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Supports and Barriers Regarding The Iron-Folic Acid Supplementation Adherence Level in Anemic Pregnant Women: Indonesian's Perspective

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ABSTRACT
Anemia is a worldwide public health issue that affects various groups in low, middle, and high-income nations. Anemia is linked to pregnancy and is influencing poor cognitive and motor development outcomes in children. A recommended intervention to reduce anemia prevalence during pregnancy is the universal administration of Iron-Folic Acid (IFA) supplements. This study investigated supports and barriers regarding iron-folic acid supplementation adherence levels in pregnant women recorded in public health centers in Malang, Indonesia. This research was conducted using qualitative methods with in-depth interviews using semi-structured open-ended questions from July to September 2023. Twenty-five participants from four public health centers was included. The interview guide's content was developed using World Health Organization's framework as well as other pertinent themes. Data analysis was processed from verbal record transcription, generating the codes into the outcomes. Five main themes with a total of eleven subthemes were highlighted from interview process. These themes was further classified into barriers and supports. Side effect, forgetfulness, boredom, laziness, and insufficient understanding of disease recorded as barriers. In contrast, husband and family support, health care team motivation, affordability of access, knowledge and education background included in supports. These findings enlighten the barriers encountered by the pregnant women in IFA supplementation adherence. However, the effectiveness of treating anemia during pregnancy might be influenced by fundamental elements that support IFA supplementation adherence. Therefore, to tackle the this issue, the pregnant women requires a proper therapy and all key points mentioned in support group must be applied.

INTRODUCTION

Anemia is a worldwide public health issue that affects variable groups, such as children under five (especially toddlers under two), women between the ages of 15 to 49, and pregnant women in low- and middle-income nations.[1] One of the Sustainable Development Goals and a Global Nutrition Target set by the World Health Assembly for 2025 is the reduction of anemia cases.[2]

The widespread delivery of Iron and Folic Acid (IFA) to prevent anemia in pregnant women is a highly recommended technique to improve the mother's survival and fetus development.[8] Anemia can bring exhaustion that leads to less productivity, which is further linked to poor conditions during pregnancy and causes poor cognitive and motor development in babies (including low birth weight and prematurity).[3] Thus, in low, middle, and high-income countries, anemia has a substantial impact on human health and the country's social and economic development. Anemia is characterized by a decrease in the blood's concentration of hemoglobin (Hb) and has impacted one-third of the global population[4–6] with more than 800 million recorded as children and women.[7] The Indonesian government has made efforts to prevent and control anemia by recommending the consumption of a minimum of ninety iron supplement pills containing ferrous (Fe) fumarate or Fe sulfate during pregnancy. Fe fumarate is more effective in increasing the amount of hemoglobin (Hb) and has a lower side effect compared to administering Fe sulfate for 30-90 days in anemic pregnant women.[9,10] Fe fumarate is also useful in increasing serum ferritin levels compared to Fe bi-glycinate and iron carbonyl.[11] Apart from that, Fe fumarate is a free supplement provided by the government through the Health Social Security Administering Agency (Indonesian: *Badan Penyelenggara Jaminan Sosial, or BPJS)* and is routinely given to pregnant women at every Community Health Center. Unfortunately, many nations' national IFA supplementation programs have struggled to reach the high coverage and adherence levels required to significantly lower anemia cases.[12]

A mixed-method study conducted in seven countries during 2012-2013 has reported the barriers and enablers in the IFA supplementation programs among pregnant women. The barrier is related to the specific cultural beliefs and practices. Meanwhile, rationale family and community support or reminders from the family are found to be a supportive factor towards adherence level.[13] A study in Yaoundé, Cameroon, concluded that pregnant women were not interested in daily consuming the supplement. Another study reported that pregnant women age 25 years old or older and pregnant women who don't encounter the side effects from IFA supplementation are more likely to adhere to the IFA supplementation program than those who are younger than 25 years old and experiencing the side effects.[14] A study in North Wollo Zone, Ethiopia, reported the low compliance status of pregnant women.[15]

This present study aims to gain a deeper understanding of support and barrier factors in practices of the IFA supplementation program to provide information to the government to help meet the needs of pregnant women and raise the standard of prenatal care in the nation. Therefore, the supplementation program implementation will be better in the future.

MATERIAL AND METHOD

This research was done using qualitative data collection with semi-structured interviews from July to September 2023. Qualitative research was distinguished by its flexibility and was grounded in a different research paradigm than quantitative research.[16] This study was carried out at four primary healthcare services in Malang City, Indonesia, namely at Kedungkandang, Polowijen, Janti, and Mulyorejo regions. This research included a total of 25 participants. The number of participants in this research was determined by theoretical, qualitative research.[17] The inclusion criteria in this research were pregnant women with anemia (Hemoglobin ≤ 11 g/dL) who had received IFA supplementation from primary health care services. A purposive sampling technique was performed in this study to gather information from participants who received the supplementation program from healthcare services to overcome the anemia problem.

The researcher conducted in-depth face-to-face interviews with semi-structured instruments to explore the phenomena directly with the participants. The data regarding

Hemoglobin was collected from a health care laboratory under permission and supervision from midwives and the head of the primary health care services. The interviews were done by two interviewers accompanied by community health center cadres beside the participants. The entire interview was recorded on audio using audio recording and transcribed verbatim. The interview guide, including an interview checklist, was used as the instrument to collect the data. To establish the credibility of the interviewers, the team's seasoned researchers conducted training to guarantee that each investigator had the necessary abilities and knowledge to fulfill their roles. All participants in the study were given information regarding the meaning and the purpose of this study, and before conducting the interview, the participants signed an informed consent form. The participants were also rewarded with compensation for their participation.

The following procedures were used to analyze qualitative data: (1) transcribe the recordings into a narrative; (2) carry out a data reduction procedure, such as picking data and removing terms that aren't needed; (3) generating codes—words or phrases—from the narration's outcomes before categorized them. The interview guide's content was developed using the WHO framework[18] as well as other pertinent themes that surfaced from participant narratives to classify variables affecting long-term therapy adherence into five dimensions.

This study has received ethical clearance approval from The Ethics Committee of the Faculty of Medicine, University of Muhammadiyah Malang, with the code number No.E.5.a/209/KEPKUMM/VII/2023.

RESULTS

All 25 participants have met the inclusion criteria set for this research. Table 1 lists the demographic and gestational characteristics of the study participants. The majority of the total participants were aged 27 to 37 years old (48%), had attended high school (40%), were a housewife (72%), and were in their last trimester of pregnancy (56%).

According to the data analysis result, this study identified four main themes among the perception of the participants, namely: 1) Socioeconomic-related factors; 2) Health care team/health system-related factors; 3) Therapy-related factors; 4) Patient-related factors. For each of the themes, the factors were then classified into two classifications: support and barrier. Table 2 shows the detailed analytical framework of this research.

Figure 1 explains the graphic of Table 2 regarding the classification of support and barrier factors linked with IFA supplementation adherence level. The figure shows subthemes of support and barrier individually and then connected to the IFA supplementation adherence level.

Table 1. Characteristics of Participants Based on Several Parameters

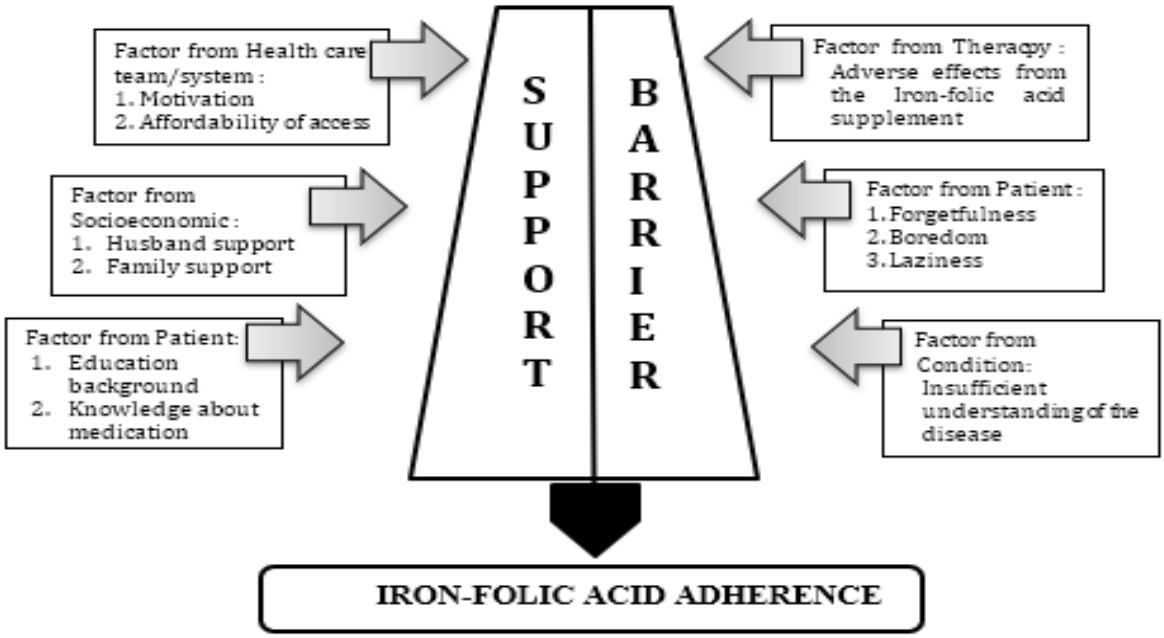
Parameters	n = 25	%
Age (Year)		
16-26	11	44
27-37	12	48
38-48	3	12
Education		
Elementary School	3	12
Junior High School	5	20
Senior High School	10	40
University Education	7	28
Employment status		
Housewife	18	72
Merchant	1	4
Government Employee	1	2
Self-Employed	2	8
Private Employee	3	12
Gestational Week		
First Trimester	3	12
Second Trimester	8	32
Third Trimester	14	56

Source: Primary Data, 2023

Table 2. Analytical Framework

Theme	Classification	Subthemes
Socioeconomic-related factors	Support	1. Husband support 2. Family support
Healthcare team/health system-related factors	Support	1. Motivation from the healthcare team 2. Affordability of access to community healthcare service
Therapy-related factors	Barrier	Adverse effects from the Iron-folic acid supplement
Patient-related factors	Barrier and Support	**Barrier** 1. Forgetfulness 2. Boredom 3. Laziness **Support** 1. Education background 2. Knowledge about medication
Condition-related factors	Barrier	3. Insufficient understanding of the disease

Source: Primary Data, 2023



Source: Primary Data, 2023

Figure 1. Support and Barrier Perspective Framework Related to IFA Supplementation Adherence Level

Theme 1: Socioeconomic-Related Factors Support: Husband Support

In an effort to ensure that the majority of participants adhere to their iron-folic acid supplement regimen, the husband's role is crucial. Based on the interview's findings, the participants stated that they only had their husbands beside them to support them because some were far from their parents. Husband support is a very fundamental support for anemic mothers.

> *"Usually, my husband reminds me to take the tablet if it is time to have the supplement"* (Participant 1).
>
> *"My husband supports me and insists I take the supplement every day because my other families live separately from me."* (Participant 6).
>
> *"Yes, my husband always reminds me about the tablet because I feel lazy if I remember the taste from the supplement, but he always reminds me to*

take it. I have no other families, just me and my husband here." (Participant 7).

Support: Family Support

The results of the in-depth interviews revealed that family support, besides husband support, also motivated them to take the supplement. One way that parents and families can encourage pregnant women is by providing meals. Mostly, the role of the participant's mother and siblings is very important in supporting them directly and indirectly.

"My mom also checks on my supplement, not only remind me to take the tablet. She always checks my supplement is still there or whether it has run out" (Participant 8)

"My sister always reminds me to take the tablet" (Participant 9)

"…Yes, my family also asked me to eat fruits more..." (Participant 12)

"…Every day they (family member) always reminded me whether I have drunk it (Iron-folic acid supplement) or not" (Participant 22)

Theme 2: Healthcare Team/Health System-Related Factors

Support: Motivation from the Healthcare Team

The role played by health workers is to provide information, communication, and motivation to pregnant women about the dangers of anemia, the benefits of iron and food that contain iron, the importance of Antenatal Care (ANC), and the importance of improving health during the pregnancy. In this study, the participants stated that they had always been motivated, monitored, and reminded again about their anemia condition and the importance of IFA supplementation.

"...Every time I visit healthcare services, the midwife always asks about my supplements (Iron-folic acid)" (Participant 1)

"They advise to always take the IFA tablets and do not miss the tablets." (Participant 11)

"Yes, I was advised that I had to keep taking iron-folic acid supplement tablets because my hemoglobin was below normal, 10.8" (Participant 14)

"Yes, remind me to take the supplement tablets" (Participant 16)

"They give support and give input to me." (Participant 23)

Support: Affordability of Access to Community Healthcare Service

Ease of affordability of access to the health center (Indonesian: *Pusat Kesehatan Masyarakat*, or Puskesmas) is always an enabling factor for patients to achieve healthiness and get treatments for their illnesses. The interview reveals that most participants live near Puskesmas and have no worries or obstacles regarding access to healthcare services. This factor was found to be the support factor in achieving affordability of the IFA supplementation program.

"…but it's not so far from my home. I go to the Puskesmas usually by online driver service" (Participant 6)

"I go by myself because it's near; I have no problem about that, it's a convenience to me" (Participant 11)

"I go to ANC check with my husband, he drives me and accompany me there." (Participant 24)

Theme 3: Therapy-Related Factors

Barrier: Adverse effects from the IFA Supplementation

There are adverse effects associated with all medications; IFA supplement tablets are no exception. Based on the responses provided, it was observed that fourteen participants reported nausea symptoms after taking the IFA supplement tablet.

"I feel nausea, but I don't get tired easily" (Participant 5)

"I just feel nauseous" (Participant 8)

"When I take iron-folic acid supplement tablets, it sometimes makes me feel nauseous since the tablet is larger than usual; other times, it stops in the middle, which is uncomfortable to me; nevertheless, if there are other issues, they don't seem to be present" (Participant 13)

"…Yes, I feel nauseous after taking the tablet; however, if I don't drink it, I don't feel nauseous as much" (Participant 9)

Theme 4: Patient-Related Factors

Barrier: Forgetfulness

The most frequent cause from the patient's perspective is forgetting to take supplements because they lose track of time. In this study, the participants stated that they always forget to take the supplement because they overslept due

to work and frequent traveling.

"Yes, I often forget to take the tablets" (Participant 9)

"It only happened 1-2 times... because I left town and didn't bring my medicine because I forgot it" (Participant 10)

"Yes, I forget, but sometimes I switch to foods that I think contain iron, like milk, I switch to real food, not just medicines, I also eat spinach and vegetables" (Participant 12)

"Sometimes I forget for one day and then remember the next day" (Participant 19)

Barrier: Boredom

The response given by pregnant women during interviews regarding their experience of feeling bored when consuming IFA supplements was that they take it every day and they have no other way to reduce the boredom.

"Yes, sometimes I get bored because I have to drink it every day…" (Participant 11)

"If you're bored, of course you'll get bored every day, taking medicine every day..." (Participant 15)

Barrier: Laziness

According to the responses provided, fourteen participants claimed to feel lazy, and the other participants supported this claim. This occurs because pregnant women who take IFA supplement tablets may feel lethargic as a result of its side effects.

"…I feel lazy to take the tablets because the taste is not good" (Participant 8)

"…incredibly lazy when it comes to taking the medications" (Participant 23)

Support: Education Background

The level of education is related to compliance with the use of IFA supplement tablets in pregnant women. Education can increase awareness of pregnant women in taking the supplement tablets. Education influences a person's logical thinking process. For the answers obtained, all twenty-five participants answered that education had an influence on compliance with supplement use. Based on the participant's answers in this study, there are supporting factors influencing the IFA supplementation adherence level in the education category.

"A good educational background for pregnant women is very important..." (Participant 10)

"Yes, nowadays, because the times are advanced, we don't have to see a doctor face to face so that we can get it now. This is all self-awareness, how important it is for us to understand our own condition, and like health workers, they only help; it is their responsibility, right? To ourselves, what do we know about iron-folic acid tablets? Especially if we have education, we should know more about how important taking the tablets is" (Participant 12)

"Yes, that's what's really important for Indonesia, right now, stunting is happening. I think practitioners and health workers are doing a lot of this to provide education, especially for pregnant women and those who are planning to get pregnant. Again, education levels in Indonesia are also very varied. There are so many different levels of education, so yes, we must catch up" (Participant 19)

Support: Knowledge of Disease and Medication

Pregnant women's knowledge impacts the anemia treatment procedure when it comes to utilizing IFA supplement tablets. Based on the participants' answers in this study, there are supporting factors for IFA supplementation adherence level in terms of knowledge, especially regarding the disease and the benefits of using IFA.

"In my opinion, it's definitely important because it's a necessity too" (Participant 16)

"…crucial information, from ignorance to comprehension at first" (Participant 21)

"It's very important that the baby is healthy too" (Participant 24)

"Family members are aware of the importance of knowledge" (Participant 25)

Theme 5: Condition-Related Factors

Barrier: Insufficient Understanding of the Disease

Principally, patients' lack of knowledge regarding their conditions affects their medicine intake. When asked about their conditions, most patients stated that they had no idea about their condition.

"Well, if that's very important, yes, many of them don't know about this disease. I don't know why I was told to drink Iron-folic acid, that's why health workers need to have access to this" (Participant 19)

"Yes, actually, it's very important. Maybe if we don't know the facts, we can ignore it I found out about it (anemia) from my friend, to asked me to check my hemoglobin in laboratory because I immediately checked at the hospital, and the doctor didn't get

me any advice, maybe because so far my symptoms have been non-existent" (Participant 13)

DISCUSSION

The study aimed to determine the barriers and support factors to IFA supplementation adherence levels according to the WHO's five dimensions. Based on the five dimensions of adherence level, we found socioeconomic factors, healthcare team/health system-related factors, therapy-related, patient-related, and condition-related factors dimensions to be barriers and support aspects affecting adherence. This study has highlighted the complex factors of administering IFA supplements in a community. In this study, the identified support to IFA supplementation adherence level was husband support, family support, motivation from the healthcare team, affordability of access to community healthcare service, educational background, and knowledge about medication. The barriers to IFA supplementation adherence level were adverse effects of the supplement, forgetfulness, boredom, laziness, and insufficient understanding of the disease that may occur due to anemia condition.

According to Ramayanti & Sulistyoningtyas, family support is a condition that influences health improvement through prevention and treatment obtained from people who are trusted, especially in the role of the husband, which makes a pregnant woman feel that other people care for and love her.[19] So far, participants have received support from their families in using IFA tablets. The most influential family support is from the husband. Family support influences pregnant women's adherence to consuming IFA tablets. Based on qualitative research conducted in Johannesburg, South Africa,[22] family support facilitates multiple micronutrient supplementation. This shows that the family is important in pregnant women's compliance with IFA supplementation. If the family's role is good in helping maintain the health of pregnant women, it will make them agree to consume IFA tablets. Family support was a significant enabler overall: as family members learned about the supplements' aim, they were supportive and crucial in reminding women to take their IFA supplements.[20] Numerous other research studies have emphasized how crucial family support is to promote supplement adherence.

Good health services influence pregnant women to take IFA supplementation. If the behavior of health workers is positive, it will result in good health services. Research by Namchar Kautsar shows a relationship between the role of health workers and the adherence level with IFA supplementation. According to Yanti et al., the role of health workers can influence pregnant women's adherence to the use of IFA supplementation. The role played by health workers is to provide information, communication, and motivation to pregnant women about the dangers of anemia, the benefits of iron and food factors that contain iron, the importance of ANC, and the importance of improving health.[21] Health workers play a role in every visit to pregnant women, such as educating pregnant women about health and providing information that must be recommended to patients. The majority of participants stated that they had good communication with their medical team and easy access to the primary health care center. The healthcare team's information and assistance were seen as encouraging and beneficial.[22] Despite the common belief that patients are to blame for non-adherence rather than healthcare providers, research shows that aspects of the healthcare system significantly impact the adherence level. Patients' adherence to treatment plans may be lowered by inadequate follow-up, poor provider-patient relationships, inadequate drug supply, ambiguous information regarding drug administration, and poor follow-up.[20]

When using Iron-folic acid tablets, the knowledge possessed by pregnant women influences the anemia treatment process itself. Based on research by Lutfita, there is a relationship between the level of knowledge and compliance of anemic pregnant women in taking IFA supplementation.[23] In contrast, with lower knowledge about anemia, pregnant women with better knowledge were more likely to adhere to IFA supplementation. Similar findings have also been reported previously elsewhere.[24,25] A woman with knowledge of anemia may likely be able to comprehend the condition's causes, pre-

ventative strategies, and potentially harmful effects on both the mother and her unborn child. Pregnant women with good knowledge indicate that they know the importance of IFA tablets for pregnancy and maintaining normal HB levels. The level of education is related to the adherence to the use of IFA supplementations in pregnant women. Education can increase pregnant women's awareness of the use of IFA supplementations. Education influences a person's logical thinking process. According to Sasono[26], the level of education can influence a person's level of knowledge; namely, the higher the level of education, the easier it will be for someone to receive information. The level of education underlies the attitude of pregnant women in accepting health information. Based on research by Yanti et al.[27] There is a relationship between education level and adherence to the IFA supplementation. The higher a person's level of education makes a person have the ability to understand input and information from health workers better.

Barrier factors such as side effects, forgetfulness, and boredom were found in this study. Based on research conducted by Bakhtiar et al, the most common side effect is nausea. The most common side effects experienced by pregnant women are discomfort in the pit of the stomach or above the navel, nausea, vomiting, and blackish stools.[28] Based on research conducted by Maryam, the reason for not liking taking IFA supplement tablets is boredom. The response given by pregnant women during interviews regarding their experience of feeling bored when consuming the IFA supplement was that they drank it every day, and they had no other way to reduce the boredom.[29] Another common cause is forgetting to take medication because pregnant women lose track of time, such as frequently falling asleep due to extensive work and frequent travel. Similar reasons for non-adherence have also been reported among pregnant women in India and Kenya.[30,25] Incorporating instruction on IFA supplementation-related adverse effects management within ANC counseling is imperative for healthcare practitioners.[33-35]

There has been evidence that certain behaviors, such as taking IFA tablets right before bed or with meals while consuming an abundance of fruits and vegetables, can lessen the side effects of IFA.[31] Encouraging women to utilize modern technology to remind them to take their supplements or at specified times, including after meals, every morning, or before bed, could help prevent forgetfulness among iron-folic acid users.

Meanwhile, an insufficient understanding of the disease is a condition-related factor that affects participants' IFA supplementation adherence level. One key contributing element to bad health is ignorance. In addition to causing individuals—especially the impoverished—to waste scarce resources on unnecessary care, it also causes people to put off obtaining care when necessary, even without financial impediments.[32]

The strength of this study was that it focused on interviewing 25 pregnant women diagnosed with anemia in depth to determine barriers and support factors for IFA supplementation adherence in the community setting from a primary healthcare center. The limitation of this study was that it focused only on the perspectives of the patients. Future studies should include perspectives from healthcare practitioners, especially from the side of pharmacists and midwives. As the participants were only 25, the findings of this study could not be generalizable to the population.

CONCLUSION AND RECOMMENDATION

These findings shed light on the barriers encountered by pregnant women in iron-folic acid adherence, such as forgetfulness, boredom, and laziness. However, the effectiveness of treating anemia during pregnancy might be influenced by fundamental elements that support the adherence level, such as family support, husband support, and knowledge regarding the disease and the medication. Thus, to tackle the anemia cases and provide pregnant women with the optimal therapy, all relevant parties mentioned in this study must collaborate. The implication of this research is the need for advanced counseling by the health provider to direct the right practice of the patients.

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AUTHOR CONTRIBUTIONS

Conceived and designed the qualitative study by RNA; A contributed designed the instrument and interview guide; DA performed the collection data process; LYS analyzed the data; AAP performed final data analytic including tables and graphic; SU contributed final check for the manuscript. The authors read and approved the final manuscript. RNA = Rizka Novia Atmadani; A = Akrom, DA = Dhea Ananda; LYS = Laila Yoga Saputri; AAP = Alvina Arum Puspitasari; SU = Siti Urbayatun.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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