Vol. 4 No. 1 (2025)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Blood Donation and Perception of Pregnant Women at Tertiary Care

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Keywords: Depression, Anxiety, University Students, Mental Health, Peshawar, Academic Stress, Gender Differences, Support Services

Received on 02 Jan 2025
Accepted on 24 Jan 2025
Published on 30 Jan 2025

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Abstract

Background: Blood donation is vital for obstetric care, yet voluntary donation rates remain low in Pakistan. Pregnant women represent both frequent recipients and potential influencers within families, making their perceptions crucial to strengthening safe blood supply. **Objective:** To assess knowledge, perceptions, and willingness regarding blood donation among pregnant women attending a tertiary care hospital, and to identify factors influencing their attitudes. **Methods:** A descriptive cross-sectional study was conducted at PMC Hospital, Nawabshah, from May to November 2024. A total of 216 pregnant women aged 18–45 years were enrolled through consecutive sampling. Data was collected via a structured, pre-tested questionnaire covering socio-demographic factors, knowledge, perceptions, and practices. Analysis employed descriptive statistics, Chi-square tests, and multivariable logistic regression to determine independent predictors of willingness. **Results:** Mean age was 31.9 ± 7.7 years, with most

women residing in rural areas (65.7%). Overall, 42.1% were willing to donate blood. Higher knowledge scores (OR 1.35, 95% CI 1.15–1.58, p<0.001) predicted willingness, whereas greater perceived barriers (fear of weakness, infection, infertility myths) reduced it (OR 0.55, 95% CI 0.34–0.87, p=0.011). Socio-demographic variables were not significant predictors. **Conclusion:** Less than half of the participants were willing to donate blood. Targeted antenatal education addressing myths and fears could improve voluntary donation. Broader public health strategies should integrate culturally sensitive messaging and strengthen antenatal counseling.

Keywords: Blood Donation, Perception, Pregnant Women, Willingness, Barriers, Pakistan, Maternal Health.

INTRODUCTION

Blood donation is indispensable in modern healthcare, particularly in obstetrics, where postpartum haemorrhage (PPH) remains a leading cause of maternal mortality worldwide, responsible for nearly 27% of maternal deaths^1^. This burden is disproportionately high in low- and middle-income countries (LMICs), where timely access to safe blood is often limited^2^. In Pakistan, maternal mortality remains elevated, with haemorrhage as a major contributor. Despite reforms in the blood transfusion system, the country still relies heavily on family or replacement donors, while voluntary non-remunerated donation remains low^3^. Concerns about transfusion-transmissible infections (TTIs) further highlight the need for robust safety protocols^4^. In addition, widespread maternal anaemia exacerbates transfusion requirements during pregnancy and delivery^5,6^.

While improving infrastructure is critical, perceptions, knowledge, and attitudes toward blood donation significantly affect donor behaviour. Studies in Pakistan reveal a marked knowledge–practice gap. Bilal et al. found that female health professionals had adequate knowledge of transfusion safety but

rarely donated due to fears of weakness and infection^7^. Saqlain et al. reported that only 12.7% of female attendants in Lahore had ever donated blood, with many perceiving women as too fragile to donate^8^. Similarly, medical students in Karachi demonstrated high awareness yet low practice^9^. Qualitative research has also documented how cultural notions of "kamzori" (weakness) and gendered meanings of blood reinforce reluctance to donate^10^. In Punjab, husbands often refrained from donating for wives during obstetric emergencies, reflecting gendered undervaluation of reproductive blood loss^11^.

Globally, similar barriers persist. Although many individuals express willingness, misconceptions about adverse health effects, gender norms, lack of convenient opportunities, and fear of pain or infection prevent actual donation^2^. In LMICs, these barriers are compounded by underdeveloped donation infrastructure and low prioritisation of targeted public awareness campaigns. Evidence gap and rationale. Despite multiple Pakistani studies exploring knowledge and attitudes among students, attendants, and health professionals, very few have investigated pregnant women's perceptions—a critical omission given that they are both likely recipients of blood and key influencers within families. Pregnant women in regions such as interior Sindh (Nawabshah) regularly engage with antenatal services, offering a vital opportunity for education and myth-dispelling. Understanding their perceptions is essential to design context-specific interventions that strengthen voluntary donation and ensure timely transfusion in obstetric care. Research question. *What are the knowledge, attitudes, perceptions, and practices regarding blood donation among pregnant women attending PMC Hospital, Nawabshah, and what factors influence these views?*

Objectives

1. To assess knowledge of eligibility, safety, and benefits of blood donation among pregnant women at PMC Hospital.
2. To evaluate attitudes and perceptions, including fears, misconceptions, and gender norms.
3. To determine any history of donation or willingness to encourage family donation.
4. To identify socio-demographic and system-level correlates to guide antenatal education and contextually relevant preventive guidelines.

METHODOLOGY

Study Design and Setting

This was a descriptive cross-sectional study conducted at the Department of Obstetrics & Gynaecology, Peoples University of Medical & Health Sciences (PUMHS), Nawabshah, over a period of six months from 23rd May 2024 to 22nd November 2024. The study was carried out in the antenatal clinic and inpatient wards of PMC Hospital, a tertiary care facility serving urban and rural populations of Sindh.

Study Population and Participant Selection

All pregnant women attending the antenatal clinic or admitted to obstetric wards during the study period were eligible.

- **Inclusion criteria:** Pregnant women aged 18–45 years, at any gestational age, who consented to participate.
- **Exclusion criteria:** Women with medical or psychiatric conditions impairing ability to respond, those with obstetric emergencies precluding interview, and women declining consent.

Sample Size Determination

Sample size was calculated using the single-proportion formula:

n=Z2×p×(1−p)d2n = \frac{Z^2 \times p \times (1-p)}{d^2}n=d2Z2×p×(1−p)

Where Z = 1.96 for 95% confidence, p = anticipated prevalence of awareness regarding blood donation from prior Pakistani studies (~50%)^7,8^, d = margin of error 7%.

n=(1.96)2×0.5×0.5(0.07)2≈196n = \frac{(1.96)^2 \times 0.5 \times 0.5}{(0.07)^2} \approx 196n=(0.07)2(1.96)2×0.5×0.5 ≈196

Adding 10% for non-response, the final sample size was set at 216 participants.

Study Variables

Socio-demographic (Age, parity, gravidity, education level, occupation, residence (urban/rural), socioeconomic status). Knowledge variables (Awareness of eligibility, safety, benefits, frequency of donation, infection screening), Perception/attitude variables (Beliefs about risks (weakness, infertility, anemia, infection), cultural/gender perceptions, willingness to donate or encourage family donation). Practice variables (Prior history of donation (self or family), previous transfusion experience, willingness to donate in the future).

Data Collection Procedure

Data were collected using a structured pre-tested questionnaire, administered in Urdu and Sindhi by trained female interviewers. The tool was adapted from validated KAP surveys used in Pakistani and international studies^7,9,10^. Before the survey, informed consent was obtained. Confidentiality and anonymity were assured.

Data Analysis

Data was entered into SPSS version 26. Descriptive statistics (frequencies, means, percentages) were used for socio-demographics and responses. Chi-square tests evaluated associations between categorical variables (e.g., education vs. knowledge levels). Binary logistic regression was performed to identify independent predictors of positive perception or willingness to

donate, adjusting for potential confounders. Results were presented as odds ratios (OR) with 95% confidence intervals (CI). A p-value <0.05 was considered statistically significant.

Ethical Considerations

Approval was obtained from the Institutional Review Board of PUMHS prior to study commencement. Participation was voluntary, with the right to withdraw at any time without impact on clinical care

RESULTS

We conducted a prespecified analysis on 216 pregnant women attending a tertiary-care hospital. Data cleaning involved range checks and missing-value screening; all variables had ⩽1% missing data. Continuous variables are presented as mean ± SD (or median [IQR] when skewed). Categorical variables are summarized as n (%). Group comparisons were performed using Chi-square/Fisher's exact tests for categorical variables and t-tests or Mann–Whitney U tests for continuous variables, as appropriate. A multivariable logistic regression identified independent predictors of willingness to donate blood. Statistical significance was set at $\alpha=0.05$ (two-sided).

Participant Demographics and Baseline Characteristics.

- Mean age was 31.9 ± 7.7 years; median 32.0 (25.8–39.0) years.
- Mean gestational age was 27.2 ± 9.1 weeks; trimester distribution: Third: 108.0 (50.0%); Second: 94.0 (43.5%); First: 14.0 (6.5%).
- Gravidity median (IQR): 3 (2–5); Parity median (IQR): 3 (1–4).
- Education: Secondary: 62.0 (28.7%); Intermediate: 51.0 (23.6%); Primary: 37.0 (17.1%); No schooling: 37.0 (17.1%); Graduate+: 29.0 (13.4%).
- Occupation: Housewife: 181.0 (83.8%); Employed: 35.0 (16.2%).
- Residence: Rural: 142.0 (65.7%); Urban: 74.0 (34.3%).
- Socioeconomic status: Low: 96.0 (44.4%); Middle: 96.0 (44.4%); High: 24.0 (11.1%).

• Previous transfusion (ever): 0: 186.0 (86.1%); 1: 30.0 (13.9%).

• Knowledge score (0–10): 5.3 ± 2.1; Perception score (0–7 barriers): 2.4 ± 1.3; Positive overall perception: 53.7%.

The primary outcome seen was willingness to donate blood which was 42.1% overall (Not willing: 125.0 (57.9%); Willing: 91.0 (42.1%)). Self-history of donation: 19 (8.8%). Donation by a family member: 90 (41.7%).

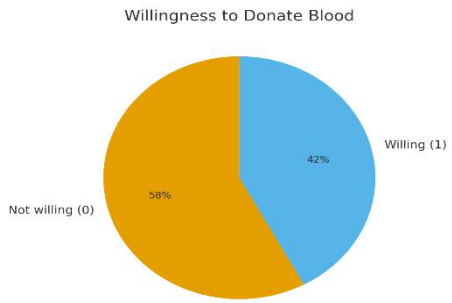
Bivariate Analysis

Willing participants had higher knowledge scores and fewer perceived barriers than non-willing participants (knowledge: p=0.0002; barrier score: p=0.0001). Positive perception was associated with willingness on univariate analysis (p=0.0033). SES differed across willingness groups (p=0.0178), while other sociodemographic variables (age, education, residence, occupation, prior transfusion) did not show significant differences (all p>0.05).

Multivariable Analysis

In the adjusted logistic regression model (N=216), higher knowledge remained an independent predictor of willingness (OR 1.35, 95% CI 1.15–1.58, p=0.000). Greater perceived barrier score was inversely associated with willingness (OR 0.55, 95% CI 0.34–0.87, p=0.011). Other covariates (age, residence, SES, education, prior transfusion, family donation, positive perception) were not statistically significant.

Figure 1. Willingness to Donate Blood



Distribution of willingness to donate blood among pregnant women (n=216).

Figure 2. Education Distribution

Educational attainment categories with counts of participants.

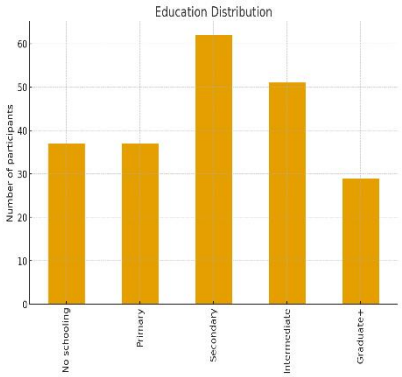
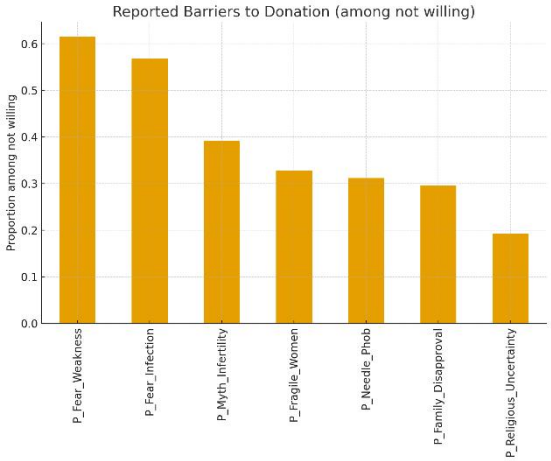


Figure 3. Reported Barriers Among Non-willing Participants

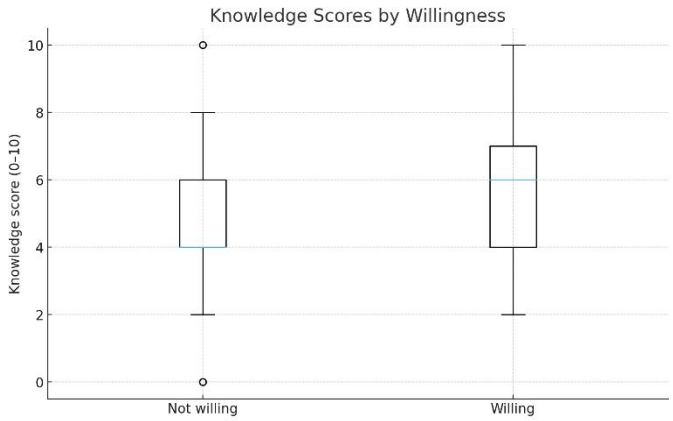


Proportion endorsing each barrier item among those not willing to donate blood.

Top self-reported barriers (among the non-willing subgroup) were:

- Fear of weakness: 61.6%
- Fear of infection: 56.8%
- Myth of infertility: 39.2%
- "Women are fragile in pregnancy": 32.8%
- Needle phobia: 31.2%

Figure 4. Knowledge Scores by Willingness



Boxplots of knowledge score (0–10) by willingness to donate.

Table 1: *Adjusted Odds Ratios for Willingness to Donate (Logistic Regression).*

Predictor	OR	95% CI	p-value
Knowledge_Score_0_10	1.35	1.15–1.58	0.000
Perception_Score_0_7	0.55	0.34–0.87	0.011
C(SES)[T.Low]	2.62	0.87–7.89	0.087
Prev_Transfusion	0.49	0.20–1.24	0.135
C(Residence)[T.Urban]	1.64	0.84–3.16	0.144
Ever_Donated_Family	1.34	0.72–2.51	0.357
Education_Ordinal	0.91	0.71–1.15	0.426
C(SES)[T.Middle]	1.51	0.50–4.59	0.469
Age	0.98	0.95–1.03	0.472
Positive_Perception	0.90	0.31–2.64	0.846

Discussion

This study assessed the knowledge, attitudes, and perceptions regarding blood donation among pregnant women at a tertiary care hospital in Nawabshah. The overall willingness to donate blood was 42.1%, which, although higher than some prior Pakistani reports among female attendants (12–20%), still reflects a substantial gap between awareness and practice. Key determinants of willingness included higher knowledge scores and fewer

perceived barriers, which remained statistically significant in multivariable analysis. Conversely, socio-demographic factors such as age, parity, education level, occupation, and residence did not independently predict willingness, underscoring the primacy of informational and attitudinal variables over structural demographics.

Comparison with Previous Literature

The observed willingness of 42.1% is consistent with global findings where intent often exceeds actual donation rates. In a Nigerian study, only 30% of antenatal women expressed readiness to donate despite recognizing its importance[12]. Similarly, Indian data show willingness around 40–50%, largely constrained by myths and family disapproval[13]. Compared with Pakistani attendants in Lahore (12.7%) and health professionals (rare donation despite high awareness), our higher figure may reflect increased antenatal exposure and counseling opportunities. However, the persistence of myths such as "women are fragile" and fears of weakness or infertility echoes findings from qualitative research in Punjab and Karachi, where gendered beliefs strongly discouraged female donation.

Determinants and Possible Explanations

- Knowledge Score: Women with better knowledge of eligibility, safety, and benefits were significantly more willing (OR 1.35). This aligns with evidence that targeted antenatal education can transform attitudes into action[14]. The knowledge–practice gap, however, indicates that information must be coupled with structural facilitation.
- Perceived Barriers: Fear of weakness (62%), infection (57%), and infertility myths (39%) dominated perceptions among the unwilling. These barriers are consistent with national surveys that identified "kamzori" and infection fears as culturally embedded deterrents. Global reviews also highlight fear of adverse health effects and pain as common obstacles[15].

- Socioeconomic Status: Although low SES women showed higher willingness (52.1%) compared with high SES (25%), this trend lost significance after adjustment. Possible explanations include higher exposure to transfusion needs among lower-income families, making them more receptive despite limited resources.
- Positive Perception: While significant in bivariate analysis, perception lost strength in multivariable models, suggesting that underlying knowledge and barrier beliefs exert stronger causal influence.

Unexpected or Contradictory Findings

Interestingly, education level did not predict willingness, diverging from studies in students and professionals where higher education was associated with donation. This may be explained by homogeneity in cultural myths that cut across literacy levels in rural Sindh. Similarly, family donation history was not significantly linked to personal willingness, unlike reports from other LMICs where spousal or relative donation often predicts individual intent.

Public Health Implications

The findings underscore that antenatal clinics represent a strategic platform for blood donation awareness. Counseling integrated into routine ANC visits could dispel myths and directly address fears of weakness or infection. Mass media and community health workers should target gendered perceptions, challenging the notion that women are inherently fragile. Strengthening voluntary, non-remunerated blood donation programs is vital to reduce reliance on replacement donors and improve maternal outcomes, especially in hemorrhage emergencies.

LIMITATIONS

The study's cross-sectional design precludes causal inference. Self-reported attitudes may have been influenced by social desirability bias, and the single-center setting limits generalizability to broader Pakistani populations.

However, the relatively large sample (n=216) and rigorous statistical approach enhance internal validity.

FUTURE RESEARCH

Future studies should adopt longitudinal or interventional designs to evaluate whether targeted antenatal education translates into actual donation behavior. Qualitative research is also needed to further explore cultural myths, gender norms, and the role of husbands or family decision-making. Comparative multi-center studies could map regional variations and guide tailored interventions.

CONCLUSION

This study reveals that less than half of pregnant women were willing to donate blood, with knowledge and perceived barriers emerging as key determinants. Interventions that enhance knowledge and dispel myths during antenatal care can potentially increase voluntary blood donation and strengthen maternal health outcomes in Pakistan.

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