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ASSOCIATION OF ANEMIA WITH PARITY AMONG PREGNANT MOTHERS

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ABSTRACT

Background: Iron deficiency, a major preventable cause of anemia globally, is a significant public health challenge in South Asia, particularly in Peshawar, affecting a significant portion of the population. **Objective:** To determine the incidence of iron deficiency illnesses associated with pregnancy in the district Peshawar, Khyber Pakhtunkhwa, Pakistan. **Methodology and Materials:** A descriptive cross-sectional study was carried out on 295 pregnant women aged 18 to 40 years. Non-probability convenience sampling technique used and self-structured questionnaire, healthcare records, and laboratory results for data collection were used. The data was analyzed using SPSS version 22. **Results:** The Mean age of the participant was 29.52±4.81 years and mean age at the time of marriage was 23.03±3.15. Majority of the female had no formal education followed by primary and secondary education. The study found that 25.4% of

participants had primary gravida, with 60% reporting healthy eating habits and 90% used iron supplements. The average Hb% was 11.1±1.3, with 47.46% being anemic. The study found that primary gravida had higher mean Hb values than multigravida. The study found a significant difference in MCHC, with primary grvida having higher mean values than multigravida. Blood pressure levels varied across parity levels, with a decrease up to gravida 2 and a similar decrease in levels 3, 4, and 5. The mean difference was statistically significant across gravida. **Conclusion:** Our results revealed that anaemia is a major public health problem for pregnant women in Peshawar, particularly those with a high parity. The findings highlight the critical need for targeted maternal health treatments such as better nutrition, regular supplements, complete prenatal care, and optimal family planning. These interventions are critical for reducing the burden of anaemia and improving maternal and foetal outcomes.

INTRODUCTION:

Anemia during pregnancy remains one of the most pressing public health concerns globally, particularly in economically developing nations. It is estimated to affect nearly half of all pregnant women and is associated with adverse maternal and neonatal outcomes, including preterm delivery, low birth weight, and increased maternal morbidity and mortality [1]. According to the World Health Organization [2], anemia in pregnancy is defined as a hemoglobin (Hb) concentration below 11 g/dL, with trimester-specific thresholds of <11 g/dL in the first and third trimesters, and <10.5 g/dL in the second trimester. Recent WHO data indicate that approximately 37% of pregnant women worldwide are anemic. The WHO classifies anemia as a public health issue when the population prevalence reaches 5% or more, and considers it a severe public health problem at prevalence levels of ≥40%. Iron deficiency is the leading cause of anemia in pregnancy, although other factors such as infections, nutritional deficiencies, and chronic illnesses also contribute significantly [3].

Pregnancy significantly increases iron demands, with daily requirements rising from approximately 2.5 mg/day in early pregnancy to about 6.6 mg/day in the later trimesters to support maternal and fetal growth [4]. Consequently, many women especially those in low- and middle-income countries (LMICs) enter pregnancy with insufficient iron stores. According to global estimates, up to 56% of pregnant women in LMICs suffer from anemia [5], and roughly 30–50% are iron-deficient at the time of conception. Anemia is not only a physiological concern but also a socioeconomic one, as its prevalence is closely linked with poverty, low dietary diversity, high parity, poor birth spacing, and inadequate antenatal care [6].

The relationship between parity and anemia has received growing attention. Although not extensively studied, available evidence suggests a potential association between increasing gravidity and the likelihood of developing anemia during pregnancy [7]. For instance, reported that primigravida women were 61% less likely to be anemic compared to multigravida women, highlighting the possible impact of repeated pregnancies on maternal iron stores. Supporting this, a study conducted in India [8]. Found anemia prevalence to be 46% among primigravida women compared to 70.7% among multigravida women. Similarly, a local study in Sindh, Pakistan, observed anaemia prevalence of 43% in

primigravida women versus 60% in multigravida women [9].

Despite the global emphasis on maternal anemia, there remains a notable gap in region-specific data, especially regarding the association between parity and anemia in pregnancy. In many settings, especially in South Asia, the available evidence is fragmented, and few studies have systematically examined this relationship. Addressing this gap is essential for tailoring effective maternal health strategies [10].

Therefore, the present study aims to determine the prevalence of anemia in pregnant women and assess its association with gravidity. The findings are expected to contribute to a better understanding of maternal anemia patterns and help inform targeted interventions aimed at reducing its burden, particularly among high-risk groups such as multigravida women.

METHODOLOGY:

A cross-sectional study was conducted over a four-month period from August 2020 to December 2020 at Kuwait Teaching Hospital and Molvi Jee Memorial Hospital in Peshawar, Khyber Pakhtunkhwa, Pakistan. A total of 295 pregnant women diagnosed with iron deficiency anemia were enrolled using a non-probability convenience sampling technique. Prior to participation, written informed consent was obtained from all subjects, and ethical approval was granted by the Institutional Review Board of Paraplegic Centre Peshawar and the respective hospital ethics committees.

Pregnant women 18 to 40 years who agreed to participate were included in the study and women with multiple pregnancies, anemia not related to pregnancy, acute or chronic illness, gestational diabetes mellitus, hypertension, or a history of blood transfusion during the current pregnancy were excluded. Data were collected using a structured questionnaire, which included items on socio-demographic characteristics, pregnancy-related information, dietary habits, and laboratory findings. The questionnaire was initially prepared in English and translated into Pashto to ensure comprehensibility for local participants.

Anemia was confirmed using standard blood tests, considered reliable and valid for diagnosis. All collected data were kept confidential to ensure participant privacy and comfort. Data was analysis through SPSS version 22. Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to summarize the data. Inferential statistics, including independent samples t-test and one-way ANOVA, were applied to examine associations between variables, with a p-value of less than 0.05 considered statistically significant.

Results:

A total of 295 pregnant women were included in the current study with age ranges from 18-40 years. The mean age of the participant was 29.52±4.81 years. All of the participants had single pregnancy and the frequency of primagravida was 75 (25.4 %) and multigravida 220 (74.6 %).

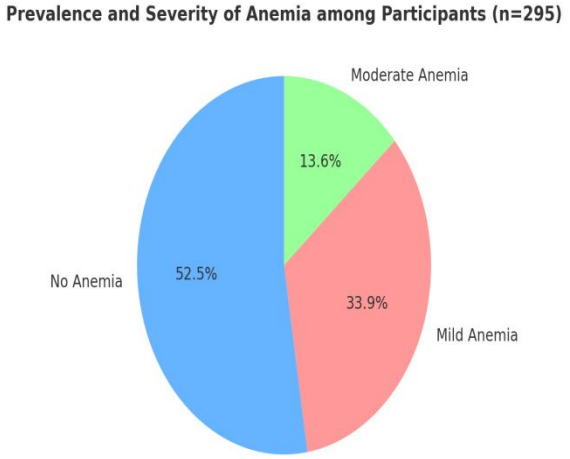
Table 1. Baseline characteristics of study participants

Characteristics	N (%)
Participants	295 (100)
Mean Age	29.52±4.81
Primagravida	75 (25.4)
Multigravida	220 (74.6)

Nearly 60% disclosed good eating habits, where majority reported that they eat three times a day. Similarly, daily tea intake was described by 78.31% twice daily. More than half and 2/3 of the participants disclosed that they take dry fruits and read meat. Iron supplementation use was disclosed by 90% of the participants. An average hour of rest per day was 7.0±1.00. Mean Hb% of the total population was 11.1±1.3. Mean HCT, MCV, MCH, and MCHC 33.3±3.1, 72.7±7.0, 27.9±3.1 and 33.0±3.2 respectively out of the total, 140(47.46%) participants were anemic using the standard cutoffs I.e. Hb (<11mg.dl)for females was

categorized as 'Anemia'., Hb level between 10-10.9 mg/dL was referred to as 'mild Anemia' and below 7-9.9 mg/dL was considered as moderate anemia.

Further categorizing the anemic, analysis showed that 62.14% were mild and 37.96 percent were moderate anemic, and no severe cases were observed.



A student independent t-test was used to compare the means of prima (primiparous pregnant) and multigravida (multiparous pregnant). The mean Hb value was greater in primagravida compared to multigravida and the difference was statistically significant. Similarly the difference in terms of MCHC was also found to be statistically significant where the mean value of primagrvida was higher compared to multigravida. Rests of the parameters were statistically insignificant.

Table 2. Hemoglobin levels (Mean ± SD) across different gravidity levels

Gravidity	Hemoglobin Level (g/dL) Mean ± SD	Observation/Trend
Gravida 1	11.9 ± 1.5	Highest mean Hb level
Gravida 2	10.7 ± 1.1	Significant decrease compared to G1
Gravida 3	11.7 ± 0.9	Comparable to G1
Gravida 4	11.0 ± 0.8	Stable compared to G3
Gravida 5	10.1 ± 1.0	Decline observed
Gravida 6	9.8 ± —	Lowest Hb level noted

Note: Hemoglobin levels showed a decreasing trend with increasing gravidity, significantly lower in Gravida 2, comparable in Gravida 3 and 4, followed by another decline in Gravida 5 and 6. The mean difference across gravidity was statistically significant ($p < 0.05$).

The hemoglobin levels mean and standard deviation is given for each level of gravidity, in gravida 1 it is (11.9 ± 1.5), in gravida 2 its (10.7 ± 1.1) in gravida 3(11.7 ±0.9), in gravida 4 its (11.0 ± 0.8) and in 5 and 6 it is noted as (10.1 ± 1.0 and 9.8 respectively), As the parity increases the levels of Hb decreases up to gravida 2 ,while comparable in 3,4 and then decrease in 5,6 was observed. The mean difference was found to be statistically significant across the gravida.

DISCUSSION:

This study examined the association between parity and the prevalence of anaemia among pregnant women in Peshawar. The findings revealed that 47.46% of the participants were anaemic, a prevalence rate that surpasses the World Health Organization's threshold for a severe public health issue (≥40%). This rate is considerably higher than those reported in developed regions, such as Macedonia (26%) and other high-income countries, where anaemia prevalence during pregnancy is generally below 15%. The results suggest a continuing burden of anaemia in low- and middle-income countries, including Pakistan [11].

Although a majority of participants reported iron supplement use during pregnancy, anaemia remained widespread. This suggests that mere access to supplements may not be sufficient to prevent anaemia. Factors such as late initiation, poor adherence, dietary deficiencies, and lack of health education may contribute to this discrepancy. These findings indicate the need for evaluating not only access to but also the effectiveness and consistency of antenatal nutritional interventions [12].

Parity showed a significant correlation with anaemia status. Anaemia was more common in multigravida women (52.7%) compared to primigravida women (32%). These findings are consistent with previous studies, such as one conducted in Saudi Arabia and

Pakistan, which reported anaemia in 56% of multiparous women. Conversely, a study from Ethiopia found higher anaemia prevalence in primigravida women, possibly due to different nutritional statuses or healthcare access. These contrasts highlight the influence of context-specific factors such as diet quality, antenatal care practices, and baseline iron stores [13].

Hemoglobin levels also differed significantly between groups. Primigravida women had a mean hemoglobin level of 11.86 ± 1.5 g/dL, while multigravida women had 10.8 ± 1.10 g/dL ($p < 0.001$). These values are higher than those reported in a study, but remain below optimal levels. The observed trend supports the notion that cumulative nutritional demands from multiple pregnancies may deplete iron stores, resulting in lower hemoglobin levels in multigravida women [14].

The majority of anaemic participants in this study had mild anaemia (62.14%), while moderate anaemia was observed in 37.5% of primigravida and 37.9% of multigravida women. No cases of severe anaemia were recorded. These findings differ from other studies, which reported severe anaemia rates as high as 13.2% in multigravida women. This discrepancy may be due to regional variations in diet, healthcare access, or study populations [14].

Despite the higher prevalence of anaemia in multigravida women, this study did not find a significant association between short inter-pregnancy intervals and severe anaemia. Previous research, such as, has shown increased anaemia severity with reduced birth spacing, but in this study, the majority of women with high parity still exhibited only mild anaemia. Findings by Farsi et al. similarly suggest that mild anaemia may persist across increasing parity levels [15].

Finally, anaemia in multiparous women has been implicated in increased risk of obstetric complications, including postpartum haemorrhage. While the exact mechanism remains uncertain, hypotheses include reduced uterine elasticity and increased venous drainage, which may predispose to uterine rupture and excessive bleeding. These clinical implications underscore the importance of addressing anaemia as part of comprehensive maternal care, particularly in populations with high parity

Conclusion and Recommendations:

This study concludes that nearly half (47.46%) of the pregnant women in Peshawar were anemic, with anemia significantly more prevalent in multigravida women compared to primigravida. Hemoglobin levels declined progressively with increasing parity, indicating that high parity is a key risk factor for developing iron deficiency anemia in pregnancy. To address this, it is recommended that public health strategies prioritize maternal nutrition education, routine iron and folic acid supplementation, promotion of breastfeeding, and regular antenatal check-ups. Additionally, family planning measures should be strengthened to ensure adequate spacing between pregnancies, ideally more than three years, to reduce the risk and consequences of anemia for both mother and child.

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