Maternal Health Care Utilizations Among Rural Women In Northern Bangladesh: A Comprehensive Analysis

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KEYWORDS
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ABSTRACT:
Background: Rural-urban disparities in maternal healthcare persist globally, with rural women disproportionately affected by geographic isolation, limited infrastructure, and socioeconomic constraints. This study assessed maternal healthcare utilisation patterns among rural women and identified associated influencing factors. ***Methods:*** A retrospective study was conducted among 200 rural women aged ≥18 years. Data were collected via structured questionnaires covering antenatal care (ANC), postnatal care (PNC), delivery practices, service awareness, encountered barriers, and postpartum mental health symptoms. Descriptive statistics, chi-square tests, and multivariable logistic regression were used to identify predictors of maternal healthcare utilisation. Data analysis was performed using SPSS version 26, with a significance threshold of $p < 0.05$. ***Results:*** Sixty-five percent of participants reported adequate ANC (≥ four visits), 80% had institutional deliveries, and 60% accessed adequate PNC (≥ two visits). Education emerged as the strongest predictor, with women who completed secondary and higher education exhibiting higher odds of ANC (AOR: 4.2, 95% CI: 2.3–7.7) and PNC utilisation (AOR: 3.0, 95% CI: 1.7–5.4). The most prominent barrier was facility distance, which reduced ANC uptake by 70% (AOR: 0.3, 95% CI: 0.2–0.6). Twenty percent of women reported postpartum mental health symptoms, yet only 25% of those affected sought professional support. ***Conclusion:*** Marked disparities persist in maternal healthcare access among rural women, with education and socioeconomic status as primary determinants. Geographic isolation, transport disadvantage, and limited mental health service availability constitute major gaps requiring tailored, community-responsive interventions to improve maternal health outcomes.

INTRODUCTION

Maternal health is still on the agenda of global health community mainly owing to healthcare in rural areas differs greatly from urban settings [1]. Inequality in interventions reflect the disparity that continues to exist between low income countries (with MMR of 346 per 100,000 live births) and high income countries (10/100,000 Live Births that require focused attention for specific measures in above settings [2]. The high risk of mortality faced by rural women and female representatives of the

economically disadvantaged groups, the use of rural maternal care services has grown into an important topic in public health [3].

Rural women have poorer health outcomes and limited access to medical services due to a lack of providers of women's healthcare in most rural communities [1]. Geographical low-stimulus and healthcare service scarcity combined mean that fewer than 30% of rural communities in developing countries utilize hospital-based obstetric services [4].

The growing attention to maternal health has not addressed the unequal pattern of service provision across many countries [5]. The utilization of rural maternal health care services is related to more than one factor including transportation problem, their economic statuses and traditional beliefs and lack of knowledge about existing health facilities [6]. Rural women receive a fragmented continuum of care and services due to their inability to access integrated prenatal, delivery and postpartum care [7]. While the World Health Organization has suggested 8 antenatal care visits, many women in rural areas do not achieve that [8]. The underutilization of postnatal care services is associated with an elevated risk for post-partum complications particularly among less educated women at higher risk [9].

The growing concern about postpartum mental health care in rural regions examines the condition of postpartum psychosis. The limited availability of specialist perinatal mental health support compounds the burden for women who live in deprived areas [10], where waiting times are lengthy, services distant and few women receive specialist care. The postpartum depression affects 25% of new mothers but rural women may have more challenges in getting psychological help following childbirth [11].

This study explores all dimensions of the utilization of maternal health services by rural women through examining their ANC and PNC attendance, rates of institutional delivery and awareness about the services as well as experiences with postpartum mental health. The patterns of maternal healthcare utilisation and the factors associated with its use will allow researchers to develop particular interventions that may lead to improved rural maternal health outcomes.

METHODS

Study designs and data collection

Study setting the study was conducted between January and April, 2025 in a 250-bed general hospital at Pabna in the Northern Bangladesh. The 2-in-2 study ran baseline surveys with 200 rural women to measure their use of maternal healthcare services (i.e. ANC and delivery, as well as PNC), knowledge of maternal health services, experience of postpartum mental health issues, etc. The studies comprised of women who were 18 years or more and had delivered at least one child in the last two years. The participants were purposively sampled to obtain heterogeneity of did age-groups, education levels and occupation status and SES. Face to face interviews were conducted with participants using a pretested questionnaire local field workers administered in the vernacular language so as to ensure cultural comprehension and unencumbered communication. Data collection was done with the help of a multi-section research instrument. The demographic data on the participants of the study was obtained from a questionnaire looking at age, education (highest level), occupation and social position number of born children. ANC service utilisation was assessed based on the frequency and timing of visits, and delivery events (hospital delivery or home birth) were noted. The survey assessed women's knowledge of ANC and PNC utilization based on their ability to mention maternal danger signs. Postnatal care visit and type of attendance (place where postnatal was attended) were assessed using the survey. The questionnaire asked about experiences of access to health care service for maternal, detailing transport difficulties and financial constraints as well as geographic distance and information gap and cultural alienation and perceptions of care decreasing. Postpartum mental health was assessed by inquiring about confusion, hallucination as well as changes in mood, bonding difficulties and care seeking behavior. Ethical approval was obtained from the institutional review board for data collection and participated consented.

Statistical Analysis

Data were analyzed using SPSS Version 26 by the research team. Participant demographics and key maternal health variables were described using descriptive statistics (frequencies and percentages). Chi-square test was used to assess the influence of socio-demographic variables on utilisation of ANC services (ANC visit at least once, institutional delivery and PNC attendance). Multivariate logistic regression was applied to identify independent predictors of appropriate ANC service utilization. Parameters that were significantly associated in bivariate analyses were entered into final model to control for confounding. For the association being measured, the adjusted odds ratios (AOR) were determined and 95% confidence intervals (CI) to consider as statistically significant if $p < 0.05$.

RESULTS

Participant Characteristics

A total of 200 rural women were recruited for this study (Table-1). The largest proportion (35.0%) were aged between 25–29 years, followed by 18–24 years (25.0%), 30–34 years (22.5%), and ≥35 years (17.5%). Educational attainment ranged widely: 35.0% completed secondary education, 30.0% had primary education, 15.0% achieved higher secondary or above, while 20.0% had no formal education. Most participants were homemakers (70.0%), with the remaining 30.0% engaged in paid employment. Socioeconomic analysis indicated 45.0% of women belonged to middle-income households, 40.0% to low-income, and 15.0% to high-income households. Regarding parity, 40.0% had one child, 37.5% had two, and 22.5% had three or more children.

Table 1. Demographic characteristics of the study participants (N = 200)

Variable	Category	n	%
Age group (years)	18–24	50	25.0
	25–29	70	35.0
	30–34	45	22.5
	≥35	35	17.5
Education level	No formal education	40	20.0
	Primary	60	30.0
	Secondary	70	35.0
	Higher secondary & above	30	15.0
Occupation	Homemaker (Housewife)	140	70.0
	Employed	60	30.0
Socioeconomic status (SES)	Low	80	40.0
	Middle	90	45.0
	High	30	15.0
Parity	One child	80	40.0
	Two children	75	37.5
	≥ Three children	45	22.5

Antenatal care utilisation

Approximately 65.0% of participants completed ≥4 antenatal care (ANC) visits (Table-2). Adequate ANC utilisation was significantly associated with age 25–34 years (69.2%; $p = 0.001$), secondary or higher education (69.2%; $p < 0.001$), employment status (34.6% vs. 21.4% among homemakers; $p = 0.042$), and middle/high socioeconomic status (76.9%; $p < 0.001$).

Table 2. Adequate Antenatal Care (ANC) visits by socio-demographic variables (N = 200)

Variable	≥4 ANC Visits (n = 130)	<4 ANC Visits (n=70)	*p*-value
Age: 25–34 years	90 (69.2%)	25 (35.7%)	0.001

Education: Secondary & above	90 (69.2%)	10 (14.3%)	<0.001
Occupation: Employed	45 (34.6%)	15 (21.4%)	0.042
SES: Middle/High	100 (76.9%)	20 (28.6%)	<0.001

Place of Delivery

Institutional delivery was predominant (80.0%) and showed strong associations with both education and socioeconomic status (Table-3). Women with secondary or higher education had significantly higher rate of institutional delivery (75.0%; $p < 0.001$), as did those from middle/high SES backgrounds (81.2%; $p < 0.001$).

Table 3. Place of delivery by education and socioeconomic status (N = 200)

Variable	Institutional Delivery (n = 160)	Home Delivery (*n* = 40)	*p*-value
Education: Secondary & above	120 (75.0%)	5 (12.5%)	<0.001
SES: Middle/High	130 (81.2%)	10 (25.0%)	<0.001

Awareness of Maternal Health Services

Awareness of ANC services was high (90.0%), whereas 75.0% of participants were aware of postnatal care (PNC), and only 60.0% recognised maternal danger signs (Table-4). This gradient indicates notable gaps in health education, especially regarding emergency complications.

Table 4. Awareness of Maternal Health Services (N = 200)

Variables	n	%
Aware of antenatal care (ANC)	180	90.0
Aware of postnatal care (PNC)	150	75.0
Aware of danger signs	120	60.0

Postnatal care Engagement

Of the total sample, 60.0% attended two or more PNC visits, 25.0% attended only one, and 15.0% had no postnatal contact (Table-5). Education level was significantly associated with PNC uptake (Table-6): 66.7% of women with secondary or higher education had ≥2 visits compared to only 8.3% among those with no formal education ($p < 0.001$).

Table 5. Postnatal care (PNC) utilization (N = 200)

PNC Visits	n	%
No visit	30	15.0
One visit	50	25.0
≥ Two visits	120	60.0

Table 6. Association between education level and PNC utilization (N = 200)

Education Level	≥2 PNC Visits (n = 120)	<2 PNC Visits (n=80)	*p*-value
No formal education	10 (8.3%)	30 (37.5%)	<0.001
Primary	30 (25.0%)	30 (37.5%)	0.040
Secondary & above	80 (66.7%)	20 (25.0%)	<0.001

Symptoms related to Postpartum Mental Disorder and Help-seeking behaviour

Symptoms related to mental disorders were reported by a higher proportion of participants: 20.0% experienced severe mood swings, 15.0% reported confusion or disorientation, 12.0% had bonding difficulties, and 10.0% experienced hallucinations or delusions (Table-7). Despite these indicators, only 25.0% sought professional support, pointing to critical gaps in mental health service access or awareness.

Table 7. Postpartum Psychosis Symptoms and Help-Seeking Behaviour (N = 200)

Mental disorder/care-seeking indicator	Yes (%)	No (%)
Confusion/disorientation	15.0	85.0
Hallucinations/delusions	10.0	90.0
Severe mood swings	20.0	80.0
Difficulty bonding with infant	12.0	88.0
Sought professional care	25.0	75.0

Barriers to Maternal Healthcare Access

Several key barriers identified that were influencing access to maternal health services (Table-8). These included geographic distance from facilities (45.0%), lack of transportation (40.0%), high service costs (35.0%), lack of awareness (30.0%), cultural and familial restrictions (25.0%), and poor quality of care (20.0%).

Table 8. Barriers to Maternal Healthcare Utilisation (N = 200)

Barrier	n	%
Distance to health facility	90	45.0
Lack of transportation	80	40.0
High cost of services	70	35.0
Lack of awareness	60	30.0
Cultural/family restrictions	50	25.0
Poor quality of care	40	20.0

Multivariable Analysis of Predictors

Regression analyses identified age ≥25 years (AOR = 2.5, $p = 0.001$), education level secondary and above (AOR = 4.2, $p < 0.001$), and middle/high SES (AOR = 3.6, $p < 0.001$) as significant predictors of adequate ANC use (Table-9). These factors also positively influenced PNC attendance. Among barriers, distance to facilities (AOR = 0.3, $p < 0.001$), lack of transportation (AOR = 0.4, $p = 0.010$), and cost (AOR = 0.5, $p = 0.025$) were consistently associated with reduced utilisation of maternal health services. Poor quality of care was notably the only factor significantly linked to an increased risk of postpartum mental disorder (AOR = 2.2, $p < 0.05$).

Table 9. Adjusted Odds Ratios (AOR) for Maternal Health Outcomes by Sociodemographic and Healthcare Access Factors (N = 200)

Predictor	ANC ≥4 Visits AOR (95% CI), *p*	PNC ≥2 Visits AOR (95% CI), *p*	Postpartum mental disorder, AOR (95% CI), *p*
Sociodemographic Factors			
Age: ≥25 years	2.5 (1.5–4.1), $p = 0.001$	1.8 (1.1–3.0), $p = 0.020$	0.7 (0.3–1.5), $p = 0.350$
Education: Secondary & above	4.2 (2.3–7.7), $p < 0.001$	3.0 (1.7–5.4), $p < 0.001$	0.5 (0.2–1.2), $p = 0.120$
SES: Middle/High	3.6 (2.0–6.5), $p < 0.001$	2.4 (1.4–4.2), $p = 0.002$	0.8 (0.4–1.7), $p = 0.550$
Healthcare Access Barriers			

Lack of Transportation	0.4 (0.2–0.8), p = 0.010	0.5 (0.3–0.9), p = 0.030	1.1 (0.5–2.5), p = 0.800
High Cost of Services	0.5 (0.3–0.9), p = 0.025	0.6 (0.3–1.1), p = 0.090	1.3 (0.6–2.9), p = 0.500
Distance to Facility	0.3 (0.2–0.6), p < 0.001	0.4 (0.2–0.7), p = 0.001	1.0 (0.4–2.3), p = 0.950
Lack of Awareness	0.7 (0.4–1.3), p = 0.250	0.8 (0.4–1.5), p = 0.450	1.5 (0.7–3.3), p = 0.300
Cultural Restrictions	0.6 (0.3–1.2), p = 0.150	0.7 (0.4–1.4), p = 0.300	1.8 (0.8–4.0), p = 0.150
Poor Quality of Care	0.9 (0.4–1.8), p = 0.700	1.0 (0.5–2.0), p = 0.950	2.2 (1.0–4.9), p = <0.05

Interpretation of Predictive Factors (Table 9):
Analysis of predictive factors revealed several key influences on maternal health service utilisation and postpartum mental health outcomes. Older women demonstrated significantly higher uptake of both antenatal (p=0.001) and postnatal (p=0.020) care, indicating that age and maturity may positively shape health-seeking behaviours. Education emerged as the most powerful enabler of care utilization (p<0.001)), though it showed no direct association with mental health risk. Similarly, women from higher socioeconomic backgrounds were more likely to access services (p<0.01), yet this advantage did not translate into reduced vulnerability to psychological distress. In contrast, mobility constraints, such as lack of transport, substantially hindered service uptake (p<0.05)), underscoring the need for mobile outreach initiatives or transportation support. Financial barriers were particularly detrimental to ANC attendance (p<0.05), suggesting that targeted subsidies or free ANC services could improve access. Among all factors, the most critical barrier identified was limited access to decentralised or community-level care (p=0.001), pointing to an urgent need for structural reforms in service delivery. Notably, the only factor linked to elevated risk of postpartum mental disorders was the experience of disrespectful or poor-quality maternity care (p<0.05), highlighting the imperative for respectful, culturally safe, and patient-centred approaches in maternal health services.

DISCUSSION

The study reveals remarkable variations in the utilisation of the maternal health services by rural women. What the studies demonstrate Education level and income status have emerged as the major predictors of service utilization. Research findings are consistent with international studies of Elci and et al. (2025) who found that the least fortunate maternal health service outcomes are observed among women in rural areas with low educational level [12]. The study also demonstrates that women with secondary or higher education completed ANC use and PNC attendance at the rates of 4.2 times ($p < 0.01$) and 3.0 times ($p < 0.05$) better than their less educated counterparts respectively [15]. The proportion of women receiving adequate ANC care (at least four visits to ANC) was 65% which is higher than what is expected from a low income setting [13] based on Benova et al. (2018) [13]. The study revealed that women of middle and high socio-economic status were three times more likely to have received appropriate ANC follow-up: e enthusiasts among them had the means to use healthcare services. However, this global response to improving maternal health has not been able to address the issue of unequal access to healthcare that still prevails in many countries [5]. The research reveals a reassuring institutional delivery rate of 80% but expresses concern about the 20% home birth rate, which disproportionately impacts women from lower education and financial backgrounds. The rural health care system is plagued by basic inadequacies with over 50% of rural population being without hospital based obstetric service [4,14]. The issue of education level and place of delivery indicates that there are two interventions to be conducted for healthcare providers: the first is a literacy based intervention, and second, improvement in health facility. According to the survey, 45 per cent of women said that distance was the biggest barrier in accessing healthcare. The described inequalities in access to healthcare in rural settings reveal that there is no structured service line for women from the prenatal through postnatal period [15]. The study also found that women who travelled long distances to get to health facilities were 70% less likely to receive any ANC and 60% unlikely to utilize PNC in which was the

most important barrier. The absence of transportation impacted 40% of participants who required urgent travel to healthcare venues that would have made their physical distance more difficult to breach. The economic burden of care led to 35% of women non-utilizing ANC (variation from early pregnancy services being at the nexus of financial barriers). Research findings indicate that holistic strategies need to address the physical and financial barriers preventing women from utilising health facilities. Postpartum mental health the results of the postpartum mental well-being points were a serious worry since 20% of the participants had mood swings and PPD symptoms [16]. The study reported that among symptomatic women, only a quarter received professional treatment for their mental health problems despite being in need. Women's main barriers to care were long wait times, and distant services, and lack of specialist perinatal mental health help in rural/underserved areas [17]. The study validates a global phenomenon that approximately 25% of new mothers will suffer from PPD in the first year postpartum but would remain untreated [11]. Quality of care was also an independent risk factor for postpartum mental disorders as women who were mistreated during the care and management were about twice more likely to suffer from complications. Apparently, negative experiences in healthcare during childbirth will lead to deterioration and poor mental health of the postpartum mothers implying healthcare providers providing respectful 'woman centred' care even at rural setting [18].

Limitations of the Study

The findings require an assessment through the filter of numerous modifiers influencing their interpretation. The surveillance design does not allow researchers to infer causal relationships between the analyzed factors and maternal health outcomes. The selection bias produced by the study design through purposive sampling means that the research is not representative for the whole rural population, which also limits its applicability in general.

CONCLUSION

This study shows that there is a gap in maternal healthcare access between rural women due to their levels of education and economic condition, which affect their ability to get care. The encouraging figure of institutional delivery should not mask the continuing disparities between women with perfect antenatal and post-natal care.

The primary barriers to care-seeking for women were that they could not afford care, they did not have transportation and they lived far from any maternal healthcare facility. The juxtaposition of postnatal mental health symptoms with few professional services available presents a worrying development. Twenty percent of women were experiencing symptoms of postpartum mental disorder, but only 25 per cent sought professional help as mental health services are out of reach for the majority of the population.

Because maltreatment during pregnancy implies higher chances of postnatal mental disorders, it is necessary to develop understanding compassionate maternity care at the time trauma is discovered. RESEARCH ESSENTIALS Full-spectrum solutions must be called upon to address the physical, economic, and social barriers to improving maternal health outcomes in rural areas.

RECOMMENDATION

Longer time frame research would be the first choice to validate cause-effect relationship and assess long-term impact of maternal health interventions. mHealth through community health workers at the maternal end has great capacity to increase rural women's access to complete coverage of maternal care from antenatal, delivery and most health programs are very much viable in terms of overcoming transportation barriers that currently impede access for many rural women. The implemented initiatives postpartum care.

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