

# Barriers and Facilitators of Compliance with Iron-Folic Acid Supplementation Among Pregnant Women in Southern Afghanistan: A Qualitative Study

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**Background:** Compliance with iron-folic acid (IFA) supplementation is essential to prevent maternal anemia and associated adverse maternal and neonatal outcomes. Despite national policy support, adherence remains suboptimal in Afghanistan, and contextual evidence on determinants of compliance is limited. This study aimed to explore barriers and facilitators of IFA supplementation compliance among pregnant women in southern Afghanistan.

**Methods:** This exploratory qualitative study was conducted between November and December 2025 among 24 pregnant women attending antenatal care services at four comprehensive health centers in southern Afghanistan. Participants were purposively selected to participate in two focus group discussions (n=16) and eight in-depth interviews (n=8). Data were analyzed using a hybrid deductive-inductive thematic approach informed by the Health Belief Model.

**Results:** Four key facilitators of compliance were identified: perceived health benefits, social support (cues to action), perceived susceptibility to anemia, and self-efficacy. Seven major barriers emerged: lack of supplement availability, long waiting times, transportation and mobility constraints, unfavorable attitudes of healthcare providers, fear of side effects, forgetfulness, and myths and misconceptions. Findings indicate that compliance was shaped not only by individual beliefs but also by structural health system challenges and sociocultural norms.

**Conclusion:** Compliance with IFA supplementation among pregnant women in southern Afghanistan is influenced by interconnected individual, health system, and community-level factors. Interventions to improve adherence should integrate behavioral strategies with efforts to strengthen health system capacity and address sociocultural barriers.

**Keywords:** iron-folic acid supplementation, IFA, barriers, facilitators, qualitative data, Afghanistan

## Introduction

Iron deficiency is one of the most common cause of anemia, and it is a significant public health issue, affecting approximately 35% of pregnant women and 30% of women aged 15 to 49.<sup>1,2</sup> In 2019, anemia resulted in a loss of 50 million healthy years of life due to disability, with dietary iron deficiency being one of the major contributors.<sup>2</sup> This

preventable global health issue is linked to negative health effects, higher rates of illness and death, as well as significant health and economic burdens.<sup>3</sup>

In pregnancy, anemia increases the risk of adverse maternal and neonatal outcomes, including preterm birth, low birth weight, postpartum hemorrhage, infections, and maternal mortality.<sup>4,5</sup> Severe anemia substantially elevates the risk of maternal mortality, and contributes to intergenerational consequences such as impaired child growth and development.<sup>6,7</sup> Iron-folic acid (IFA) supplementation is a simple, safe, and cost-effective intervention to prevent and treat iron deficiency anemia during pregnancy.<sup>8,9</sup> The World Health Organization (WHO) recommends daily oral supplementation with 30–60 mg of elemental iron and 400 µg of folic acid for all pregnant women, starting as early as possible and continuing throughout pregnancy to reduce the risk of maternal anemia, puerperal sepsis, low birth weight, and preterm birth.<sup>10,11</sup> In Afghanistan, a country with a high maternal mortality rate,<sup>12</sup> and short birth intervals,<sup>13</sup> consistent daily intake of IFA supplements is particularly important to ensure adequate maternal iron stores and optimal fetal development.

In Afghanistan, IFA supplementation is included in the national antenatal care (ANC) package and is provided free of charge through public health facilities as part of routine maternal services.<sup>14,15</sup> Despite this policy commitment and the availability of supplements within the Basic Package of Health Services (BPHS), adherence to IFA supplementation remains inconsistent, particularly in rural and underserved regions, where access to quality maternal care and effective counselling may be limited.<sup>16</sup> According to the Afghanistan Health Survey 2018 (AHS 2018), 46.8% of women received IFA supplements during their most recent pregnancy;<sup>17</sup> however, only a small proportion adhered to the recommended duration of supplementation,<sup>13</sup> indicating substantial gaps between access and effective use. National data indicate that only 6.2% of women received good-quality ANC,<sup>18</sup> potentially reducing opportunities for appropriate guidance and follow-up on supplement use.

Factors contributing to anemia in pregnant women include maternal age, marital status, gestational age, place of residence, gravidity (number of pregnancies), parity (number of births), maternal education level, and limited access to IFA supplements.<sup>5,19</sup> Maternal awareness of the benefits of IFA supplementation significantly influences its usage among pregnant women.<sup>20</sup> However, a limited number of ANC visits, infrequent counseling on nutrition, and inadequate education regarding IFA supplements are associated with low consumption levels.<sup>21</sup> Additionally, misconceptions about supplement safety and sociocultural influences within households may further reduce compliance.<sup>22</sup> Household decision-making dynamics, gender norms, and the level of support from husbands and senior family members may either facilitate or hinder consistent supplement intake within the broader social and familial context of pregnancy.<sup>23,24</sup> Moreover, research in LMICs has shown that theory-based models influence compliance with IFA supplementation. As such, several quantitative and qualitative studies have documented the influence of Health-Belief Model (HBM) constructs on compliance with IFA supplementation among pregnant women.<sup>21,25</sup> These studies show that women's perceived susceptibility to anemia and perceived severity of its consequences, perceived benefits of IFA use, and perceived barriers such as side effects or misconceptions significantly influence adherence.<sup>21,25</sup> In addition, cues to action, including counselling during ANC visits, and self-efficacy in managing daily supplement intake play important roles in shaping consistent use of IFA supplements.<sup>25</sup>

The World Health Organization's Global Nutrition Target aims for a 50% reduction in anemia prevalence among women of reproductive age (15–49 years) by the year 2030. This goal is part of the efforts to achieve Sustainable Development Goals (SDGs) 2 and 3, which focus on enhancing nutrition and promoting good health and well-being.<sup>26</sup> Despite global recommendations and routine IFA distribution through ANC services, compliance with supplementation remains suboptimal in many low-and middle-income countries (LMICs).<sup>27–29</sup> While previous studies have primarily focused on prevalence and its associated factors of anemia,<sup>19,30</sup> there is limited evidence exploring the underlying behavioral, sociocultural, and health-system factors that influence compliance to IFA supplementation, particularly using theory-informed approaches.

In Afghanistan, and especially in southern regions affected by fragility, limited healthcare access, and sociocultural constraints,<sup>31</sup> there is a lack of in-depth qualitative research examining women's perceptions, experiences, and decision-making processes regarding IFA use. Furthermore, no studies to date have comprehensively applied the health belief model to understand compliance with IFA supplementation in this context. Therefore, this study aimed to explore the

barriers and facilitators of compliance with IFA supplementation among pregnant women attending ANC services in southern Afghanistan.

## Methods

### Study Design and Settings

This qualitative study used two focus group discussions (FGD, n=16) and eight in-depth interviews to explore barriers and facilitators of compliance with IFA supplementation among pregnant women attending ANC services in southern Afghanistan. The primary guiding framework for this study was the health belief model.

The study was conducted from 01 November to 20 December 2025 at four (out of 25) comprehensive healthcare centers (CHCs) in southern Afghanistan. CHCs are community health centers that provide primary healthcare services to their catchment populations and are primarily used by pregnant women for maternal and child healthcare. Briefly, the study sites were Allama Reshad CHC, Shamsul-Haq-Kakar CHC, and Adam Darmal CHC in Kandahar Province, as well as Karte-Lagan CHC in Helmand Province. These study sites were purposively selected to capture diverse perspectives in terms of public health infrastructure, geography, and cultural diversity across southern Afghanistan.

### Study Participants

Pregnant women attending ANC services at selected sites were invited to participate in either a discussion session or an individual in-depth interview to explore barriers and facilitators of compliance with IFA supplementation among pregnant women. Eligibility criteria included being at least 18 years of age and having attended at least one ANC visit at the study sites. Women who were severely ill or who declined participation were excluded. Participants were recruited using purposive sampling to ensure diverse perspectives. Selection was based on adherence to IFA supplementation (adherent vs. non-adherent), educational status (educated vs. uneducated), residential area (urban vs. rural), and socioeconomic status. This approach allowed for the representation of a wide range of experiences and viewpoints.

### Data Collection

The interviews were conducted by a female research assistant fluent in Pashto, which facilitated culturally appropriate engagement with pregnant women. The research assistant moderated the discussion sessions and interviews, and HS audio-taped them and took field notes of her observations. Before enrollment, the study objectives and procedures were clearly explained, and informed consent was obtained from all participants; either in writing or verbally, depending on the participant's literacy level.

A semi-structured questionnaire based on the constructs of the health belief model was used as a guide to facilitate the discussion and interviews (See [Supplementary File 1](#)). However, the discussion sessions and interviews were flexible and provided an opportunity to delve into topics that were not initially considered. Prior to the commencement of actual study, the interview guide was content-validated by three public health experts and later pre-tested at a non-participating healthcare center (Kandahar Teaching Hospital), which led to substantial improvements. The discussion sessions and interviews were conducted in a designated room at the health facility. Data collection ended after the eighth in-depth interview, guided by the principle of data saturation (no new information was found). The discussion sessions lasted 90 minutes, while the interviews ranged from 30 to 45 minutes. All participants were compensated for their time and participation.

### Data Management and Analysis

On a daily basis, the audio recordings and field notes from the sessions were transcribed into Pashto and then translated into English by the same research assistant who conducted the sessions. The first author (MHS) double-checked the transcripts and audio recordings to ensure accuracy and completeness. After proofreading and making corrections, all audio recordings and transcripts were stored on a password-protected computer at the Research Center in Kandahar Medical Faculty, accessible only to the principal investigator. Moreover, signed consenting documents, field notes, and

other study-related printed materials were securely kept under lock and key at the Department of Public Health, Faculty of Medicine, Kandahar University.

Data were analyzed independently by the three researchers using the six phases of thematic analysis as described by Braun and Clarke,<sup>32</sup> (1) familiarization with data; (2) coding; (3) generating initial themes; (4) reviewing themes; (5) refining and naming themes; and (6) writing up analysis, with a focus on capturing the barriers and facilitators of compliance with IFA supplementation among pregnant women. A hybrid deductive-inductive approach was used to analyze qualitative data, using manual coding during which initial coding was guided by health belief model constructs (deductive), while new themes not captured within the framework (eg., structural mobility restrictions) were allowed to emerge inductively. The data analysis team, each experienced in qualitative data analysis, independently coded the transcripts. They then revised and collated the codes to identify patterns and similarities across all transcripts. Meaningful units were organized, initial sub-themes and themes were developed, and these were subsequently refined, defined, and named. This process was followed by a thorough review and a reflexive team discussion, resulting in a higher degree of consistency. From this collaborative approach, codes, sub-themes, and themes were repeatedly examined, reorganized, and refined. All data analyses were conducted using MS Word and MS Excel as described.

## Results

A total of 24 pregnant women were included in this qualitative study. Of them, 13 (54.2%) were aged 18–24, 12 (50%) were rural residents, and more than one-third (37.5%) had no formal education. Furthermore, 10 (41.7%) were nulliparous, 13 (54.2%) were in the second trimester, and the majority (62.5%) had a monthly household income of 5000 to 10,000 Afghanis. Details on the employment status, distance to the health facility, and participants' compliance level are summarized in Table 1.

**Table 1** Sociodemographic and Other Related Characteristics of the Participants (n=24)

| Characteristics                        | Frequency (%) |
|----------------------------------------|---------------|
| Age (in completed years)               |               |
| 18-24                                  | 13 (54.2)     |
| 25-34                                  | 7 (29.2)      |
| >35                                    | 4 (16.8)      |
| Residence                              |               |
| Urban                                  | 12 (50.0)     |
| Rural                                  | 12 (50.0)     |
| Educational status                     |               |
| No formal education                    | 9 (37.5)      |
| Primary                                | 9 (37.5)      |
| Secondary/higher                       | 6 (25.0)      |
| Employment status                      |               |
| Employed                               | 3 (12.5)      |
| Homemakers                             | 21 (87.5)     |
| Monthly household income (in Afghanis) |               |
| 5,000–10,000                           | 15 (62.5)     |
| >10,000                                | 9 (37.5)      |

(Continued)

**Table 1** (Continued).

| Characteristics                              | Frequency (%) |
|----------------------------------------------|---------------|
| Distance to the health facility (by walking) |               |
| ≤ 30 minutes                                 | 11 (45.8)     |
| > 30 minutes                                 | 13 (54.2)     |
| Parity                                       |               |
| Nullipara                                    | 10 (41.7)     |
| Primipara                                    | 8 (33.3)      |
| Multipara                                    | 6 (25.0)      |
| Gestational age                              |               |
| 1 <sup>st</sup> trimester                    | 8 (33.3)      |
| 2 <sup>nd</sup> trimester                    | 13 (54.2)     |
| 3 <sup>rd</sup> trimester                    | 3 (12.5)      |
| Compliance with IFA supplementation          |               |
| Low                                          | 13 (54.2)     |
| High                                         | 11 (45.8)     |

**Abbreviation:** IFA, Iron-Folic Acid.

## Facilitators of Compliance with IFA Supplementation

### Perceived Health Benefits

Perceived health benefits emerged as a central facilitator of compliance with IFA supplementation. Women commonly framed supplementation as essential for preventing anemia and its related symptoms, reducing the risk of adverse pregnancy outcomes, and ensuring the birth of a healthy child. These perceived benefits were not abstract biomedical concepts but were grounded in lived experiences of weakness, dizziness, and prior pregnancy complications.

One participant explained:

I am supposed to regularly use supplements as they prevent anemia during my pregnancy and help the fetus grow healthy and well. Importantly, I don't want my child to be premature, weak, and with birth defects. I want to have a healthy child. (FGD-1, P3)

For some women, personal experience of anemia symptoms reinforced the tangible benefits of supplementation:

I have little blood and even experience headache and dizziness, so these tablets help me a lot. (FGD-2, P5)

Beyond immediate symptom relief, perceived benefits were closely linked to women's broader reproductive aspirations. Compliance with IFA supplementation was framed as an investment not only in the current pregnancy but also in future fertility and long-term maternal health. One participant connected supplementation to safe childbirth and future childbearing:

Being able to have a safe delivery and looking after my unborn baby are the main benefits of me sticking with my supplementation. Also, I am young, and I want to have more children in the future, why not? I can easily have healthy children by maintaining a healthy diet and complying with supplementation. (IDI-2)

Importantly, women's accounts reflected a moral dimension of motherhood, where taking supplements was associated with being a responsible and caring mother. Perceived benefits were therefore intertwined with maternal identity and social expectations surrounding healthy childbearing. In this way, perceived benefits functioned not only as a cognitive appraisal of health gains (as conceptualized in the health belief model), but also as an emotionally and socially embedded motivation for action.

## Social Support (Cues to Action)

Social support emerged as a critical facilitator of IFA supplementation compliance, functioning as a powerful “cue to action” within women’s everyday lives. Support was primarily described in relation to husbands, mothers-in-law, and female peers, reflecting the central role of family and community networks in shaping maternal health behaviors.

Many participants emphasized the supportive role of husbands, particularly those perceived as educated or health-aware. In several accounts, husbands not only encouraged supplementation but actively reminded women to take their tablets:

I believe a supportive, educated husband can help women have a good pregnancy. I am lucky that I have a husband who cares about my health. He makes me aware that compliance with iron tablets is very important during pregnancy, and I need to stick with it. For example, he reminds me every day about my tablets. (FGD-2, 7)

These reminders functioned as daily behavioral prompts, helping women integrate supplementation into their routine. However, they also reflect the broader gender dynamics within which health decisions are negotiated. In a context where men often control mobility and financial resources, spousal support may facilitate not only daily adherence but also access to health facilities.

Mothers-in-law were also influential, particularly in multigenerational households. Their endorsement of supplementation appeared to legitimize the practice within the family structure:

My mother-in-law told me about the benefits of iron tablets for my and my child’s health and encouraged me to use it regularly. I changed my behavior and am regularly using the supplements now. She also reminds me of the number of tablets left so I can visit the health facility. (IDI-5)

This suggests that compliance is not solely an individual decision but is embedded within family hierarchies, where senior female relatives can either enable or constrain maternal health practices.

Peer influence within the community also played a role. Women described receiving information and encouragement from neighbors and other pregnant women:

A woman in the neighborhood told me about the benefits of iron tablets. She also said that all government health facilities give you these tablets for free. She encourages me to visit the health facility and regularly use my iron tablets. (IDI-8)

Such peer exchanges indicate informal diffusion of health information within communities, reinforcing positive perceptions and facilitating service utilization. Overall, social support operated at multiple levels; spousal, familial, and community, serving as both emotional encouragement and practical prompting. In the framework of the health belief model, these relationships functioned as cues to action. However, within the Afghan sociocultural context, they also reflect the relational nature of health decision-making, where compliance with IFA supplementation is negotiated collectively rather than determined solely by individual belief.

## Perceived Risk/Susceptibility

Perceived susceptibility to anemia and its associated pregnancy complications emerged as a strong motivator for compliance with IFA supplementation. Women who believed they were personally at risk due to prior pregnancy experiences, current symptoms, medical diagnosis, or nutritional vulnerability, demonstrated greater commitment to regular supplementation.

For some participants, susceptibility was grounded in lived experience. Women who had previously experienced adverse pregnancy outcomes or had been diagnosed with anemia described heightened awareness of potential risks:

My earlier child died of prematurity, the doctor told me that I had anemia and I should regularly take my supplements. So knowing this helps me to strictly comply with supplementation. (FGD-1, 3)

In such cases, perceived risk was not abstract but shaped by personal loss and medical advice. The authority of healthcare providers played a significant role in legitimizing the risk and reinforcing adherence. Others described susceptibility in

relation to physical symptoms such as dizziness, weakness, or “having little blood,” which made the threat of anemia tangible. These bodily experiences appeared to strengthen the perceived necessity of supplementation.

Economic hardship also shaped perceptions of vulnerability. Women who reported limited access to nutritious food viewed themselves as more likely to develop anemia:

I know that I may be at risk of becoming anemic as my family is not able to buy enough nutritious food and fruits. As such, I am keener to comply with the supplementation. (FGD-1, 8)

Structural poverty heightened perceived susceptibility, with IFA supplementation viewed as a compensatory strategy amid nutritional insecurity. Susceptibility was closely linked to perceived severity, as anemia was associated not only with weakness but also with prematurity and maternal or infant complications. Together, these perceptions reinforced compliance.

Within the health belief model, perceived susceptibility functions as a key cognitive driver; however, in this context, it was shaped by lived experience, medical authority, and structural deprivation rather than individual risk appraisal alone.

## Self-Efficacy

Self-efficacy emerged as an important facilitator of compliance, particularly when women felt confident in their ability to integrate IFA supplementation into their daily routines and manage potential side effects. Participants described how counselling from midwives increased their understanding of when and how to take supplements, thereby strengthening their sense of control over the process.

### One Participant Explained

Becoming more aware of integrating the supplements into my everyday routine helped me to better comply with the supplementation. (IDI-2)

This suggests that compliance was not solely dependent on motivation but also on practical knowledge about habit formation. Women who were able to anchor supplementation to daily routines (eg., after dinner) reported greater consistency. Another participant highlighted how provider guidance helped her manage adverse effects:

The midwife taught me to take the supplements at night after dinner with a big glass of water, which helped me reduce my stomach problems and gave me more confidence to comply with the supplementation. (IDI-5)

Self-efficacy was strengthened through problem-solving strategies that reduced discomfort, indicating that side effects did not inevitably lead to non-compliance; rather, sustained use depended on women's ability to manage them. Confidence was closely linked to the quality of counselling received, with clear guidance enhancing women's capacity to adhere. Thus, self-efficacy was relationally constructed through provider–patient interaction.

Within the health belief model, self-efficacy is a key determinant of action; however, in this context, it was shaped by access to information and counselling quality rather than individual motivation alone.

## Barriers of Compliance with IFA Supplementation

### Lack of Supplements at the Health Facility

Shortages of IFA supplements at health facilities emerged as a major structural barrier to sustained compliance. Participants described inconsistent availability, insufficient quantities, and periodic stock-outs, which disrupted continuity of use and undermined adherence efforts.

One participant explained:

When I came to the health facility, I only received a small amount of supplements, which were finished in a week, so I could not continue them. (IDI-3)

Others reported being asked to return at a later time due to stock shortages:

During my visit, the midwife told me that the supplements are out of stock and that I should come at the beginning of next month, which would make it difficult for me to comply with the supplements. (FGD-1, 5)

Supply interruptions created gaps in supplementation beyond women's control. Even motivated participants were unable to maintain consistent use when availability was unreliable, underscoring that adherence depended on health system functionality rather than belief alone. Recurrent stock-outs, combined with transportation costs and waiting times, compounded access barriers and reduced the feasibility of sustained use.

While the health belief model emphasizes individual determinants, this finding highlights the central role of structural health system capacity. Without a reliable supply, even high perceived susceptibility and strong self-efficacy were insufficient to ensure adherence.

## Long Waiting Times at Health Facilities

Long waiting times at health facilities emerged as a significant barrier to consistent access to IFA supplementation. Participants described spending several hours at facilities, often after traveling long distances, which created substantial time burdens in the context of their domestic responsibilities.

One woman explained:

I am a housewife and caretaker of my children, and I usually don't have 2-3 hours to remain at the health facility. (ID1-7)

Another participant highlighted the compounded burden of travel and waiting:

My home is far, it takes 40 minutes to reach the facility, and I have to wait here for 2 hours, so it takes a lot of time. (FGD-2, 4)

Time spent at health facilities competed with household duties and childcare, reflecting "time poverty" driven by heavy domestic workloads. Attendance for supplementation, therefore, involved negotiating competing responsibilities. Long waiting times, combined with frequent refill requirements, discouraged repeat visits, making the burden cumulative.

While the health belief model frames barriers as perceived obstacles, these findings highlight how structural inefficiencies create tangible constraints. Even motivated women faced practical limitations that undermined sustained adherence.

## Unfavorable Attitude of Healthcare Workers

Participants described negative interactions with healthcare workers as a barrier to consistent IFA supplementation. Some women reported that midwives provided tablets without adequate explanation, appeared dismissive of their concerns, or did not create space for questions.

One participant stated:

The midwife told me, "Take this." Once finished, come again. She did not give me more information. (ID1-8)

Another described feeling unheard:

I asked the midwife, but she was talking with her friend and laughing. She said "yes, yes" without listening to my question. (IDI-2)

Limited communication and perceived lack of respect undermined women's confidence in care. Inadequate counselling reduced understanding of supplementation, side-effect management, and duration of use, thereby affecting both perceived benefits and self-efficacy. Negative interpersonal experiences also discouraged follow-up visits, weakening ongoing engagement with antenatal services.

Within the health belief model, provider interactions shape cues to action and self-efficacy. Here, poor provider behavior functioned as a barrier, particularly in a context where women already face structural and gender-based constraints in accessing care.

## Transportation Issues

Transportation challenges emerged as a significant structural barrier to sustained compliance with IFA supplementation. Participants described long distances to health facilities, high transportation costs, and sociopolitical restrictions on women's mobility as key obstacles to accessing supplements regularly.

Economic barriers were frequently mentioned. For some women, the cost of transportation represented a substantial financial burden:

My home is far from the health facility. I have to pay 200 Afghani for a round-trip fare. My family is poor and not able to afford this amount each month, making it difficult for me to visit the health facility each month. (ID1-6)

In contexts of economic hardship, repeated monthly visits for supplement refills became financially unsustainable, even for women who recognized the importance of supplementation. Beyond cost, participants described gendered mobility restrictions that limited their ability to travel independently. One participant explained:

The government doesn't allow me to travel without an adult male family member. My husband is at work during the day. So this creates a problem for me in traveling to the health facility. (FGD-2, 3)

The requirement for a male chaperone (Mahram) illustrates how political and cultural regulations constrained women's access to antenatal services, making compliance dependent on male availability and permission. Transportation barriers often compounded other challenges, including long waiting times and stock-outs, such that accumulated obstacles reduced the feasibility of sustained adherence.

Although the health belief model conceptualizes perceived barriers at the individual level, our findings indicate that these perceptions were shaped by broader structural conditions. In this context, transportation costs, mobility restrictions, and dependence on a male chaperone limited women's ability to access supplements, suggesting that compliance was influenced by both individual beliefs and external constraints.

## Fear of Adverse Effects

Fear of adverse effects emerged as an important barrier to regular IFA supplementation. Several participants described experiencing side effects such as stomach pain, nausea, vomiting, constipation, and dark stools, which discouraged consistent use. For some women, even a single tablet triggered discomfort severe enough to interrupt adherence.

One participant stated:

I have a stomach ulcer; even if I take a single tablet, it gives me stomach pain for the whole day. (FGD-2, 5)

Another explained:

When I take the tablet, I feel nauseous. Additionally, sometimes I have stomach pain when I take it in the morning. With such experience, I really don't want to take them every day. (FGD-1, 2)

Physical discomfort directly influenced women's willingness to continue supplementation, with side effects often interpreted as signs that the tablets were harmful or unsuitable. In the absence of adequate counselling, temporary symptoms became deterrents to sustained use. Women who lacked guidance on managing side effects were more likely to discontinue supplementation, whereas those who received clear instructions reported greater confidence.

Within the health belief model, these experiences functioned as perceived barriers, operating both physiologically and psychologically. The findings suggest that anticipatory counselling may mitigate this barrier by framing side effects as manageable and temporary.

## Forgetfulness

Forgetfulness was frequently mentioned as a barrier to consistent IFA supplementation. However, participants' accounts suggest that forgetting to take tablets was often linked to heavy domestic workloads, caregiving responsibilities, and physical exhaustion rather than lack of motivation.

One participant explained:

Sometimes, when I am very busy with my housework, I get so tired that I sleep without taking my iron tablets. (FGD-2, 5)

Another described the cognitive strain of managing multiple responsibilities:

I take care of my children and housework. My ability to remember everything is gone. My husband and other family members don't remind me to take my iron tablets. (IDI-7)

Forgetfulness was closely linked to unpaid domestic labor and caregiving responsibilities, with supplementation competing against multiple daily demands. In the absence of consistent reminders or structured routines, tablets were occasionally missed. Women who received spousal or family reminders were better able to maintain adherence, highlighting the role of social reinforcement.

Within the health belief model, forgetting may be viewed as a gap in cues to action. However, in this context, it reflects gendered domestic burdens and cognitive load rather than individual negligence.

Myths and Misconceptions

Myths and misconceptions surrounding IFA supplementation emerged as a community-level barrier to compliance. Participants described circulating beliefs that iron tablets could increase fetal size, lead to difficult childbirth, or signify maternal weakness. These narratives shaped attitudes toward supplementation and, in some cases, discouraged regular use.

One participant recalled:

Some friends discouraged me from taking my iron tablets; they said, “This is your first pregnancy, and these tablets will make the baby large, and you will have a difficult delivery.” (FGD-1, 4)

The belief that supplementation increases fetal size reflects concerns about obstructed labor and delivery complications, which are particularly salient in settings with limited access to emergency obstetric care. In this context, avoiding supplementation was sometimes perceived as a protective strategy.

Another participant described supplementation as being socially interpreted as a sign of weakness:

My mother-in-law told me that you became weak and you are taking power tablets to become pregnant. (IDI-3)

Such perceptions suggest that IFA supplementation carries symbolic meaning within the community, where its use may be interpreted as a sign of weakness or bodily inadequacy. These narratives, often reinforced by senior family members and peer networks, undermined women’s confidence in supplementation. In the absence of consistent counselling, community beliefs sometimes competed with biomedical explanations.

Within the health belief model framework, these misconceptions functioned as perceived barriers and shaped interpretations of risk and severity. However, the findings also underscore that compliance was influenced not only by individual cognition but by broader sociocultural norms that structured maternal health behaviors. Table 2 summarizes the barriers and facilitators of compliance with IFA supplementation mapped with the constructs of health belief model constructs (Table 2).

**Table 2** Barriers and Facilitators of Compliance with Iron-Folic Acid Supplementation Among Pregnant Women in Southern Afghanistan Mapped to Health Belief Model Constructs

| Barriers and Facilitators | Themes                                  | Health Belief Model Constructs              |
|---------------------------|-----------------------------------------|---------------------------------------------|
| Facilitators              | Perceived health benefits               | Perceived benefits                          |
|                           | Social support                          | Cues to action                              |
|                           | Perceived susceptibility/risk to anemia | Perceived susceptibility and Perceived risk |
|                           | Self-efficacy                           | Self-efficacy                               |

(Continued)

**Table 2** (Continued).

| Barriers and Facilitators | Themes                                    | Health Belief Model Constructs |
|---------------------------|-------------------------------------------|--------------------------------|
| <b>Barriers</b>           | Lack of supplement availability           | Perceived barriers             |
|                           | Long waiting times                        | Perceived barriers             |
|                           | Transportation and mobility constraints   | Perceived barriers             |
|                           | Unfavorable healthcare provider attitudes | Perceived barriers             |
|                           | Fear of side effects                      | Perceived barriers             |
|                           | Forgetfulness                             | Perceived barriers             |
|                           | Myths and misconceptions                  | Perceived barriers             |

## Discussion

This study explored barriers and facilitators of compliance with IFA supplementation among pregnant women in southern Afghanistan. Findings indicate that while several constructs of the health belief model shaped individual motivation to adhere, compliance was simultaneously influenced by structural, health system, and sociocultural factors.

The health benefits of IFA supplementation are well established.<sup>33,34</sup> In this study, most participants identified several potential benefits of IFA supplements, including preventing anemia during pregnancy, reducing adverse pregnancy outcomes, and having a healthy child, which together facilitated compliance with IFA supplementation. This finding aligns with earlier research in LMICs, suggesting that pregnant women's knowledge of the health benefits linked with IFA supplementation is a major driver of compliance.<sup>25,35</sup> However, our findings further suggest that perceived benefits were closely tied to maternal identity and aspirations for healthy childbearing, reinforcing the emotional and social dimensions of adherence beyond biomedical awareness alone. Hence, increasing awareness of the health benefits of regular IFA supplementation is essential when designing interventions to enhance compliance.

There is evidence that social support improves maternal healthcare utilization in LMICs.<sup>36</sup> Similarly, our participants reported that family and peer support helped them to comply with IFA supplementation. Participants described receiving encouragement, reminders, and information from husbands, mothers-in-law, and peers. The influence of social support on optimal maternal healthcare utilization has been documented in prior qualitative analyses in Afghanistan and elsewhere.<sup>36–38</sup> Importantly, in the Afghan context, adherence decisions often occur within collective household structures, suggesting that compliance is relationally negotiated rather than purely individual.<sup>39</sup> Therefore, social support should be central to the process of developing targeted interventions to help Afghan women comply with IFA supplementation.

Prior research has shown that perceived susceptibility is critical for adopting preventive health behaviors.<sup>14,40</sup> In the current study, women who perceived themselves to be at high risk of pregnancy-related complications were more likely to comply with regular use of IFA supplementation. Previous history of anemia, adverse pregnancy outcomes, and dietary vulnerability shaped this risk perception. Notably, structural poverty appeared to heighten perceived susceptibility, positioning IFA supplementation as a compensatory strategy in contexts of nutritional insecurity. This finding underscores the need for context-specific awareness programs on anemia knowledge, risk perception, and preparedness among high-risk populations.

In this study, participants reported that counselling enhanced their self-efficacy to comply with IFA supplementation. This finding is consistent with a growing body of literature indicating that higher self-efficacy is an important component of policy measures to improve medication adherence.<sup>35,41,42</sup> Additionally, several interventions have provided promising evidence for the effectiveness of health education and counselling in enhancing self-efficacy, a crucial factor for successful medication adherence.<sup>43,44</sup> In our study, self-efficacy was relationally constructed through provider–patient interactions, suggesting that the quality of counselling, not merely its provision, is central to sustained adherence.

Facility- and community-based educational programs may therefore play a critical role in strengthening adherence, particularly in Afghanistan's current sociopolitical context.

Access to medications has been shown to play an important role in adherence.<sup>8,25,42,45</sup> In this study, participants had concerns about the shortage of IFA supplements at health facilities. Earlier studies in Afghanistan have also documented a wide range of challenges in the Afghan health system, including a shortage of equipment and medications.<sup>12,46</sup> Moreover, the recent reductions in international aid may further exacerbate these vulnerabilities, with funding shortfalls forcing facilities to reduce or suspend services.<sup>47</sup> These findings highlight that adherence is contingent upon health system functionality; without a reliable supply, individual motivation alone is insufficient to ensure compliance. Given persistent dietary vulnerability and food insecurity,<sup>48</sup> uninterrupted IFA distribution remains essential for maternal and child health protection.

Long waiting times were identified as another barrier to compliance. Similar barriers have been documented in Afghanistan and other LMICs.<sup>27,36,49</sup> Our findings suggest that waiting time should be interpreted within the broader context of women's time poverty, where unpaid domestic labor competes with healthcare-seeking behaviors. Improving service efficiency and reducing refill frequency may therefore enhance adherence. Healthcare workers' attitudes also influenced compliance. Some participants reported dismissive communication and inadequate counselling. Prior literature indicates that provider attitudes significantly affect maternal healthcare utilization in Afghanistan.<sup>37</sup> Rather than confirming causality, our findings suggest that negative provider-patient interactions may undermine trust, reduce self-efficacy, and discourage follow-up visits. Strengthening respectful maternity care and communication skills may therefore support improved adherence.

Transportation costs and the recent mandates requiring a male chaperone during travel were reported as concerns that led to non-compliance with the recommended regime. Geographical disparities have been widely reported in the access and utilization of maternal healthcare services across Afghanistan.<sup>12,16,50,51</sup> In this context, mobility restrictions and financial hardship intersect to limit women's ability to access routine antenatal services, particularly for those in rural and underserved areas. Evidence from Afghanistan suggests that transportation vouchers can improve access to maternal healthcare services.<sup>37</sup> However, recent restrictions on women's mobility may further exacerbate inequities and marginalize already vulnerable populations.<sup>12</sup> To improve compliance with IFA supplementation, interventions should address both financial and structural barriers, including transportation support mechanisms and community-based distribution of supplements to reduce reliance on facility-based access.

Fear of side effects has been widely documented as a contributor to medication non-adherence.<sup>52</sup> In this study, participants identified a number of side effects, such as nausea, vomiting, and abdominal discomfort, associated with IFA supplementation as key barriers to compliance. This finding aligns with earlier qualitative and interventional studies conducted in other LMICs.<sup>25,53</sup> Studies have also provided evidence on the crucial role of counselling in enabling pregnant women to mitigate side effects associated with IFA supplementation.<sup>53,54</sup> Strengthening counselling on side-effect management may therefore represent an important strategy for improving adherence in this context.

Forgetfulness emerged as a key barrier to compliance with the recommended IFA supplementation. Participants attributed missed doses to competing household and caregiving responsibilities, fatigue, and the absence of reminders. Similar patterns have been documented in other health contexts.<sup>53,55</sup> Additionally, evidence suggests that several context-relevant interventions can help clients remember their medication and improve compliance.<sup>53,54</sup> Nonetheless, the effectiveness of these interventions is yet to be examined in the context of Afghanistan.

Myths and misconceptions consistently challenge healthy behaviors in traditional societies.<sup>56,57</sup> Afghanistan is no exception to this phenomenon. A few participants were concerned with the harm of IFA supplements to the fetus and the stigma of weakness associated with IFA supplementation. Earlier research in Afghanistan has also demonstrated several misconceptions during the period of pregnancy and post-childbirth.<sup>37,56,58,59</sup> Engaging religious leaders and elder family members in awareness and educational programs could help negate myths and misconceptions surrounding IFA supplementation and improve compliance in Afghanistan.

Overall, while health belief model constructs explained individual-level motivations, our findings demonstrate that compliance with IFA supplementation in southern Afghanistan is deeply embedded within structural constraints,

sociocultural norms, and health system capacity. Interventions must therefore extend beyond individual behavior change to address systemic and contextual determinants of adherence.

## Policy Implications and Recommendations

Based on these findings, several actionable measures could improve IFA supplementation compliance in southern Afghanistan. First, health authorities and implementing partners should strengthen uninterrupted IFA supply at public health facilities through improved forecasting, stock monitoring, and timely redistribution to prevent stock-outs. Second, ANC services should incorporate standardized counselling on the benefits of IFA, duration of use, and management of common side effects, supported by refresher training in respectful communication for healthcare providers. Third, community-based strategies, including outreach distribution through community health workers and engagement of husbands, mothers-in-law, and religious or community leaders, should be used to address mobility barriers, forgetfulness, and myths surrounding supplementation. Fourth, context-appropriate reminder approaches, such as family reminders, pictorial calendars, or mobile phone messages where feasible, may help women maintain daily intake. Finally, transport support or decentralized refill mechanisms should be considered for women in remote areas where travel cost and mobility restrictions limit access to routine ANC services.

## Limitations

This study employed an exploratory qualitative design using focus group discussions and in-depth interviews, which enabled an in-depth exploration of factors influencing IFA supplementation compliance. However, several limitations should be acknowledged. First, social desirability bias may have influenced participants' responses, particularly given that interviews were conducted within healthcare facilities and involved pregnant women currently attending antenatal care services. Participants may have provided responses perceived as favorable to healthcare providers or aligned with expected health behaviors. Second, the study sample was limited to women attending ANC services. The perspectives of pregnant women who do not access ANC, who may face greater structural, sociocultural, or financial barriers, were not captured, potentially limiting the diversity of viewpoints. Third, the study was conducted in selected health facilities across two provinces in southern Afghanistan. Although sites were purposively selected to reflect contextual variation, findings may not be transferable to other regions with different sociocultural, economic, or security conditions. Fourth, data were translated from Pashto into English, which may have resulted in a subtle loss of nuance despite careful verification procedures. Additionally, the analysis was guided by the health belief model. While this theoretical framework strengthened analytical coherence, it may have constrained the identification of themes beyond predefined constructs. Despite these limitations, the study provides contextually grounded insights into the multilevel determinants of IFA supplementation compliance in a fragile and resource-constrained setting.

## Conclusion

This study provides context-specific insights into the multilevel determinants of IFA supplementation compliance among pregnant women in southern Afghanistan. While individual-level factors such as perceived benefits, susceptibility, social support, and self-efficacy influenced adherence, compliance was also shaped by structural health system constraints, sociocultural norms, and mobility restrictions. Improving IFA adherence requires more than awareness-raising alone. Operationally, programs should ensure uninterrupted IFA availability at health facilities, strengthen routine ANC counselling on supplement use and side-effect management, train providers in respectful and responsive communication, and expand community-based distribution or refill mechanisms for women facing mobility and transport barriers. Interventions should also engage husbands, mothers-in-law, and community or religious leaders to address misconceptions, reinforce reminders, and support women's continued supplement use. Policymakers and program planners should adopt comprehensive, context-sensitive approaches to improve sustained compliance with IFA supplementation in fragile settings such as Afghanistan.

## Data Sharing Statement

The primary data used to support the findings of this study are available from the corresponding author upon request.

## Ethical

The study was ethically approved by the Human Research Ethics Committee at Walailak University (WUEC-25-371-01) and the Department of Public Health, Faculty of Medicine, Kandahar University (PHMFKDRU-111-01-11-2025). Prior to participants' recruitment into the study, we obtained informed consent from all participants, including explicit consent for their anonymized direct quotes to be used for research-related publications. Moreover, the study was conducted in accordance with local ethical guidelines and in compliance with the Declaration of Helsinki.

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## Disclosure

The authors report no conflicts of interest in this work.

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