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Factors related to the compliance to consuming iron-folic acid in young women in East Kalimantan, Indonesia

Faktor-faktor yang berhubungan dengan kepatuhan konsumsi tablet tambah darah pada remaja putri di Provinsi Kalimantan Timur

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Abstract

Weekly Iron Folic Acid supplementation/WIFAS program for adolescent girls is an effective strategy for preventing anemia. However, in Indonesia, only 1,4% adhere to taking WIFAS. This study aimed to discover the factors related to adolescent girls' adherence to consuming WIFAS in East Kalimantan. The design of this study was cross-sectional, using a purposive sampling technique to find a sample of 825 adolescent girls. The research location was the East Kalimantan Provincial Health Office from November 15 to December 15, 2021. The analytical method uses the Chi-Square test and binary logistic regression test. The results showed that the level of adherence to the consumption of iron folic acid for adolescents girl was 17,6%. The factors related to the adherence of adolescent girls in consuming WIFAS in East Kalimantan were the area of residence (p=0,023), hemoglobin check (p=0,0001), access to information on iron-folic acid (p=0,014), received/purchased iron-folic acid (p=0,000), knowledge (p=0,010) and the use of the Cegah Anemia Remaja Indonesia (CERIA) application (p=0,0001). Based on reg log analysis, factors such as having received/purchased iron WIFAS, Hb checks, knowledge, and use of the CERIA application were associated with adolescent girls' adherence to WIFAS. In conclusion, adolescent girls with regular WIFAS consumption were easier to get WIFA, check Hb, have good knowledge and use the CERIA application. These findings suggest the need to carry out hemoglobin checks on adolescent girls, increase the availability of WIFAS and socialize the use of the CERIA app.
Keywords: Adherence, adolescent girl, anemia, iron folic acid

Abstrak

Program pemberian Tablet Tambah Darah (TTD) mingguan kepada remaja putri merupakan salah satu strategi yang efektif dalam mencegah anemia. Namun diketahui hanya 1,4% yang patuh mengkonsumsi tablet tambah darah setiap minggunya. Tujuan dari penelitian ini adalah untuk mengetahui faktor-faktor apa saja yang berhubungan terhadap kepatuhan remaja putri dalam mengkonsumsi tablet tambah darah di Provinsi Kalimantan Timur. Desain penelitian ini menggunakan cross-sectional dengan menggunakan teknik purposive sampling sehingga mendapatkan sample sebesar 825 remaja putri. Lokasi penelitian di Dinas Kesehatan Provinsi Kalimantan Timur pada 15 November – 15 Desember 2021. Metode analisis menggunakan uji Chi-Square dan uji regresi logistik biner. Hasil penelitian menemukan bahwa tingkat kepatuhan remaja putri sebesar 17,6%. Diketahui wilayah tempat tinggal (p=0,023), cek Hb (0,000), akses informasi TTD (p=0,014), pernah mendapat/membeli TTD (p=0,000), pengetahuan (p=0,010) dan penggunaan aplikasi Cegah Anemia Remaja Indonesia (CERIA) (0,000) memiliki hubungan terhadap kepatuhan remaja putri. Sedangkan dalam uji regresi logistik ditemukan bahwa faktor-faktor yang memiliki hubungan signifikan terhadap kepatuhan remaja putri adalah Mendapat/Membeli TTD, cek Hb, pengetahuan remaja putri dan penggunaan aplikasi CERIA. Kesimpulan, remaja putri yang patuh

mengkonsumsi TTD adalah remaja putri yang memiliki ketersediaan TTD, melakukan pemeriksaan Hb, pengetahuan yang baik dan pengguna aplikasi CERIA. Temuan ini menunjukkan perlunya untuk menjalankan pengecekan Hb pada remaja putri, meningkatkan ketersediaan TTD dan meningkatkan sosialisasi penggunaan aplikasi CERIA di sekolah.
Kata Kunci: Anemia, kepatuhan, remaja putri, tablet tambah darah

Introduction

Anemia is a problem that can occur not only in pregnant women and breastfeeding mothers but also in young women worldwide, including in Indonesia. Adolescence is the golden period for overcoming anemia because there is an increase in nutritional needs, especially iron (Dubik et al., 2019).

Young women are prone to anemia because, when entering adolescence, they lose blood during menstruation. Girls who experience anemia risk developing anemia when they become pregnant, which harms the fetus's growth and development in the womb, causing low birth weight babies (LBW) and death (Regasa & Haidar, 2019). Globally, approximately 1,62 billion people worldwide experience anemia, and about half of all who experience anemia can be caused by iron deficiency (Mantadakis et al., 2020). Indonesia has a population of 270,20 million, with 17% of the population being young women. It comprises 44 million young women (BPS, 2020). One in four young women and women of childbearing age aged 15–49 years (not pregnant) had anemia (Kemenkes RI, 2018a).

According to the National Movement for the Acceleration of Nutrition Improvement contained in Presidential Regulation 42 of 2013, health and nutrition improvement efforts will be prioritized in the First 1000 Days of Life to increase the growth and development of children in Indonesia (Perpres RI No. 42, 2013). Anemia control programs for girls and women of childbearing age have been integrated into efforts to accelerate nutritional improvement (Ningtyias et al., 2020).

Efforts to prevent and treat anemia in young women are carried out by administering one iron-folic acid (IFA) to drink every week to reduce the prevalence of anemia in young women and women of childbearing age in Indonesia by 2025. Blood add supplement contains 200 mg of ferrous sulfate or 60 mg of elemental iron and 0,25 mg of folic acid or 0,4 mg of folic acid in one tablet. This supplementation program was conducted through the School Health Unit in collaboration with the Integrated Healthcare Center or the surrounding public health centers (Ningtyias et al., 2020).

The results of the National Health Survey 2018 (RISKESDAS) showed that the number of young women in Indonesia who adhered to consuming IFA every week or ≥52 capsules in one year was only 1,4%, while 98,6% of them were disobedient to taking iron supplements. This indicates that young women's compliance with IFA remains relatively low (Kemenkes RI, 2018b). Based on the achievement data for the Nutrition Program Indicators for the Province of East Kalimantan in 2020, the highest percentage of compliance levels for girls is in the East Kutai Regency (15,78 %). Meanwhile, in Paser District, North Penajam Paser, West Kutai, Berau, Mahulu, and Samarinda City, the obedience level is 0% (Dinkes Kalimantan Timur, 2020). This can happen because, in several regions or cities, teenage girls consume < 52 tablets of IFA in a year; thus, the percentage in some districts or cities is 0%.

Although blood supplement tablets are provided free of charge and information from official recording and reporting, there are still many adolescent girls who do not comply with taking blood supplement tablets via SMS or WhatsApp group or through the Prevent Indonesian Youth Anemia application (*Cegah Anemia Remaja Indonesia/CERIA*) (Kemenkes RI, 2020). Therefore, this problem is related to the level of compliance among teenage girls. This low level remains the main obstacle to the blood supplementation program for young girls (Novita et al., 2021).

Compliance with IFA supplements is the behavior of teen girls who follow all the instructions or procedures for consuming IFA supplements recommended by health workers (Novita et al., 2021). The disobedience of teenagers in consuming IFA supplements can be caused by several factors, such as boredom or laziness, unpleasant taste and smell of iron tablets, and side effects experienced after consuming iron tablets, such as nausea and

vomiting, abdominal pain, diarrhea, loss of appetite, or allergies (Apriningsih et al., 2022). In addition, the observance of young women consuming IFA supplements is a form of behavior, so this tendency can be analyzed using behavioral theories, such as Lawrance Green's theory.

Based on the results of Widiastuti & Rusmini (2019), young women still lack awareness of the importance of iron tablets, which affects their compliance, especially those who live in urban areas. Lismiana & Indarjo (2021) also found that perceptions of susceptibility, seriousness, benefits, barriers, and beliefs affected teen girls' adherence to iron tablets. Furthermore, Al Rahmad (2017) research found that more than half of the girls did not take iron tablets. This is due to the symptoms felt after consuming blood-boosting tablets, such as nausea, vomiting, pain, and dizziness. In addition, the research showed a relationship between knowledge about IFA supplements and young ladies who were not compliant with consuming iron tablets. Girls with less knowledge about IFA supplements and anemia tended to be disobedient when taking iron tablets (Andani et al., 2020; Runiari & Hartati, 2020; Sab'ngatun & Riawati, 2021; Samputri & Herdiani, 2022; Wahyuningsih & Qoyyimah, 2019).

Therefore, researchers are interested in examining the factors influencing the low consumption of IFA supplements among young women in the East Kalimantan Province.

Methods

Observational analytic research using a cross-sectional design: On December 16–20, 2021, data will be collected through an online quiz. The study population was young women aged 10–19 years in East Kalimantan, with 318.108 women in 2020 (BPS, 2020).

The sample consisted of young girls from 43 junior high schools and 26 high schools and their equivalents, aged 12–19 years, who were the target of the blood supplement program in East Kalimantan, totaling 825 girls. The sampling technique in this study uses the technique of purposive sampling and is calculated using the Lemeshow sample size formula with a 90% confidence level

The variables studied included respondent characteristics, access to iron supplements, knowledge, use of the CERIA application, and compliance with taking iron supplements. Respondent characteristics include age, age at first menstruation, education level, area of residence, and check Hb. Age at first menstruation was divided into 7-9 years (fast), 10-14 years (normal), and over 15 years (late) (WHO, 2018). Access to IFA supplements includes information on blood increase tablets, ownership of blood increase tablets, sources of blood increase tablets, and types of blood increase tablets. Knowledge of young women about blood increase tablets (definition, benefits, and program objectives) and anemia (definition, causes, symptoms, prevention, and sources of iron in addition to blood increase tablets). Knowledge was divided into two categories: poor knowledge (< 8) and good knowledge (≥ 8). All variables were assessed using a questionnaire.

Data analysis techniques were used to determine the relationship between variables in the bivariate test using the chi-square and multivariate tests with binary logistic regression tests. Data analysis was performed using SPSS 25. This study received ethical approval (No. 127/KEPK-FK/VIII/2022, issued by the Health Research Ethics Commission, Faculty of Medicine, Mulawarman University, Samarinda, on August 9, 2022.

Result and Discussion

Table 1. Characteristics, access, knowledge, and compliance of respondents

Characteristic	n	%
Age		
12-15 Years	671	81,3
16-18 Years	153	18,6
19-21 Years	1	0,1
Age of First Menstruation		
7-9 Years (Fast)	11	1,3
10-14 Years (Normal)	786	95,3
≥15 Years (Late)	18	2,2
Not Menstruating	10	1,2
Level of education		
Junior High School	617	74,8
Senior High School	208	25,2
Residential Area		
Regency	106	12,8
City	718	87,0

Characteristic	n	%
Perform Hb Check		
Never	762	92,4
Ever	63	7,6
Access information on iron supplement tablets		
Schools, health facilities, and families	644	78,1
Social media and broadcasting	79	9,6
Others	102	12,4
Ever received or purchased iron supplement tablets		
No	247	29,9
Yes	578	70,1
Source of iron supplement tablets		
Schools, health facilities, household	687	83,3
Self and Family Initiative	121	14,7
Others	17	2,1
Types of iron supplement tablets		
Ferrous Fumarete-Folic Acid	334	75,1
Sangobion, Sakatonik Liver, Livon B.plex	110	13,3
Hemobion	1	0,1
Using the CERIA App		
No	759	92,0
Yes	66	8,0
Knowledge		
Less	281	34,1
Good	544	65,9
Obedience		
Disobedient	680	82,4
Comply	145	17,6

Table 1 shows that the average age of the respondents was 14,37, with a standard deviation of 1,599. The youngest was 12 years old, and the oldest was 19 years old. Most respondents' first menstrual period (3395,3%) was normal, namely, 10–14 years old, with most coming from the junior high school level of education (74,8%). Most of the respondents lived in the city (87,0%). Most respondents (92,4%) had never checked their Hb levels, and respondents received information about IFA supplements from schools, health facilities, or their families (78,1%). Most patients had received or purchased iron supplement tablets (70,1%). Most respondents received iron supplement tablets from schools, health facilities, or households (83,3%), with the majority receiving or buying the Ministry of Health's standard iron supplement tablets, namely ferrous fumarate-folic Acil (75,1%).

Most respondents had never used the Indonesian Youth Anemia Prevention Application (*Cegah Anemia Remaja Indonesia/CERIA*). Most respondents (65,9%) had good knowledge of IFA supplements and anemia. At the obedience level of young girls, only 17.6% of respondents were obedient to consuming IFA supplements every week, whereas most respondents (82,4%) were disobedient to consuming iron tablets. At the observance level of young women, only 17,6% of the respondents complied with taking IFA supplements weekly. At the same time, most respondents (82,4%) were disobedient in consuming iron supplement tablets. One of the Indonesian government's programs to reduce the incidence of anemia is to distribute free IFA supplements to young women. However, they are still disobedient in consuming IFA supplements based on recording and reporting from My Health report or taking control cards, short messages, or WhatsApp (Kemenkes RI, 2020). Compliance with the supplement consumption of blood-boosting tablets was obtained by calculating the remaining tablets. Teen girls were categorized as obedient if they consumed ≥52 tablets yearly. However, they are considered disobedient if they consume <52 tablets yearly (Kemenkes RI, 2018a).

According to the Indonesian Ministry of Health (Kemenkes RI, 2015), the disobedience of young women who consume IFA supplements can be caused by several factors, such as boredom or laziness, unpleasant taste and smell of iron tablets, and side effects that occur after consuming iron tablets, such as nausea and vomiting, abdominal pain, diarrhea, loss of appetite, or allergies. In addition, young women's adherence to taking IFA supplements is a form of behavior, so the tendency to regularly take IFA supplement can be analyzed using behavioral theories, such as Lawrence Green's theory. Lawrence Green's theory explains that a person's health behavior can be influenced by three factors: predisposing factors (age, education, knowledge, work, and attitudes), enabling factors (health facilities and infrastructure), and reinforcing factors (support from family, friends, or public figures) (Ngurah, 2016).

The study results showed that 82,4% of teen girls were not compliant with consuming one iron tablet every week. This is in line with the research conducted by Ningtyias et al. (2020) and Fatmawati & Subagja (2020), which showed that more than half of young girls are disobedient to taking iron-boosting tablets. According to Fatmawati & Subagja (2020), this is due to the symptoms felt after consuming blood-boosting tablets, such as nausea and vomiting, pain, diarrhea, loss of appetite, or dizziness. In addition, some do not like the unpleasant taste and smell of the blood supplement tablet. In addition to the side effects of blood-boosting tablets, forgetting to take the tablets is also one of the factors that prevent people from taking blood-boosting tablets regularly (Izzati et al., 2021). In addition, the factors that cause young women to be disobedient when taking IFA supplements are feeling unnecessary, lazy, and bored (Larasati et al., 2021).

IFA supplements are highly recommended for young women to prevent and reduce the risk of anemia.

Factors that Have a Relationship with Iron Tablet Consumption Compliance in Adolescents

The results of the chi-square test for the dependent variable. Table 2 shows that of the 11 existing factors, as many as six factors (region of residence, having ever checked Hb, access to information on iron supplements, having ever received or purchased iron tablets, knowledge of young women, and use of the CERIA application) are related to adherence to consuming iron tablets.

Meanwhile, the variables age of the respondent, age at first menstruation, level of education, source of iron tablets, and type of IFA supplement were unrelated to adherence to iron tablets.

Table 2. Factors associated with adherence to blood supplementation tablet consumption among adolescent girls in East Kalimantan Province

Variable	Frequency (n= 825)	Obedience to drinking iron supplement tablets		p-value
		Comply	Disobedient	
Respondent Age	14,37 ± 1,599			0,611
Age of First Menstruation				0,705
7-9 Years (Fast)	11	3	8	
10-14 Years (Normal)	786	139	647	
≥15 Years (Late)	18	3	15	
Not Menstruating	10	0	10	
Level of education				0,926
Junior High Schol	617	108	509	
Senior High School	208	37	171	
Residential Area				0,023
Regency	106	27	79	
City	718	118	600	
Perform Hb Check				< 0,001
Never	762	123	639	
Ever	63	22	41	
Access information on iron tablets				0,014
Schools, health facilities, RT	644	125	519	
Social media and broadcasting	79	12	67	
Others	102	8	94	
Ever received or purchased iron supplement tablets				< 0,001
No	247	8	239	
Yes	578	137	441	
Source of iron supplement tablets				0,053
Schools, health facilities, household	687	129	558	
Self and Family Initiative	121	16	105	
Others	17	0	17	

Variable	Frequency (n= 825)	Obedience to drinking iron supplement tablets		p-value
		Comply	Disobedient	
Types of iron supplement tablets				0,098
Ferrous Fumarate - Folic Acid	334	104	230	
Sangobion, Sakatonik Liver, Livon B.plex	110	26	84	
Hemobion	1	1	0	
Knowledge				0,010
Less	281	36	245	
Good	544	109	435	
Using the CERIA App				< 0,001
No	759	121	638	
Yes	66	24	42	

Based on the results of the chi-square test analysis that checked Hb for compliance in the consumption of blood supplement tablets in rheumatism in East Kalimantan Province, it was found that the p-value = 0,000, and based on the result of the analysis of the binary logistic regression test, it was found that the value of p = 0,001, so it can be concluded that the variable that has performed the Hb test on the precision of consuming IFA supplement has a significant relationship. The results of this study are consistent with the research carried out by Krismawati et al. (2022) and Zuraida et al. (2022), where a significant relationship was found between Hb and compliance with blood supplement consumption tablets. An increase in Hb levels is known to be influenced by several factors, including weekly blood supplement tablets, balanced nutritional intake, especially iron, and health education so that young women know the benefits of fulfilling balanced nutrition and iron supplement tablets (Permatasari et al., 2018). The consumption of IFA supplements has been shown to increase and maintain hemoglobin (Hb) levels (Zaddana et al., 2019).

Six hundred and forty-four young girls (78,1%) received information about IFA supplements from schools, health facilities, and their families. Based on the results of the chi-square analysis, it was found that the p-value = 0,014 (p < 0,05) and access to information about blood supplement tablets were related to adherence to consuming blood iron tablets. This is in line with research conducted by Rahayuningtyas et al. (2021), where it was found that access to information was related to adherence to the consumption of iron tablets and research conducted by (Noviatiningsih et al., 2019), who found a relationship between access to information, especially information counseling from community health workers, and adherence to taking iron tablets.

Knowledge results from knowing the information obtained after someone has learned or experienced it (Amir & Djokosujono, 2019). Based on the study's results, 281 young women (34,1%) had insufficient knowledge of high blood pressure and anemia. Meanwhile, 544 girls (65,9%) had good knowledge of high blood pressure and anemia. Based on chi-square analysis, the p-value was 0,010 (p < 0,05). The knowledge variable is related to their compliance with consuming iron tablets. This is in line with research conducted by Amir & Djokosujono (2019) and Wahyuningsih & Qoyyimah (2019), who found a relationship between the knowledge of girls and adherence to taking iron tablets. Research by Kavle & Landry (2018) also showed that the higher the knowledge of young women regarding the benefits, side effects, why, and how to take iron tablets, the more likely they are to change their behavior toward taking iron tablets.

In addition, based on logistic regression analysis, a p-value of 0,047 (p < 0,05) was found, so it can be concluded that the knowledge variable has a significant relationship with compliance with taking iron tablets. In the parameter coefficient test, the odds ratio was 1,560, meaning that every young woman with less knowledge tended to be disobedient in taking iron supplements 1,560 times compared to adolescents with good knowledge. The better the knowledge and attitude of a young woman, the better her adherence to taking IFA supplements (Telisa & Eliza, 2020; Utari & Al Rahmad, 2022).

The CERIA app, or Prevent Anemia in Indonesian Youth, is a support application for

monitoring young women taking IFA supplements every week. Based on the statistical analysis of the chi-square test, it was found that the use of the CERIA application variable was related to adherence to blood supplement use in adolescents in East Kalimantan (p = 0,001).

In addition, based on logistic regression analysis, it was found that the p-value= 0,000 (p<0,05), the variable use of the CERIA application has a significant relationship with female adolescent compliance, with a parameter coefficient (Odds Ratio) of 3,013. It can be concluded that every young woman who does not use CERIA tends to disobey IFA supplement 3,013 times compared to young women who use CERIA.

This is in line with research conducted by Krismawati et al. (2022) and Manik (2021), where the use of reminder applications is known to increase the compliance attitude of young women in consuming blood-boosting tablets, and research conducted by (Syahrina et al., 2020), where there was a significant increase in users of the Fe tablet drinking recording application, namely Edu-Anemia, on adolescent adherence to consuming iron tablets. However, this differs from the research by Riyanto (2021), who found no difference between girls who used the application and those who did not.

According to Rohani (2021), using smartphone applications is one of the best strategies to increase young women's knowledge, attitudes, and obedience. Apart from disseminating information, the application can also remind young women to consume iron supplement tablets weekly (Asrina et al., 2021). Smartphone applications can monitor female adolescents' compliance with the consumption of blood supplements (Krismawati et al., 2021).

Dominant Factors in Compliance with Iron Tablet Consumption in Adolescent Girls

The analysis used a binary logistic regression test, including candidate variables from the previous chi-square test. The results of the binary logistic regression test are shown in the following table:

Table 3. Binary Logistic Regression analysis results

Variable	B	S.E.	Wald	p-value	Exp (B)	CI	
						Lower	Upper
Not using CERIA Application	1,103	0,295	14,011	<0,001*	3,013	1,691	5,369
Lack of knowledge	0,444	0,223	3,957	0,047*	1,560	1,007	2,417
Never do a Hb check	0,961	0,299	10,346	0,001*	2,615	1,456	4,698
Regency/City Area	-0,424	0,257	2,717	0,099	0,655	0,396	1,083
Ever received or purchased iron supplement tablets	2,071	0,377	30,192	<0,001*	7,934	3,790	16,608
Constant	-3.435	0,450	58.170	0,000	0,032		

*Significant value if p <0,05; Exp (B) or Odds Ratio

Based on Table 3, it was found that only four variables had a significant relationship with the compliance variable, namely, the knowledge of young women, having received or bought iron tablets, using the CERIA application, and checking Hb. Meanwhile, the district and city variables did not significantly affect the female adolescent compliance variable, and the information variable, blood increase tablets, were excluded from the test because they did not meet the requirements to continue the test deeper in the regression analysis.

Based on the odds ratio or Exp (B) value, it can be interpreted that girls who do not use the CERIA app tend to be disobedient in consuming the IFA supplement 3,013 times compared to those who use the CERIA application. Adolescent girls with less knowledge about anemia and iron supplements tended to be disobedient in taking iron supplements 1,560 times compared to female adolescents with good knowledge. Young women who had never had their Hb checked tended to be disobedient when taking the IFA supplement 2,615 times compared to girls who had their Hb checked. Young women who had never received IFA supplements tended to be disobedient when consuming IFA supplements 7,934 times compared with those who had received iron tablets. A constant value of 0,032 means that no independent variable affects the compliance value 0,032.

Furthermore, the coefficient of determination test obtained from the analysis is used to show how far the predictor variable can explain the ability of the resulting model by examining the Negelkerke R-Square value. The Negelkerke R-Square value was 0,172, which means that the ability of the variables produced in this model to explain the rheumatological compliance variable was 17,2%, so there were 82,8% of other factors outside the resulting model.

Conclusion

Factors related to adherence to taking IFA supplements in young women are the area of residence, access to iron tablet information sources, Hb checks, having received or bought iron tablets, knowledge of young women, and use of the Prevent Anemia Adolescents application in Indonesia (*Cegah Anemia Remaja Indonesia/CERIA*).

Furthermore, there were four dominant factors: having received or purchased iron tablets, having checked Hb, having knowledge, and using the CERIA application.

Efforts to overcome the problem of anemia in adolescent girls prioritize promotional activities and preventative measures by increasing the consumption of foods rich in iron, increasing iron supplementation, and increasing the fortification of iron and folic acid in foodstuffs. In addition, health offices, health centers, and related institutions can cooperate with schools to enter a menu for periodic Hb checks during routine health checks, such as school children's health screening. Thus, it can increase socialization regarding iron tablets, anemia, and using the CERIA app.

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