents had varying understandings of the dosage, consumption rules, benefits, and side effects of the WIFAS program. - Adolescent girls complied with the WIFAS program because they understood the consequences of anemia (less focused when studying), knew the benefits of the WIFAS program (overcoming premenstrual syndrome and increasing stamina), were influenced by peers who took IFA supplements, were influenced and monitored by teachers when taking IFA supplements, were influenced by parents, and became peer cadres who helped distribute the IFA supplements at school. The reason why parents have children who comply with the WIFAS program is because parents tell their children to comply. - The reasons why students did not comply with the WIFAS program were that they had not eaten when they took the IFA supplements together at school, forgot, felt healthy, were menstruating, had side effects when taking IFA supplements, were influenced by parents and friends who did not take IFA supplements, the tablet size was too big, and did not want to take drugs or supplements. Some parents did not allow their children to take IFA supplements because they were worried about the potential side effects, such as high blood pressure and drug dependence, and did not want their children to take drugs.
6	Silitonga *et al.* 2023[15] Research Title: *Knowledge, attitude, intention, and program implementation of iron supplementation among adolescent girls in Sidoarjo, Indonesia*	Mixed methods	14-19 years	n = 202 (senior high school students) n = 13 (senior high school) n = 2 (nutritionists) n = 3 (healthcare facilities)	Senior High Schools, Nutritionists, and Healthcare Facilities in Sidoarjo Regency, East Java	- Cross-sectional quantitative methods with questionnaires filled by senior high school students in Sidoarjo. - Qualitative method with in-depth interviews with high schools in Sidoarjo and FGDs with nutritionists and healthcare facilities in Sidoarjo.	- Most adolescent girls involved in this study were 17 years old (36.6%). - Most of them (59.9%) had poor knowledge regarding anemia, but most of them (59.9%) had good knowledge regarding iron supplementation. - Their attitudes towards anemia and iron supplementation and willingness to take iron supplementation were low (51% and 51.5%, respectively). This was influenced by the lack of education, differences in distribution time, and implementation methods used by each school. - Senior high school students reported three ways of distributing iron supplements: 1) distributed with explanation or instruction, 2) distributed without explanation, and 3) only distributed to students who requested or were anemic. - The implementation of the IFA supplementation program still varied and was not as ideal as the guidelines. IFA supplements were

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							administered to adolescent girls four strips per month to be consumed weekly. - Consumption levels were still low because they did not consider it necessary. - IFA supplement distribution was handed over to the school at different times due to limited health workers with heavy workloads. - The health workers only distributed to schools and delegated the monitoring tasks to the teachers. However, monitoring was not carried out and only evaluated during visits.
7	Silitonga *et al.* 2023b[16] Research Title: *The association between social support with compliance of IFA supplement intake among adolescent girls in Sidoarjo, Indonesia*	Analytic observational study with a cross-sectional approach with a multistage sampling technique	14-19 years	n = 202	Senior High Schools in Sidoarjo Regency, East Java	- A study to determine the amount of information sources and reminders as part of social support on adolescent schoolgirls' adherence to the WIFAS program. - Data collection was done using Google Forms.	- Adolescent girls who participated in the study were 14-19 years old, and most of them were middle adolescents aged 14-17 years (n = 169, 83.7%) and in 12th grade (n = 77, 38.1%). - A total of 24.3% of adolescent girls did not receive any information support. Most of them (49%) received information from one source. - Adolescent girls who received a reminder as support were 53% (n = 107), while those who did not receive a reminder were 43.6% (n = 88). - The majority of adolescent girls obtained information support from teachers and parents. - Adolescent girls got reminders from teachers, calendars, and phone apps. - A total of 74.8% of them received IFA supplements, but only 11.4% of them took IFA supplements regularly every week. - Adolescent girls did not take IFA supplements regularly because they forgot (80%), did not like the taste (70%), did not consider it necessary (49%), had side effects (20%), and did not receive IFA supplements (2%).
8	Silitonga *et al.* 2023c[17] Research Title: *The role of social support and interpersonal trust to improve compliance of iron supplementation amongst adolescent girls: A qualitative approach*	Cross-sectional qualitative study with in-depth interviews	15-18 years	n = 13	Senior High School in Sidoarjo Regency, East Java	A qualitative study to determine the adherence of IFA supplement consumption and the role of social support as a source of information and reminders in adolescent girls, which was discussed under four themes: consumption compliance, reasons for consumption, information related to IFA supplement, and social support reminders.	- Compliance IFA supplement consumption can be categorized into "never consume at all", "do not consume regularly", and "consume regularly". - Consumption of IFA supplement was influenced by peer, parental, and teacher influence who did not make consumption mandatory, personal perception of not being anemic, risks of not consuming, benefits of consuming, and forgetfulness. - Information related to IFA supplements was obtained from teachers and health workers. Some girls still questioned the truth of the information being conveyed, so they confirmed by checking other media. - Some girls did not receive reminders to take IFA supplements, while some others received reminders to take IFA supplements (through notes and reminders provided by student organizations or notebooks provided by healthcare facilities). The most trusted parties to remind students to take IFA supplements are parents, teachers, peers, and doctors.

FGD: Focus Group Discussion; Hb: Hemoglobin; IDI: In-Depth Interview; IFA: Iron Folic Acid; WIFAS/WIFS: Weekly Iron Folic Acid Supplementation

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The IFA supplementation program for adolescent girls through educational institutions was implemented in different provinces in Indonesia. Most of the girls receiving the IFA supplementation reported that they could easily get access to the supplements from their school for free and that they received the supplements in the form of tablets according to the national recommendation[12,13]. However, the coverage of the IFA supplementation program still varied. There are provinces with high coverage of IFA supplementation program, such as East Kalimantan (83.3%). In comparison, there are also provinces with low coverage of IFA supplementation program, such as East Java (46.7%) and East Nusa Tenggara (36.7%)[13,18]. Therefore, this program should be implemented with a blanket approach, which means that it should be able to reach and cover all adolescent girls in Indonesia[9].

The implementation of IFA supplementation programs in schools still varied; not all were ideal according to the standard. Ideally, IFA supplements are administered at a dose of one tablet per week throughout the year, and the provision is facilitated by the school/*madrasa* health unit, which schedules the weekly consumption according to their respective regional policies[9]. However, only 36.5% of schools in West Java regularly provided IFA supplements once a week. Moreover, only 21.9% of adolescent girls regularly took IFA supplements at school, while 15.3% of them took IFA supplements at home[10]. In East Java, it was found that schools provided IFA supplements in the form of strips four times a month to be consumed independently every week[15]. Only 58-66% of senior high school girls in East Java and East Nusa Tenggara experienced the ideal implementation of IFA supplementation program, which lasted only for a few weeks[13].

Furthermore, the methods used by schools to distribute the IFA supplements also varied. Some schools distributed the supplements while giving explanation or instruction, some schools distributed the supplements without giving explanation or instruction, and some schools distributed the supplements only to students who were anemic or asked for the supplements. Due to the limited number of health workers at public health centers, the distribution and monitoring of IFA supplementation program were delegated to schools. As a result, the distribution and monitoring were not implemented properly[15]. This is evidenced by the low number of IFA supplements distributed to students. In a six-month study in East Java and East Nusa Tenggara, the average number of IFA supplements received by adolescent girls were only 0.4 to 1.4 tablets. Adolescent girls who received at least one dose of IFA supplements were 31% in East Java and 10% in East Nusa Tenggara. Meanwhile, adolescent girls who received at least 24 tablets in six months were only 1.2%, and those who received at least 12 tablets in six months were only 2.9% in East Java. No adolescent girls received any of these amounts in East Nusa Tenggara[13].

It is generally known that the acceptance level of the IFA supplementation program is very low, as indicated by the consumption of IFA supplements by adolescent girls. A study on junior high school students in Semarang found that only 25.2% of the students consumed IFA supplements[12]. Other studies reported that senior high school students in Magelang who complied with the consumption of IFA supplements was only 15.6%. In contrast, senior high school students in Semarang who consumed IFA supplements were almost twice as much as those in Magelang, which was 34.2%[19,20]. Another study reported contrasting results, where the coverage of IFA supplementation program in Yogyakarta was found to be relatively high at 91% with a compliance level of consumption at 62%[21]. Meanwhile, another study found that only 11.4% of adolescent girls consumed IFA supplements regularly every week, although 74.8% of them received the supplements[16]. The percentage of adolescent girls in East Java and East Nusa Tenggara who consumed IFA supplements according to the recommendation of 24 tablets in six months were only 1% and 0%, respectively, with an average number of IFA supplements consumed being 0.4-0.7 tablets[13]. A study in East Kalimantan also found that IFA supplement consumption was only 17.6%[18]. The target achievement of the consumption of IFA supplements among adolescent girls is 58% in 2024 as stated in the Regulation of the President of the Republic of Indonesia Number 72 of 2021 regarding the Acceleration of Stunting Reduction. Given the low acceptance of IFA supplementation among adolescent girls, it is essential to understand the factors that encourage or discourage adolescent girls to consume IFA supplements.

Based on previous studies, it is known that several factors encouraged or discouraged the consumption of IFA supplements among adolescent girls. These factors were personal factors, sociopsychological factors, school policies and commitments, and the IFA supplements provided. Personal factors that influenced adolescent girls to take IFA supplements included knowledge, motivation, self-efficacy, and attitude. Good knowledge about the benefits of IFA supplements[10,12,14] and about anemia and its consequences[10,14] was one of the main factors that encouraged adolescent girls to consume IFA supplements. On the contrary, a lack of knowledge about the definition, causes, effects, and symptoms of anemia, about the direction for taking the supplements, and about the risks of not taking the supplements might discourage them to consume the supplements. For example, some adolescent girls were reluctant to take IFA supplements because they believed that they could not take them during menstruation[14]. This lack of knowledge may be caused by the lack of dissemination about anemia and IFA supplements obtained (such as from schools and health workers) and the lack of information sources (such as supporting health media) [12,14,17].

On the one hand, internal motivation, good self-efficacy, and positive attitude in adolescent girls were also correlated with the consumption of IFA supplements[10,12]. On the other hand, the feeling of healthy or not needing to consume IFA supplements might discourage the consumption of IFA supplements in adolescent girls[10,13–17]. This is consistent with the results of a study in South Jakarta which found that a significant relationship between attitude and IFA supplement consumption behavior during menstruation, as well as a

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study in Semarang which found that perceived self-confidence and benefits were related to compliance with the consumption of IFA supplements[22,23]. Motivation and efficacy are two factors that can influence behavior. Perceived benefits, which in this case are the benefits of IFA supplement consumption, were also one of the strong predictors of behavior, which in this case is the IFA supplement consumption behavior. In other words, if adolescent girls did not consume IFA supplements because they believed that they would not get any benefit from it, the IFA supplement consumption behavior would be lower[24]. In addition, many adolescent girls did not consume IFA supplements because they forgot to take them[13,14,16,17].

Sociopsychological factors also influenced IFA supplement consumption in adolescent girls, namely parents and peers. Parents play a significant role in adolescent girls' compliance with the supplement consumption. Inaccurate knowledge and perceptions related to anemia and IFA supplements among parents could influence adolescent girls' compliance with the supplement consumption because parents might prohibit their daughters from taking the supplements. A study in East Java and East Nusa Tenggara found that parents prohibited their daughters from taking IFA supplements due to concerns about potential side effects, such as high blood pressure and drug dependence[14]. Conversely, parents who provided support, such as reminders or supervision, could encourage compliance with IFA supplement consumption among adolescent girls[12,14].

Having peers who also took IFA supplements might encourage adolescent girls to do the same[14]. Conversely, the reluctance of peers to take IFA supplement could hinder the acceptance of IFA supplementation program among adolescent girls[14,17]. The influence of friends is one of the sociopsychological variables that can prompt a person to take action[24]. It is important to note that schools could assign adolescent girls as a peer cadre who assists in the distribution of IFA supplements, which might encourage their consumption[14]. This is because social pressure can have an impact on a person's behavioral intentions[24].

Furthermore, the policies and commitments of schools, which are target institutions for intervention aimed at organizing programs to provide IFA supplements, could influence the IFA supplement consumption among adolescent girls. Providing IFA supplements at school and encouraging immediate consumption were known to be correlated with their compliance with their consumption[10]. The active roles of teachers in the IFA supplementation program, such as educating and monitoring the consumption, could also encourage compliance with the supplement consumption[10,13,14]. An intervention study conducted in Central Java and West Nusa Tenggara found that a nutrition education program delivered by teachers for 30 minutes each week aside from the school curriculum, accompanied by a social behavior change communication (SBCC) program in the form of anemia prevention, healthy eating, and physical activity for 15 months, were associated with a higher likelihood of adolescent girls consuming IFA supplements at least once (OR: 6.7; 95% CI: 1.7-3.2) at school (OR: 7.0; 95% CI: 4.0-12.2). Additionally, the intervention reduced the number of adolescent girls who found IFA supplement consumption inconvenient (from 34.5% to 24.7%) and dangerous (from 26% to 14.1%)[11].

However, the distribution of IFA supplements to adolescent girls might be hindered by various factors such as the shortage of health workers, poor program implementation, insufficient dissemination of IFA supplementation program, inadequate school facilities to support IFA supplement consumption (such as drinking water dispensers), inadequate school and teacher supervision, and lack of follow-up for non-compliance with IFA supplement consumption among adolescent girls[12–17]. According to a study conducted in West Java, only 50.4% of adolescent girls reported that their teachers had discussed anemia and the benefits of IFA supplements. Additionally, 39.8% reported that they received health education sessions from primary healthcare facility staff, while 6.2% reported that they were exposed to health education media about anemia and IFA supplements at school. Only 21.9% of the adolescent girls regularly consumed IFA supplements at school, while 15.3% consumed them at home. It is important to ensuring the availability of IFA supplements and that adolescent girls have eaten before consuming the supplements at school [10]. A study conducted in East Java and East Nusa Tenggara found that some adolescent girls did not consume IFA supplements because they wither did not have access to them or had not eaten before consuming them at school[14].

Another factor that influenced the acceptance of the IFA supplementation program among adolescent girls was the type and specification of the IFA supplements provided. The supplements provided were dark red, round or oval, and sugar-coated tablets[9]. Some adolescent girls were reluctant to consume IFA supplements because of the size of the tablets or dislike of the taste[14,16]. This is consistent with a study which found that the color and smell of the supplements were among the top-three reasons for non-consumption[25]. In addition, studies conducted in East Java and East Nusa Tenggara reported that many adolescent girls were reluctant to consume IFA supplements due to experiencing side effects from consumption[13,14,16]. This highlights the significance of producing and distributing IFA supplements that are acceptable to adolescent girls, as the type of supplement provided is known to be significantly associated with the success of intervention programs in adolescents and women of childbearing age[26]. Studies on the evaluation of IFA supplement specifications showed that commercial IFA supplements tended to have a higher compliance level compared to non-commercial IFA supplements. This is due to their more favorable taste, smaller tablet size, and fewer side effects. Another study conducted in Palu yielded similar results, indicating that commercial IFA supplements containing multi-nutrients were preferred and had a higher compliance level than those only containing iron and folic acid[27,28]. In addition, IFA supplements in the form of capsules had a higher compliance level than those in the form of tablets, likely due to increased iron bioavailability and reduced side effects[29].

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The results of this literature search provide an overview of the implementation and acceptance of IFA supplementation programs in adolescent girls in Indonesia. It includes information on program coverage and acceptance as well as factors that influenced them, both positively or negatively. The articles analyzed in this search also provide a detailed picture of these factors through qualitative study design. However, it is important to note that this literature search has limitations. Specifically, the literature search may not be representative of the Indonesian population since the reviewed articles only presented results from research in five provinces in Indonesia.

CONCLUSION

The acceptance of the IFA supplementation program in five provinces in Indonesia, namely West Java, Central Java, East Java, West Nusa Tenggara, and East Nusa Tenggara, is generally very low and still far below the national IFA supplement consumption target of 58% in 2024. Factors that influence the acceptance of the IFA supplementation program include personal factors such as knowledge, motivation, self-efficacy, and attitude; sociopsychological factors such as parents and peers; school policies and commitments; and the IFA supplements provided. The low acceptance of the IFA supplementation program among adolescent girls is partly due to a lack of knowledge about anemia, including its definition, causes, side effects, and symptoms as well as how to consume IFA supplements as well as the benefits and risks of not doing so. In addition, misconceptions about anemia and IFA supplements among adolescent girls, inadequate support from school in the implementation of the IFA supplementation program, and the specification of IFA supplements that are not suitable for adolescent girls' taste contributed to the issue. Therefore, it is necessary to improve education of adolescent girls and parents education regarding anemia and IFA supplements. This will ensure that adolescent girls have appropriate perceptions and parents can support them in consuming IFA supplements. Finally, it is necessary to strengthen the commitment and support of schools in implementing the IFA supplementation program, which can be achieved by improving the distribution system and providing supporting facilities.

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CONFLICTS OF INTEREST AND FUNDING DISCLOSURE

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