

FACTORS AFFECTING UTILIZATION OF ANTENATAL CARE SERVICES AT A TERTIARY CARE HOSPITAL.

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Abstract

Background: Antenatal care (ANC) is a key maternal health service that improves maternal and neonatal outcomes through early detection and management of pregnancy-related complications. Despite its importance, adequate ANC utilization remains low in Pakistan.

Objective: To assess antenatal care utilization and identify factors affecting ANC utilization at a tertiary care hospital in Hyderabad/Jamshoro.

Methodology: A descriptive cross-sectional study was conducted from January to March 2026 at Liaquat University Hospital, Hyderabad/Jamshoro. A total of 147 married women aged 15–49 years who had delivered within the previous two years were recruited using purposive sampling. Data were collected through a structured interviewer-administered questionnaire and analyzed using SPSS version 23. The chi-square test was applied, with $p < 0.05$ considered significant.

Results: Among 147 participants, 49.7% utilized ANC services during their last pregnancy, while 50.3% did not. Among ANC users, 24.7% had one visit, 35.6% had 2–3 visits, and 39.7% had ≥ 4 visits. ANC utilization was significantly associated with maternal age ($p = 0.026$), education ($p = 0.005$), occupation ($p = 0.019$), household income ($p < 0.001$), and husband's occupation ($p < 0.001$). Gravidity ($p = 0.016$) and parity ($p = 0.005$) were also significant, with higher utilization among multigravida and multiparous women. Spousal accompaniment ($p = 0.002$) and lower transport cost ($p = 0.043$) increased ANC uptake. Major barriers included high cost (15%), husband refusal (14.3%), perceived lack of need for follow-up (12.9%), and long waiting time (12.2%).

Conclusion: ANC utilization is inadequate and influenced by socio-demographic, obstetric, social, and accessibility factors. Strengthening female

education, socioeconomic conditions, male involvement, and access to affordable maternal healthcare services is essential to improve ANC utilization and maternal and neonatal outcomes.

INTRODUCTION

Antenatal care (ANC) is a fundamental component of maternal healthcare that aims to ensure the well-being of both mother and fetus during pregnancy through early identification, prevention, and management of pregnancy-related complications [1]. ANC services include routine clinical assessments, nutritional counseling, health education, immunization, screening investigations, and psychological support provided by skilled healthcare professionals [2]. Globally, ANC serves as the first formal contact between pregnant women and the healthcare system and plays a critical role in reducing maternal and neonatal morbidity and mortality [3]. Improving maternal health remains a major global public health priority under the United Nations Sustainable Development Goals (SDGs), particularly SDG-3, which aims to reduce the global maternal mortality ratio to fewer than 70 deaths per 100,000 live births by 2030 and ensure universal access to reproductive healthcare services [4]. Evidence suggests that appropriate ANC utilization substantially improves pregnancy outcomes by facilitating early detection of high-risk pregnancies, preventing complications, promoting timely referral, and promoting healthy maternal behaviors [4, 5]. Despite these benefits, utilization of ANC services remains inadequate in many low- and middle-income countries. Previous studies have identified several factors associated with ANC utilization, including maternal age, education, occupation, household income, parity, place of residence, cultural beliefs, women's autonomy, and accessibility to healthcare facilities [6, 7].

Health system-related barriers such as inadequate staffing, poor quality of care, long waiting times, transportation difficulties, and financial constraints further limit maternal healthcare utilization [8]. Globally, approximately 86% of pregnant women receive at least one ANC visit;

however, completion of the recommended number of ANC contacts remains substantially lower in many developing countries [9]. To improve maternal and neonatal outcomes, the World Health Organization (WHO) updated its ANC model in 2016, increasing the recommended number of contacts from four to eight throughout pregnancy [10]. Nevertheless, the four-visit model was used in the present study for comparability with national demographic surveys and previous regional studies. In Pakistan, maternal healthcare utilization remains a major public health concern. Although a substantial proportion of women attend at least one ANC visit, completion of adequate ANC visits remains limited, particularly among rural, less educated, and socioeconomically disadvantaged women [11]. Financial limitations, low health literacy, gender inequality, sociocultural restrictions, and limited access to healthcare facilities continue to affect maternal healthcare utilization across the country [8, 12]. Globally, ANC utilization has improved; however, significant disparities persist between high-income and low- and middle-income countries, where service completion remains suboptimal due to socioeconomic, cultural, and health system barriers. In Pakistan, although many women attend at least one ANC visit, completion of adequate ANC remains low, particularly among rural, less educated, and low-income populations. Despite improvements in maternal healthcare policies, gaps in utilization continue due to structural and sociocultural barriers. This study aims to address a local evidence gap by identifying factors affecting ANC utilization among women attending a tertiary care hospital in Hyderabad/Jamshoro.

METHODS

A descriptive cross-sectional study was conducted

from January to March 2026 at the Department of Obstetrics and Gynecology, Liaquat University Hospital, Hyderabad/Jamshoro, Sindh, Pakistan. The study population consisted of married women aged 15–49 years who had delivered their most recent child within the previous two years and attended the hospital during the study period. Women who were severely ill, pregnant during the data collection period, or unwilling to participate were excluded from the study. The sample size of 147 participants was calculated using OpenEpi software version 3.01 based on an expected ANC utilization prevalence of 89.3% [13], a 95% confidence interval, and a 5% margin of error using the formula: $n = Z^2P(1-P)/d^2$. However, variability in regional prevalence estimates may explain differences observed in the current study findings. Non-probability purposive sampling was used, which may limit the generalizability of findings beyond the study population. Data were collected using an interviewer-administered structured questionnaire adapted from previously published studies [4]. The tool included socio-demographic characteristics, obstetric history, family and social support, accessibility factors, and barriers to antenatal care follow-up. Data were analyzed using SPSS version 23. Descriptive statistics were computed, and associations between variables and antenatal care utilization were assessed using

the chi-square test. A p-value < 0.05 was considered statistically significant. Effect size analysis and multivariable regression were not performed, which may limit the identification of independent predictors.

Permission for data collection was obtained from the Medical Superintendent of Liaquat University Hospital (Ref: LUH/(N)/-15720/26). Written informed consent was obtained from all participants. Confidentiality was ensured using coded identifiers and secure data storage. Participation was voluntary with the right to withdraw at any time.

RESULTS

Socio-Demographic Characteristics of Participants

A total of 147 women participated in the study. The mean age distribution showed that the largest proportion of participants was aged 15–19 years (29.9%), followed by ≥ 35 years (22.4%). Regarding education, more than one-third of women were illiterate (37.4%), while smaller proportions had primary, secondary, diploma, or higher education. Nearly half of the participants were housewives (49.0%). Monthly household income was $\leq 30,000$ PKR in 44.9% of respondents, while approximately half reported having health insurance coverage (50.3%) (Table 1).

Table 1: Socio-Demographic Characteristics of Participants (n = 147)

Variable	Category / Subgroup	Frequency (n)	Percentage (%)
Age of Mother	15–19 years	44	29.9%
	20–24 years	29	19.7%
	25–29 years	20	13.6%
	30–34 years	21	14.3%
	≥ 35 years	33	22.4%
Family Members	1–4	41	27.9%
	5–9	53	36.1%
	≥ 10	53	36.1%
Education Level	Illiterate	55	37.4%
	Read & Write	19	12.9%
	Primary	19	12.9%
	Secondary	13	8.8%
	Diploma	24	16.3%

Occupation	University & above	17	11.6%
	Housewife	72	49.0%
	Employee	24	16.3%
	Self-employed	30	20.4%
	Other	21	14.3%
Husband's Occupation	Salary paid	43	29.3%
	Daily worker	18	12.2%
	Private work	13	8.8%
	Unemployed	49	33.3%
	Other	24	16.3%
Monthly Income (PKR)	≤30,000	66	44.9%
	31,000-99,000	35	23.8%
	≥100,000	46	31.3%
Health Insurance	Yes	74	50.3%
	No	73	49.7%

Obstetric and Pregnancy Characteristics

Regarding obstetric characteristics, more than half of the participants were primigravida (56.5%), while multipara constituted 59.9% of the sample. Normal vaginal delivery was reported

by 58.5% of women, and 23.1% had preterm deliveries. Slightly more than half of the participants reported planned pregnancies (54.4%) (Table 2).

Table 2: Obstetric and Pregnancy Characteristics (n = 147)

Variable	Category	Frequency (n)	Percentage (%)
Age at First Pregnancy (Years)	≤24	62	42.2%
	25-29	50	34.0%
	≥30	35	23.8%
Gravidity	Primigravida	83	56.5%
	Multigravida	64	43.5%
Parity	Primipara	59	40.1%
	Multipara	88	59.9%
Mode of Last Delivery	Normal vaginal	86	58.5%
	Cesarean (1-2)	31	21.1%
	Cesarean (≥3)	30	20.4%
Number of Living Children	1-2	61	41.5%
	3-4	39	26.5%
	≥5	47	32.0%
Previous Abortion	None	88	59.9%
	1-2	37	25.2%
	≥3	22	15.0%
History of Stillbirth	Yes	33	22.4%
	No	114	77.6%
Gestational Age at Delivery	Term	113	76.9%
	Preterm	34	23.1%
Delivery Location	Public hospital	55	37.4%

Preferred Location	Primary health center	51	34.7%
	Home	41	27.9%
	Public health center	34	23.1%
	Private health center	39	26.5%
	Public hospital	37	25.2%
	Private hospital	37	25.2%
Planned Last Pregnancy	Unplanned	67	45.6%
	Planned	80	54.4%

ANC Utilization

Among participants, 49.7% (n = 73) of women utilized antenatal care (ANC) services during their last pregnancy, while 50.3% (n = 74) did not

receive any ANC services (Figure 1). Among women who utilized ANC services, 24.7% had one visit, 35.6% had 2–3 visits, and 39.7% achieved ≥ 4 ANC visits (Figure 2)

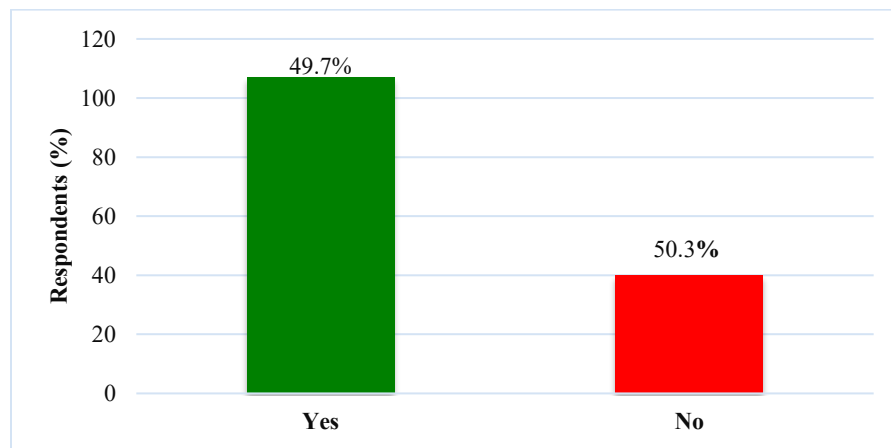


Figure 1: Receipt of Antenatal Care (ANC) During Last Pregnancy (n = 147)

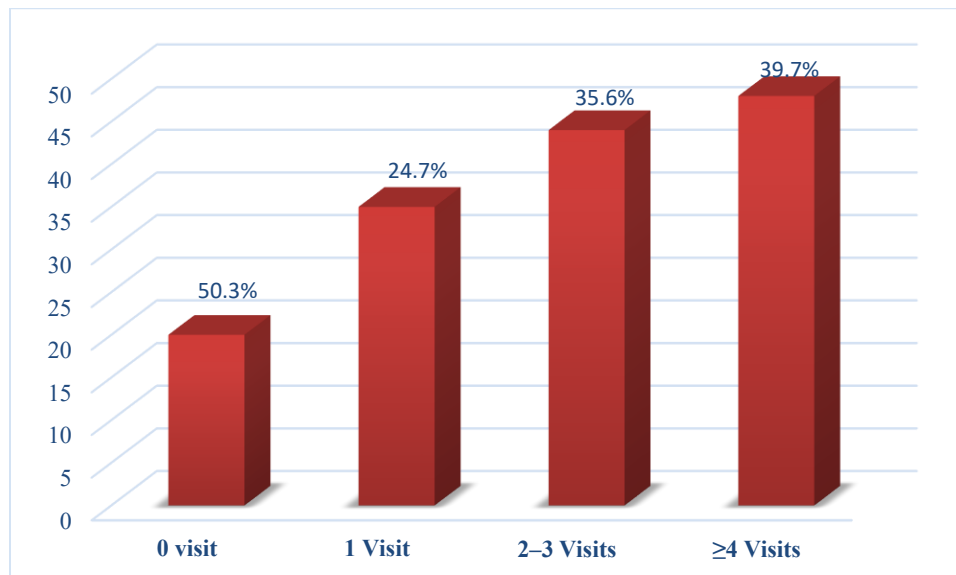


Figure 2: Number of ANC Visits During Last Pregnancy

Family, Social, and Accessibility Factors Affecting ANC Utilization

Regarding family, social, and accessibility-related factors, more than half of the participants reported restricted mobility (53.1%) and lack of partner support (53.1%). Spousal accompaniment during ANC visits was reported by 58.5% of women, while 41.5% reported no

accompaniment. The most commonly used mode of transport was walking (35.4%), followed by public transport (34.7%) and private transport (29.9%). Transport cost was reported as high by 27.9%, moderate by 37.4%, and low by 34.7% of participants. Approximately 39.5% perceived travel time as long, while 55.1% reported reaching the facility within 0.5–1 hour (Table 3).

Table 3: Family, Social, and Accessibility Factors Affecting ANC Utilization (n = 147)

Variable	Category	Frequency (n)	Percentage (%)
Role of Community in Receiving ANC	Encourage	74	50.3%
	Discourage	73	49.7%
Partner Attitude Towards ANC	Encourage	62	42.2%
	Discourage	37	25.2%
Main Encourager for ANC	Don't know	48	32.7%
	Myself	23	15.6%
	Husband	25	17.0%
	Mother	27	18.4%
	Social media	32	21.8%
Permission Required for ANC Visit	Friends/Neighbors	40	27.2%
	Yes	68	46.3%
Spouse Accompaniment to ANC Center	No	79	53.7%
	Yes	86	58.5%
Partner Support	Yes	69	46.9%
	No	78	53.1%
Reason for Lack of Husband Support	Poor husband behavior	55	37.4%
	Uncooperative	52	35.4%
	Don't know	40	27.2%
Transport to Health Facility	On foot	52	35.4%
	Public transport	51	34.7%
	Private transport	44	29.9%
Transport Cost	High	41	27.9 %
	Medium	55	37.4 %
	Cheap	51	34.7 %
Perceived Transport Time	Yes (long)	58	39.5 %
	No	46	31.3 %
	Don't know	43	29.3 %
Time to Reach Facility	<0.5 hour	66	44.9%
	0.5–1 hour	81	55.1%
Cost of Services	Cheap	46	31.3%
	Moderate	52	35.4%
	Expensive	49	33.3%

Barriers to Returning for ANC Follow-up
Regarding barriers to ANC follow-up, the most commonly reported reasons included high cost

(15.0%), husband refusal (14.3%), perception that follow-up was unnecessary (12.9%), and long waiting time (12.2%) (Table 4).

Table 4: Barriers to Returning for ANC Follow-up (N = 147)

Reason for Not Returning	Frequency (n)	Percentage (%)
High cost	22	15.0%
Absence of health problems	17	11.6%
Reliance on previous pregnancy experience	13	8.8%
Husband refusal	21	14.3%
Busy schedule	12	8.2%
Long waiting time	18	12.2%
Poor reception	15	10.2%
Unnecessary follow-up	19	12.9%
Not respecting privacy	10	6.8%

Association of Socio-Demographic Factors with ANC Utilization

Association analysis showed that several socio-demographic factors were significantly associated with ANC utilization. These included maternal

age (p = 0.026), education level (p = 0.005), occupation (p = 0.019), husband's occupation (p < 0.001), and household income (p < 0.001). No significant association was found with family size or health insurance status (Table 5).

Table 5: Association of Socio-Demographic Factors with ANC Utilization (n = 147)

Variable	Categories	Receive ANC n (%)	None n (%)	χ^2	p-value
Age	15-19	15 (34.1)	29 (65.9)	11.060	0.026
	20-24	12 (41.4)	17 (58.6)		
	25-29	11 (55.0)	9 (45.0)		
	30-34	12 (57.1)	9 (42.9)		
	≥35	23 (69.7)	10 (30.3)		
Family Members	1-4	19 (46.3)	22 (53.7)	0.401	0.818
	5-9	28 (52.8)	25 (47.2)		
	≥10	26 (49.1)	27 (50.9)		
Education	Illiterate	16 (29.1)	39 (70.9)	16.967	0.005
	Read & Write	13 (68.4)	6 (31.6)		
	Primary	11 (57.9)	8 (42.1)		
	Secondary	7 (53.8)	6 (46.2)		
	Diploma	17 (70.8)	7 (29.2)		
	University & above	9 (52.9)	8 (47.1)		
Occupation	Housewife	27 (37.5)	45 (62.5)	9.984	0.019
	Employee	17 (70.8)	7 (29.2)		
	Self-employed	16 (53.3)	14 (46.7)		
	Other	13 (61.9)	8 (38.1)		
Husband's Occupation	Salary paid	20 (46.5)	23 (53.5)	22.491	<0.001

	Daily worker	13 (72.2)	5 (27.8)		
	Private work	10 (76.9)	3 (23.1)		
	Unemployed	13 (26.5)	36 (73.5)		
	Other	17 (70.8)	7 (29.2)		
Monthly Income (PKR)	≤30,000	19 (28.8)	47 (71.2)	21.432	<0.001
	31,000–99,000	25 (71.4)	10 (28.6)		
	≥100,000	29 (63.0)	17 (37.0)		
Health Insurance	Yes	35 (47.3)	39 (52.7)	0.333	0.564
	No	38 (52.1)	35 (47.9)		

Association of Obstetric and Pregnancy Factors with ANC Utilization

Among obstetric factors, gravidity ($p = 0.016$) and parity ($p = 0.005$) were significantly associated with ANC utilization. Multiparous and multigravid women had higher ANC utilization

than primigravid and primiparous women. At the same time, no significant associations were observed for age at first pregnancy, mode of delivery, abortion history, or pregnancy planning (Table 6).

Table 6: Association of Obstetric and Pregnancy Factors with ANC Utilization (n = 147)

Variable	Categories	Received n (%)	None n (%)	χ^2	p-value
Age at First Pregnancy (Years)	≤24	25 (40.3%)	37 (59.7%)	5.225	0.073
	25–29	31 (62.0%)	19 (38.0%)		
	≥30	17 (48.6%)	18 (51.4%)		
Gravidity	Primigravida	34 (41.0%)	49 (59.0%)	5.767	0.016
	Multigravida	39 (60.9%)	25 (39.1%)		
Parity	Primipara	21 (35.6%)	38 (64.4%)	7.801	0.005
	Multipara	52 (59.1%)	36 (40.9%)		
Mode of Last Delivery	Normal vaginal	47 (48.0%)	51 (52.0%)	3.633	0.163
	Cesarean (1–2)	18 (64.3%)	10 (35.7%)		
	Cesarean (≥3)	8 (38.1%)	13 (61.9%)		
Number of Living Children	1–2	26 (42.6%)	35 (57.4%)	3.419	0.181
	3–4	24 (61.5%)	15 (38.5%)		
	≥5	23 (48.9%)	24 (51.1%)		
Previous Abortion	None	50 (56.8%)	38 (43.2%)	5.082	0.079
	1–2	13 (35.1%)	24 (64.9%)		
	≥3	10 (45.5%)	12 (54.5%)		
History of Stillbirth	Yes	8 (36.4%)	14 (63.6%)	1.830	0.176
	No	65 (52.0%)	60 (48.0%)		
Gestational Age at Delivery	Term	56 (49.6%)	57 (50.4%)	0.002	0.964
	Preterm	17 (50.0%)	17 (50.0%)		
Delivery Location	Public hospital	27 (49.1%)	28 (50.9%)	0.407	0.816
	Primary health center	27 (52.9%)	24 (47.1%)		
	Home	19 (46.3%)	22 (53.7%)		
Preferred Location	Public health center	11 (32.4%)	23 (67.6%)	6.687	0.083

	Private health center	19 (48.7%)	20 (51.3%)		
	Public hospital	23 (62.2%)	14 (37.8%)		
	Private hospital	20 (54.1%)	17 (45.9%)		
Planned Last Pregnancy	Unplanned	32 (47.8%)	35 (52.2%)	0.218	0.641
	Planned	41 (51.3%)	39 (48.7%)		

Association of Family, Social, and Accessibility Factors with ANC Utilization

Regarding family, social, and accessibility factors, spousal accompaniment during ANC visits was significantly associated with adequate ANC utilization ($p = 0.002$). Additionally, transport

cost showed a significant association ($p = 0.043$), where women reporting lower transport costs had higher ANC utilization. No significant associations were observed for community influence, transport mode, or perceived travel time (Table 7).

Table 7: Association of Family, Social, and Accessibility Factors with ANC Utilization (n = 147)

Variable	Category	Received n (%)	None n (%)	χ^2	p-value
Role of Community	Encourage	38 (51.4)	36 (48.6)	0.171	0.680
	Discourage	35 (47.9)	38 (52.1)		
Partner Attitude	Encourage	34 (54.8)	28 (45.2)	1.898	0.387
	Discourage	15 (40.5)	22 (59.5)		
	Don't know	24 (50.0)	24 (50.0)		
Encourager for ANC	Self	13 (56.5)	10 (43.5)	3.407	0.492
	Husband	14 (56.0)	11 (44.0)		
	Mother	14 (51.9)	13 (48.1)		
	Social media	17 (53.1)	15 (46.9)		
	Friends/Neighbors	15 (37.5)	25 (62.5)		
Permission required	Yes	34 (50.0)	34 (50.0)	0.006	0.939
	No	39 (49.4)	40 (50.6)		
Spouse accompanies ANC	Yes	52 (60.5)	34 (39.5)	9.679	0.002
	No	21 (34.4)	40 (65.6)		
Partner support	Yes	40 (58.0)	29 (42.0)	3.593	0.058
	No	33 (42.3)	45 (57.7)		
Transport mode	On foot	25 (48.1)	27 (51.9)	1.849	0.397
	Public transport	29 (56.9)	22 (43.1)		
	Private transport	19 (43.2)	25 (56.8)		
Transport cost	Cheap	26 (63.4)	15 (36.6)	6.277	0.043
	Medium	28 (50.9)	27 (49.1)		
	High	19 (37.3)	32 (62.7)		
Freedom outside the home	Restriction	36 (51.4)	34 (48.6)	0.167	0.683
	Freedom	37 (48.1)	40 (51.9)		
Travel time perception	Long	33 (56.9)	25 (43.1)	2.511	0.285
	Not long	19 (41.3)	27 (58.7)		
	Don't know	21 (48.8)	22 (51.2)		
Time to reach the facility	<0.5 hr	32 (48.5)	34 (51.5)	0.066	0.797
	0.5–1 hr	41 (50.6)	40 (49.4)		
Cost of services	Cheap	22 (47.8)	24 (52.2)	0.177	0.915

Moderate	27 (51.9)	25 (48.1)
Expensive	24 (49.0)	25 (51.0)

DISCUSSION

This study assessed antenatal care (ANC) utilization and associated factors among women attending a tertiary care hospital in Hyderabad/Jamshoro, Sindh, Pakistan. Overall, 49.7% of women utilized ANC services during their last pregnancy, while 50.3% did not utilize ANC, reflecting persistent gaps in maternal healthcare utilization in the study setting. These findings are consistent with national and regional evidence from Pakistan Demographic and Health Survey reports and WHO estimates for South Asia [4, 14].

Maternal age was significantly associated with ANC utilization ($p = 0.026$), with lower utilization observed among adolescent mothers. This may be attributed to restricted decision-making autonomy, limited awareness of pregnancy-related health needs, social stigma surrounding early pregnancy, and reduced access to healthcare services among younger women in rural Sindh. Similar findings have been reported in Pakistan and other low- and middle-income countries, where younger women have reduced healthcare utilization due to limited autonomy, low awareness, and sociocultural barriers [15-17]. This highlights adolescents as a high-risk group requiring targeted maternal health interventions. Maternal education was another significant factor associated with ANC utilization ($p = 0.005$). Illiterate women were less likely to achieve ANC utilization compared to educated women. This is consistent with global evidence showing that education improves health literacy, awareness of pregnancy risks, and healthcare-seeking behavior [11, 18, 19]. Studies from Pakistan also confirm that female education is strongly associated with improved maternal healthcare utilization [20, 21].

Economic factors were also significant determinants of ANC utilization. Maternal occupation, husband's occupation, and household income were independently associated with ANC uptake ($p < 0.05$),

indicating that both maternal and household-level economic status influence access to antenatal care. Women from lower-income households demonstrated reduced ANC utilization, highlighting financial constraints as a major barrier. This includes both direct service costs and indirect costs such as transport and time away from household responsibilities [22-24]. Financial constraints likely reduce healthcare access through both direct service costs and indirect costs such as transportation and time constraints.

Obstetric factors also influenced ANC utilization. Gravidity ($p = 0.016$) and parity ($p = 0.005$) were significantly associated with ANC uptake. Multigravida and multiparous women showed higher utilization compared to primigravida and primiparous women (60.9% and 59.1% ANC uptake, respectively in multigravida and multipara groups). This may be explained by increased awareness of pregnancy risks and prior exposure to healthcare systems among women with previous pregnancies, while first-time mothers may lack sufficient knowledge regarding the importance. Similar findings have been reported in previous studies [18, 20]. Family and accessibility factors also played a significant role. Spousal accompaniment during ANC visits was significantly associated with ANC utilization ($p = 0.002$), highlighting the importance of male involvement in maternal health. Husband accompaniment likely improves ANC utilization through enhanced financial support, shared decision-making, and increased autonomy for women to access healthcare services. This finding is consistent with studies from Ethiopia and Pakistan, where male involvement plays a positive role in maternal healthcare utilization by improving financial and decision-making support [25, 26]. Accessibility-related factors also influenced ANC utilization. Transport cost showed a significant association ($p = 0.043$), where lower transport cost was associated with higher ANC utilization, indicating that financial

affordability is a key enabling factor for maternal healthcare access. Participants also reported barriers such as long waiting times, husband refusal, and perceptions of unnecessary follow-up visits. Similar barriers have been reported in other low- and middle-income countries, where financial, logistical, and health system constraints reduce continuity of maternal healthcare services [21, 22, 26-28].

PUBLIC HEALTH IMPLICATIONS

The findings highlight the need for targeted interventions focusing on adolescent mothers, illiterate women, and low-income households. Strengthening female education, improving socioeconomic conditions, promoting male involvement in maternal healthcare, and reducing financial and transport-related barriers are essential strategies to improve ANC utilization in similar settings. These interventions should be integrated into existing maternal and child health programs at both facility and community levels to ensure equitable access to antenatal services.

LIMITATIONS

This study has several limitations. Recall bias may have affected participants' responses regarding past pregnancy experiences. The use of purposive sampling limits the generalizability of findings. Additionally, the hospital-based design may not represent the broader community population, introducing selection bias. The cross-sectional design also limits the ability to establish causal relationships between associated factors and ANC utilization.

CONCLUSION

Antenatal care (ANC) utilization was inadequate and was influenced by multiple socio-demographic, obstetric, social, and accessibility-related factors. Significant factors associated with ANC utilization included maternal age, education, occupation, husband's occupation, household income, gravidity, parity, spousal accompaniment, and transportation costs. Strengthening female education, improving household socioeconomic status, enhancing male

involvement in maternal health, and ensuring affordable and accessible antenatal services are essential strategies to improve adequate ANC utilization and ultimately enhance maternal and neonatal health outcomes.

Conflict of Interest: None

Funding Disclosure: None

Authors' Contributions

RK: Conception and study design; drafting of manuscript.

HBC: Supervision of the study.

ZJ: Statistical analysis and interpretation of data.

NNA: Data collection and manuscript review.

NVNA: Data collection and preparation of tables.

RB: Data collection and manuscript review.

AMRS: Data collection and preparation of tables.

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