# Barriers to Adequate Prenatal Care in Managing Anemia among Pregnant Women

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**ABSTRACT**

**Background:** Anemia during pregnancy is a significant public health issue, particularly in low- and middle-income countries. Despite efforts to address anemia, barriers to adequate prenatal care remain a critical challenge in managing this condition.

**Objective:** To assess the prevalence of anemia among pregnant women and evaluate the association of sociodemographic and healthcare access barriers with anemia status.

**Material and Methods:** This cross-sectional study was conducted at the Department of Obstetrics and Gynecology, Saeed Medical Complex, Mattani, Peshawar, from January 2024 to June 2024. A total of 361 pregnant women attending antenatal care services were included. Sociodemographic characteristics, healthcare access barriers, awareness of anemia, and compliance with iron supplementation were assessed using a structured questionnaire. Hemoglobin levels were retrieved from medical records, and anemia was classified based on World Health Organization (WHO) criteria. Data were analyzed using descriptive statistics, Chi-Square tests, and independent t-tests, with a p-value <0.05 considered statistically significant.

**Results:** The mean age of participants was 30.47 years (SD = 7.085), and the mean hemoglobin level was 10.45 g/dL (SD = 1.683). The prevalence of anemia was 44.6%, with 161 participants classified as anemic and 200 as non-anemic. Anemia prevalence varied across education, socioeconomic status, parity, distance to healthcare, and other barriers, but no statistically significant associations were observed (p > 0.05).

**Conclusion:** Anemia remains a prevalent issue among pregnant women, with multiple potential barriers contributing to its management. Despite non-significant associations, these barriers highlight areas for targeted interventions to improve prenatal care and anemia outcomes.

*Keywords: Anemia, Pregnancy, Prenatal Care, Barriers, Hemoglobin, Healthcare Access*

## 1. INTRODUCTION

Anemia during pregnancy poses significant health challenges, particularly in developing countries, where it contributes to maternal and fetal morbidity and mortality. Despite advancements in healthcare, the prevalence of anemia remains unacceptably high among pregnant women, with estimates ranging from 22% to 55% globally, depending on the region and socioeconomic status [1-4]. Anemia in pregnancy is predominantly caused by iron deficiency, though other factors such as folic acid deficiency, chronic infections, and socio-demographic conditions also play a role [5,6].

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Managing anemia in pregnancy is dependent upon access to adequate prenatal care, and this passive provision is compromised by many barriers to effective care delivery. Iron supplementation and other essential treatments are highly impeded due to financial constraints, cultural beliefs and logistical challenges in access by pregnant women [1,2]. A cross-sectional study done in Nigeria recently disclosed that poor utilization of antenatal care services and inadequate intake of vitamins was some of the leading causes of high anemia prevalence[2]. Analogously, a study carried out in Ethiopia confirmed that dietary diversity and preventing anemia through timely prenatal interventions are means of anemia prevention and its effects in reducing anemia prevalence are well established [7].

The problem is generally made worse by cultural and societal norms. For example, within some communities, iron supplementation is linked to adverse outcomes, like larger birthing babies, whose birth can become more complicated [1,3]. In addition, many women are also discouraged and afraid of the side effects of the workable iron supplements, e.g. gastrointestinal discomfort [1,4]. Moreover, rural populations suffer from a higher risk for anemia for they have unequal and limited access to healthcare facilities and qualified professionals, exacerbating the problem in effective anemia management [5].

In addition, underutilization of prenatal care services arises due to the ignorance with regard to anemia and its complications. Few women know their symptoms for anemia or the need for treatment [1,6]. In studies, education programs to increase awareness about prevention and management of anemia and long term benefits of adequate prenatal care are highlighted [8].

These problems are compounded by inadequacies of the healthcare system including irregular supply chains for iron supplements and inadequate training of the healthcare workers to offer quality of antenatal services [4, 9]. In addition, resource allocation is often biased systematically, leading to an urban bias, and leaving vulnerable populations underserved [3,5].

There is emerging evidence, however, that midwife led care models and community based intervention may hold the key to bridging the gap. Midwife led intravenous iron therapy study in Pakistan showed that pregnant women in resource limited settings prevalence of anemia can be significantly reduced [10]. These approaches highlight the promising directions of decentralized healthcare model in overcoming the barrier and in improving the maternal health outcomes.

Anemia in pregnancy is a public health problem that persists despite protection available through antenatal care and interventions. Socioeconomic factors, poor access to health care and the low compliance with supplementation as barriers, hinder the effective management. The aim of this paper is to identify these barriers and have them assessed in terms of what they contribute to poor maternal health outcomes.

## 2. MATERIAL AND METHODS

The study was carried out as a cross-sectional study, at the Department of Obstetrics and Gynecology, Saeed Medical Complex, Mattani, Peshawar, from January 2024 to June 2024. Hospital is a tertiary care hospital and provides antenatal care services for diverse population.

Pregnant women who attended the antenatal care (ANC) clinic were the study population. Pregnant women at any gestational age who were documented in their medical records to have had hemoglobin tested and who provided written informed consent were included. Excluded from the analysis were women with known chronic illness (among them renal disease or malignancies that could affect anemia status) and those who refused participation.

The study sample size was calculated with reference to prevalence of anemia among pregnant women which was previously reported to be 62.5%. The required sample was determined using 95% as a confidence level and a 5% margin of error, and this resulted to a required sample size of 361 participants [11].

The dependent variable was anemia status as anemic and non-anemic depending on hemoglobin levels. Sociodemographic characteristics, such as age, education, socioeconomic status, parity and gravidity, were independent variables. The type of healthcare facility (government or private), distance to the facility, availability of transportation, financial constraints were found to be major health care access barriers.

Data were collected using a structured questionnaire administered during antenatal visits by trained healthcare staff. The questionnaire gathered information on sociodemographic details, healthcare access barriers, and awareness of anemia. Hemoglobin levels were obtained from participants' medical records. The questionnaire was designed to ensure comprehensiveness and relevance to the study objectives.

Ethical approval for the study was obtained from the ethical review board of Civil Hospital, Bahawalpur. Written informed consent was obtained from all participants after explaining the study's purpose, procedures, and their right to withdraw at any time. Confidentiality of participant data was strictly maintained.

Data analysis was performed using SPSS version 24. Descriptive statistics were used to summarize the study variables, presenting frequencies and percentages for categorical variables and means with standard deviations for continuous variables. Associations between barriers to prenatal care and anemia status were analyzed using Chi-Square tests, while independent t-

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tests were used to compare mean hemoglobin levels between groups. A p-value <0.05 was considered statistically significant.

## 3. RESULTS

The study included a total of 361 pregnant women, with a mean age of 30.47 years (SD = 7.085). The mean hemoglobin level among participants was 10.45 g/dL (SD = 1.683). Out of the total participants, 161 (44.6%) were classified as anemic, while 200 (55.4%) were non-anemic (Fig. 1).

The prevalence of anemia was slightly higher among women with primary education, with 57 (46.7%) anemic and 65 (53.3%) non-anemic. Similarly, women with secondary education showed 54 (45.8%) anemic and 64 (54.2%) non-anemic. Among tertiary-educated women, the prevalence of anemia was lower, with 50 (41.3%) anemic and 71 (58.7%) non-anemic. However, the association between education and anemia status was not statistically significant (p = 0.666).

Anemia was more prevalent among women in the low socioeconomic group, with 67 (51.5%) anemic and 63 (48.5%) non-anemic. In the middle socioeconomic group, 46 (38.7%) were anemic, and 73 (61.3%) were non-anemic. Among women in the high socioeconomic group, 48 (42.9%) were anemic, and 64 (57.1%) were non-anemic. The association between socioeconomic status and anemia was not statistically significant (p = 0.112).

Anemia prevalence was similarly distributed across parity categories. Among nulliparous women, 59 (46.8%) were anemic, and 67 (53.2%) were non-anemic. In multiparous women, 57 (47.1%) were anemic, and 64 (52.9%) were non-anemic. Among grand multiparous women, 45 (39.5%) were anemic, and 69 (60.5%) were non-anemic. The association between parity and anemia was not statistically significant (p = 0.412).

Among women attending government healthcare facilities, 85 (45.0%) were anemic, and 104 (55.0%) were non-anemic. Women attending private facilities had similar results, with 76 (44.2%) anemic and 96 (55.8%) non-anemic. The type of healthcare facility was not significantly associated with anemia status (p = 0.880).

Women living near healthcare facilities had a slightly lower prevalence of anemia, with 72 (40.2%) anemic and 107 (59.8%) non-anemic. Among those living far from healthcare facilities, 89 (48.9%) were anemic, and 93 (51.1%) were non-anemic. However, the association between distance and anemia status was not statistically significant (p = 0.097).

Anemia was more common among women with available transportation, with 94 (47.5%) anemic and 104 (52.5%) non-anemic. Among women without available transportation, 67 (41.1%) were anemic, and 96 (58.9%) were non-anemic. The association between transportation availability and anemia was not statistically significant (p = 0.226).

Among women facing financial constraints, 79 (43.2%) were anemic, and 104 (56.8%) were non-anemic. Among those without financial constraints, 82 (46.1%) were anemic, and 96 (53.9%) were non-anemic. Financial constraints were not significantly associated with anemia status (p = 0.580).

Anemia was slightly less common among women aware of anemia risks, with 78 (43.1%) anemic and 103 (56.9%) non-anemic. Among women unaware of anemia risks, 83 (46.1%) were anemic, and 97 (53.9%) were non-anemic. The association between awareness and anemia status was not statistically significant (p = 0.564).

Anemia prevalence was similar among women compliant with iron supplementation, with 91 (44.8%) anemic and 112 (55.2%) non-anemic. Among non-compliant women, 70 (44.3%) were anemic, and 88 (55.7%) were non-anemic. The association between compliance and anemia status was not statistically significant (p = 0.921) (Table 1).
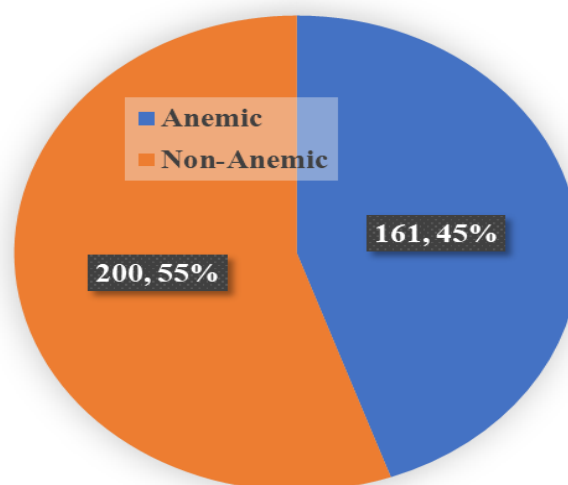


**Fig.1: Anemia status:**

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**Table 1: Barriers to Adequate Prenatal Care and Their Association with Anemia Status among Pregnant Women**

| Variable | Category | Anemic (n, %) | Non-Anemic (n, %) | Total (n) | p-value |
|---|---|---|---|---|---|
| **Education** | Primary | 57 (46.7%) | 65 (53.3%) | 122 | 0.666 |
| | Secondary | 54 (45.8%) | 64 (54.2%) | 118 | |
| | Tertiary | 50 (41.3%) | 71 (58.7%) | 121 | |
| **Socioeconomic Status** | Low | 67 (51.5%) | 63 (48.5%) | 130 | 0.112 |
| | Middle | 46 (38.7%) | 73 (61.3%) | 119 | |
| | High | 48 (42.9%) | 64 (57.1%) | 112 | |
| **Parity** | Nulliparous | 59 (46.8%) | 67 (53.2%) | 126 | 0.412 |
| | Multiparous | 57 (47.1%) | 64 (52.9%) | 121 | |
| | Grand Multiparous | 45 (39.5%) | 69 (60.5%) | 114 | |
| **Healthcare Facility Type** | Government | 85 (45.0%) | 104 (55.0%) | 189 | 0.880 |
| | Private | 76 (44.2%) | 96 (55.8%) | 172 | |
| **Distance** | Near | 72 (40.2%) | 107 (59.8%) | 179 | 0.097 |
| | Far | 89 (48.9%) | 93 (51.1%) | 182 | |
| **Transportation** | Available | 94 (47.5%) | 104 (52.5%) | 198 | 0.226 |
| | Unavailable | 67 (41.1%) | 96 (58.9%) | 163 | |
| **Financial Constraint** | Yes | 79 (43.2%) | 104 (56.8%) | 183 | 0.580 |
| | No | 82 (46.1%) | 96 (53.9%) | 178 | |
| **Awareness of Anemia** | Yes | 78 (43.1%) | 103 (56.9%) | 181 | 0.564 |
| | No | 83 (46.1%) | 97 (53.9%) | 180 | |
| **Compliance with Iron Supplementation** | Yes | 91 (44.8%) | 112 (55.2%) | 203 | 0.921 |
| | No | 70 (44.3%) | 88 (55.7%) | 158 | |

## 4. DISCUSSION

This study revealed that anemia remains a significant public health issue among pregnant women, with a prevalence of 44.6%. This finding aligns with Azhar et al., who reported a prevalence of 62.5% in Bangladesh, with higher rates among women attending government healthcare facilities and those with lower socioeconomic status. They highlighted the role of routine antenatal care and iron supplementation in mitigating anemia prevalence [11]. Similarly, Mishra et al. observed that anemia affects more than half of pregnant women in India due to barriers like late antenatal care registration, non-compliance with iron supplementation, and poor dietary practices. This underscores the need for early antenatal registration, consistent follow-up, and counseling to promote dietary improvements [12].

Education and socioeconomic status were not significantly associated with anemia in this study, yet existing evidence indicates their relevance. Yakar et al. found that low education levels and lack of nutrition education significantly predicted anemia in Turkey, emphasizing the protective role of higher education and income [13]. Saha et al. also demonstrated that inadequate antenatal care attendance was strongly associated with anemia, particularly in the third trimester [14]. These findings suggest that enhancing maternal literacy and promoting regular antenatal visits are crucial strategies.

In anemia management dietary diversity and iron supplementation compliance are critical. According to Babah et al., regular intake of green leafy vegetable was associated with a decreased odds ratio of iron deficiency anemia whereas poor compliance

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with iron supplementation predicted anemia risk in Nigeria [15]. In addition, Balcha et al. in Ethiopia examined dietary diversity and iron and folic intake as important components of anemia prevention. Mostly, non compliance was caused by systemic barries and side effects of iron supplements [16].

Healthcare access barriers, including distance to healthcare facilities and transportation availability, did not show a significant association with anemia in this study. However, Alem et al. highlighted the multifactorial nature of anemia in low- and middle-income countries, identifying rural residency, low socioeconomic status, and poor access to healthcare as significant contributors [17]. Widyawati et al. further emphasized the role of cultural beliefs and systemic healthcare limitations, such as inadequate staff and poor communication skills, in Indonesia, underscoring the need for systemic improvements [18].

The involvement of family members in antenatal care is another critical factor. Hailu et al. noted that cultural practices and lack of male involvement in antenatal care were significant barriers to anemia management in Ethiopia. Strengthing community-based interventions and improving health literacy among family members may help address these challenges [19]. Finally, El-Kholy et al. demonstrated the positive impact of pharmacist-led counseling in Saudi Arabia, which improved adherence to iron supplements and increased hemoglobin levels significantly, highlighting the value of patient education in improving anemia outcomes [20].

## 5. CONCLUSION

This study indicates that anemia is an ongoing problem for the pregnant women (44.6% were anemic). Sociodemographic factors (education, socioeconomic status, parity) and healthcare access barriers (facility type, distance, transportation, cost, awareness, compliance with iron supplementation) were associated with anemia prevalence, but none was statistically significant. The implications of these findings are that the factors affecting anemia among pregnant women appear to arise from a multitude of determinants, some of which may be unmeasured. In order to manage and reduce anemia during pregnancy, we need to focus on targeted interventions that address bigger systemic and nutritional factors.

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