JRSR
JOURNAL OF REGIONAL STUDIES REVIEW

Journal of Regional Studies Review (JRSR)
Volume 4, Issue 1 (Winter 2025) | Pages: 122–134
ISSN (Online): 3006-6646
Digital Object Identifier (DOI): 10.62843/jrsr/2025.4a057
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RESEARCH ARTICLE

# Women's Status and its Association with Antenatal Care Use: A Cross Sectional Study Conducted In Gilgit Baltistan

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**Abstract:** According to the WHO, more than 287,000 women died during pregnancy and after childbirth in 2020. Sub-Saharan Africa and south Asia are at high risk in maternal mortality rate. In Pakistan, the maternal mortality rate is 186 per 100,000 live births, and 49% of women still don't visit for adequate antenatal care. Socio-cultural factors have a critical role in accessing maternal healthcare services. This study investigated the association between women's autonomy and utilization of maternal healthcare services in Gilgit-Baltistan. In the study, a cross-sectional survey design was adopted, and multi-stage sampling techniques were employed. A total of 928 samples were selected from the four districts of the Baltistan division. The results show that women and their husband's education strongly associated with the utilization of antenatal care services (OR, 4.230, CI: 95% 2.761-6.479 with P-value .000), Women's involvement in decision making about reproductive health related matters also significantly associated with women receiving antenatal care services (OR 5.082, CI: 95% 3.366-7.673 with Pvalue-.000). Keeping in view the current findings it strongly recommended that state agencies and non-governmental organization should focus on female literacy and women empowerment

**Keywords:** Women, Pregnancy, Antenatal Care, Education, Decision Making, Gilgit-Baltistan

## Introduction

One of the fundamental women's rights is accessibility to maternal health care services around the world. According to the Convention on the Elimination of All Forms of Discrimination against Women, Article 12 (1) States that Parties shall take all appropriate measures to eliminate discrimination against women in the field of health care to ensure, access to healthcare services, including those related to family planning, further this article, States Parties shall ensure to women appropriate services in connection with pregnancy, confinement and the post-natal period, granting free services where necessary, as well as adequate nutrition during pregnancy and lactation. Article 10 (2) of International Convention on Economic, Social and Cultural Rights states that mothers should be given special protection during the period before and after childbirth (Bayefsky, 2000). Sustainable Development Goal 03 states; that all countries will ensure healthy lives and promote well-being for all including reducing the maternal mortality ratio globally to less than 70 per 100,000 live births (Georgeson & Maslin, 2018). In the constitution of Pakistan, it is clearly stated; that all citizens are equal before the law and no one shall be discriminated against based on sex in access to public services including health care services in general and maternal health care services in particular (GOP, 1973).

Despite all these international and national commitments statistics shows that 287,000 women died during pregnancy or after childbirth in 2020. In 2020, low and lower-middle-income countries accounted for approximately 95% of all maternal deaths, the bulk of which were preventable. In 2020, Sub-Saharan Africa and Southern Asia accounted for around 87 percent (253,000) of all maternal deaths worldwide

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Cite this Article: Hussain, S., Ali, H., & Jalil, A. (2025). Women's Status and its Association with Antenatal Care Use: A Cross Sectional Study Conducted In Gilgit Baltistan. *Journal of Regional Studies Review, 4*(1), 122-134. https://doi.org/10.62843/jrsr/2025.4a057

Approximately 70% of maternal deaths (202,000) occurred in Sub-Saharan Africa alone, with Southern Asia accounting for only 16% of these occurrences (47,000) (WHO, 2019).

Visit for antenatal care is assumed as a key indicator of mother and child health, through quality antenatal care visits it is possible to detect issues earlier regarding mother and child health. By detecting issues, it becomes easy to manage. Following are some statistics regarding the coverage of antenatal care visits globally. According to UNICEF, while 88% of pregnant women worldwide receive at least one antenatal care visit from a skilled health professional, only two out of three (69%) receive at least four. Even in regions with the highest rates of maternal mortality, such as Western and Central Africa, and South Asia, fewer women received at least four antenatal care visits (56% and 55%, respectively) (UNICEF, 2023).

Pakistan is a developing country and falls in the region of South Asia, as discussed earlier south Asia is also a vulnerable region in the context of mother health. Pakistan's maternal mortality ratio is 186 per 100,000 live births, and 51% of women aged (15-49) years receive more than 4 antenatal care visits (NIPS, 2019).

The study is conducted in Gilgit-Baltistan which is a mountainous and remote region located in the northern part of Pakistan. A combination of socio-cultural, geographical, and infrastructural factors are influencing the accessibility and utilization of maternal health care services. Further, the rugged terrain and harsh climatic conditions make it difficult for women to access health facilities. Traditional gender norms, women's free mobility, health beliefs, socio-economic conditions, and overall women's status also exacerbate the situation in the region.

The maternal mortality ratio in Gilgit-Baltistan is 196 per 100,000 live births (National Institute of Population Studies (NIPS) and ICF, 2020), further According to a multiple Indicator cluster survey 2017-2018, 72.5% of women who have ever been married in GB received antenatal care. Overall In Gilgit-Baltistan 40% of women recive antenatal care from other than health professionals like local dais, traditional birth attenndats, family eldrs and friends. At district level, in District Gilgit 8%, District Hunza 7%, Nager 26% and in district Ghanche 77% of women consults with other than health professionals like local dai, traditional birth attendants (P&DGB & UNICEF Pakistan, 2016)

There is an extensive body of literature in the world and neighboring countries like India, Bangladesh, and Nepal regarding the socio-cultural constraints in accessing maternal health care services, especially the influence of women's participation in decision-making on maternal health care utilization, such kind of studies also find within Pakistan, like in the province of Punjab, Khyber Pakhtunkhwa and the capital territory Islamabad, but there is certain kind of limitation in the application of these studies on Gilgit-Baltistan because the geographical, environmental and socio-cultural condition of this region is different from other part.

The present study was conducted in the Baltistan region to find out the influence of women's educational status, husband's educational status, and availability of educational facilities, trends of female education in households, and the participation of women in decision-making regarding reproductive health on the women's utilization of antenatal care services. Women's educational status plays an important role in shaping the health-seeking behavior of women as stated by Muchie, that with an increase in educational level, the likelihood of a number of antenatal care visits also increases (Muchie, 2017). Like educational status, women's decision-making power in households also positively impacts availing antenatal care services as revealed in a study conducted in Pakistan by Hou & Ma, that women's decision-making power in households has a significant positive correlation with maternal health care utilization, Hou, & Ma further said that empowered women and having ability to make decision will increase the maternal health care utilization (Hou & Ma, 2013). The current study will help revise the current maternal health-related policies and interventions by state and Non-governmental organizations.

## Methods

The current study is a part of the PhD research project and it is the requirement of the completion of the degree. In the study, a cross-sectional descriptive community survey design was adopted. The participants of the study were selected by multi stage sampling techniques. In the first stage, purposive selection was made of districts, in the second stage, Tesil was selected by simple random sampling techniques, in the third stage, union councils were selected by probability proportional to size sampling method. in the fourth stage villages were selected by simple random sampling techniques, in the fifth stage, a list of married women (15-49 year age) were developed through Lady health worker's data, from the selected villages. In the six stages through a systematic random sampling technique study participants were selected from the list which were provided by Lady Health Workers (LHWs). A total of 1000 samples were selected from the four districts of the Baltistan division; the response rate was 92% in this way a total of 928 responses were collected. For data collection, a structured questionnaire was developed, and translated into the local language (Urdu). Before the start of data collection pre test was conducted and required changes were made. Trained enumerators were hired for the data collection process. SPSS (version 26) was used for data analysis and univariate analysis frequency, percentage were used. Logistic regression was performed to identify the influence of women's educational status and participation of women in decision-making on the unitization of antenatal care services during pregnancy. The results were expressed as odds ratio (OR) and 95% confidence interval (CI). P Value 0.05 denoted a significant association between outcome and explanatory variables.

Many researchers developed various models and theories to understand the factors behind maternal healthcare utilization. In the current study, the Three Daly Model was used as a theoretical framework for the study. According to this model, there are three phases of delays that influence the utilization of maternal health care services. In the first phase of delay, women delay in decision making to seek care, further multiple factors influence the decision-making of women in seeking health care, like, women's education and awareness, husband's educational status and awareness, financial positions, restriction on physical mobility, societal norms regarding reproductive health, status of women in the household, etc. second phase of delay is about delay in reaching health facility to seek care, multiple hindrances restrict women in reaching health facility, like lack of conducive and affordable transport facility, road infrastructure, long distance from health facility, natural disasters like road blockage during winter session due to heavy snow falling, and in summer road blockage due to flood.

The third phase of delay is about the delay in receiving proper treatment, many factors influence receiving proper treatment, like lack of health professionals, lack of health infrastructures, lack of medical supply and equipment, and behaviors of health services providers. It also factors that health practices are not compatible with cultural norms and values, like in many cultures women prefer female health service providers due to religious obligations like purdah (Thaddeus & Maine, 1994). Department of Sociology issued a letter and granted permission for data collection, further, the divisional Health directorate also issued a letter and granted permission to collect the data from the jurisdiction, they also granted permission to consult with Lady health workers regarding the selection of samples. Furthermore, the local leaders were also informed about the purpose of the study. Explanation of the study objectives and rationale was told to the respondents and they were informed of their rights to stop the interview at any time if they didn't want to give information without giving any reasons. Respondents get a verbale inform consent and shared that their names would not be revealed anywhere, it is clearly stated that the information collected from the participants was used for only academic research purposes.

In the present study the outcome variable is antenatal care: any antenatal care taken by women during pregnancy, 0 were coded as no antenatal care visits while 1 is coded as yes antenatal care visits during pregnancy. While the independent variables are women's status of education which was divided into three categories, no formal education, basic education (primary to middle), and thirdly, secondary & higher (metric, intermediate, bachelor, MA/MSc/, MPhil, and PhD). The educational status of husbands was the same

as the educational status of women. Trend of educational attainment at household, this variable was divided into three categories, like, Basic education (primary/Middle), metric, and Intermediate & above. Availability of educational facilities was also divided into three categories, no educational facilities, basic level, and secondary and higher educational facilities. Another independent variable was participation of women in decision making divided into different areas like participation of women in decision-making about visiting hospitals for ANC and PNC, women's participation in decision-making about the selection of place for delivery, women's involvement in decision-making in birth spacing-related matters, women's decision making related to the use of contraceptive, women's decision related to taking nutrition and medication during and after pregnancy. Women who are rarely involved in decision-making in the above-mentioned matters are coded as "0" and the women who are involved in the decision-making in the above matters are coded as "1".

## Results

Table 1

*Descriptive Statistics of Educational Status and Availability of Education Facilities for Girls in the Area (N=928)*

| Variable | F | (%) |
|---|---|---|
| **Women's Education** | | |
| No Formal Education | 488 | (52.6) |
| Basic (Primary/Middle) Education | 133 | (14.3) |
| Secondary/Higher Secondary & Above | 307 | (33.1) |
| **Education of Husband** | | |
| No Formal Education | 237 | (25.5) |
| Basic (Primary and Middle) Education | 219 | (23.6) |
| Secondary/Higher secondary &and Above | 472 | (50.9) |
| **The trend of female education in the household** | | |
| Primary/Middle level | 115 | (12.4) |
| Metric level | 484 | (52.2) |
| Intermediate & above level | 329 | (35.5) |
| **Educational facility for Girls in the area** | | |
| No | 78 | (8.4) |
| Yes | 850 | (91.6) |
| **Educational Facilities in the Area** | | |
| No Facilities of Formal Education | 78 | (8.4) |
| Basic Education ( Primary/Middle) | 287 | (30.9) |
| Secondary/Higher Secondary & above | 563 | (60.7) |

Table 1 presents the frequency and percentage of women's educational status and the educational facilities in the area. The current study revealed that the majority (52.6%) of respondents had no formal education, while 33.1% had secondary and higher education, and 14.3% of respondents were matriculation. The majority (50.9%) of the husbands had secondary and higher education, whereas 25.5% had no formal education, in this way 23.6% of husbands had basic education. In the majority (52.2%) of households female educational trend was Metric level while 35.5% were saying intermediate and above level. Very less (12.4%) were saying that female educational trends in their household are primary and middle level. The majority of respondents said secondary and higher-level education facilities are available in the area while 30.9% said basic (primary/Middle) level educational facilities are available in the area. Very few (8.4%) respondents said that there are no educational facilities in the jurisdiction.

Table 2 presents the frequency and percentage of women's participation in decision-making about reproductive health-related matters. Data has shown that the majority (85.1%) of women's opinions are

considered most often by their partners when deciding on hospital visits for ANC, PNC, and delivery, whereas 14.9% of women said that their opinion is rarely considered when deciding on hospital visits for ANC, PNC and during delivery. When deciding about the place of delivery majority (77.0%) of women said that their preference is considered most often, whereas 23.0% of women responded that their choice is rarely considered by their partners or other decision makers like other family members. The majority (76.4%) of women said that their preference is acknowledged when deciding about birth spacing-related matters, on the other hand, 23.6% of married women said their preference is rarely acknowledged when deciding about birth spacing-related matters. Regarding the use of contraceptives, the majority (70.4%) of married women responded that their desire/choice is acknowledged most often, while 29.6% of women replied that their desire/choice is rarely considered in the matters of using contraceptives. The majority (71.7%) of women said that their opinion is acknowledged when deciding regarding the nutrition and medication during pregnancy and after delivery while 28.3% said that their opinion is rarely acknowledged regarding the utilization of nutrition and medication during pregnancy and after delivery.

Table 2

*Descriptive Statistics of Women's Involvement in Decision-making Regarding Reproductive Health-Related Matters (n=928)*

| Variable | F | (%) |
|---|---|---|
| **Women's opinion is considered when deciding on hospital visits for ANC, PNC, and delivery.** | | |
| Rarely | 138 | (14.9) |
| Most often | 790 | (85.1) |
| **Women's preferences are considered when deciding the place of delivery.** | | |
| Rarely | 213 | (23.0) |
| Most often | 715 | (77.0) |
| **Women's preference is considered when deciding regarding birth spacing.** | | |
| Rarely | 219 | (23.6) |
| Most often | 709 | (76.4) |
| **Women's desire is considered when deciding regarding the use of contraceptives.** | | |
| Rarely | 275 | (29.6) |
| Most often | 653 | (70.4) |
| **Women's preference is considered when deciding on Nutrition during and after pregnancy.** | | |
| Rarely | 263 | (28.3) |
| Most often | 665 | (71.7) |

**Bivariate Analysis**

Table 4.2 presents women's educational status with women's visits to ANC. Women's education is divided into three categories, no formal education, basic education (primary and middle), and secondary education and above. Secondary education and above have been taken as reference categories for analysis.

For the category "no formal education", 22.5% of women had no visit for ANC, whereas 77.5% availed ANC services from any health facility during their pregnancy. The odds of visiting for ANC for the category no formal education is .140 times lower compared to the reference (Secondary education and above), with a confidence interval (CI, 95%.076-.259). This represents an 86% decrease in the odds of visiting for ANC and the P-value is .000 indicates that this result is highly significant statistically.

The category of Basic Education (Primary/Middle) shows that 10.5% of married women had no ANC visits while 89.5% received ANC services from any health facility during their pregnancy. The odd ratio for the category of basic education is .346 times less as compared to the reference category (secondary education and above) with a confidence interval (OR.346 CI95% .155-.769) indicating a 65.4% decrease in

availing ANC compared to the reference category (secondary education and above). The P-value is .009, confirming this result is highly significant.

With secondary education and above, 3.9% of women have no ANC visits but the majority (96.1%) of married women visited for ANC during their pregnancy with this educational status. As a reference category, the odd ratio for this category is set to 1.00.

In summary, binary logistic regression results revealed that educational status has much influence on accessing maternal health care services, especially visiting for ANC services.

Table 3

*Regression Analysis between the Status of Education and Antenatal Care Visits among Pregnant Women in Baltistan (N=928)*

| Socio-Demographic Variables (Education) | Married Women, Visit for Antenatal Care | | OR, 95% C. I | % Change in Odds | P.Value |
|---|---|---|---|---|---|
| | No | Yes | | | |
| | F (%) | F (%) | | | |
| **Married Women, Education** | | | | | |
| No Formal Education | 110(22.5) | 378(77.5) | .140(.076-.259) | 86 | .000 |
| Basic (Primary/Middle) | 14(10.5) | 119(89.5) | .346(.155-.769) | 65.4 | .009 |
| Secondary & Higher | 12(3.9) | 295(96.1) | 1.00 | | |
| **Education of Husband** | | | | | |
| No Formal Education | 68(28.7) | 169(71.3) | 1.00 | | |
| Basic (Primary/Middle) | 27(12.3) | 192(87.7) | 2.861(1.750-4.677) | 186.1 | .000 |
| Secondary & higher | 41(8.7) | 431(91.3) | 4.230(2.761-6.479) | 323 | .000 |
| **The trend of female education in the household** | | | | | |
| Primary/Middle | 51(44.3) | 64(55.7) | 1.00 | | |
| Metric | 70(14.5) | 414(85.5) | 4.713(3.015-7.367) | 371.3 | .000 |
| Intermediate & above | 15(4.6) | 314(95.4) | 16.681(8.837-31.489) | 1586.1 | .000 |
| **Educational facility for Girls in the area** | | | | | |
| No | 37(47.4) | 41(52.6) | .146(.089-.239) | 85.4 | .000 |
| Yes | 99(11.6) | 751(88.4) | 1.00 | | |
| **Educational Facility For Girls In The Area** | | | | | |
| No Facilities | 36(46.2) | 42(53.8) | 1.00 | | |
| Basic Education | 50(17.4) | 237(82.6) | 4.063(2.368-6.969) | 306.3 | .000 |
| Secondary & higher | 50(8.9) | 513(91.1) | 8.794(5.169-14.963) | 779.4 | .000 |

Table 3 shows the influence of the husband's educational status on visiting ANC services of their partners during pregnancy. According to the data with basic education (Primary/middle) of husbands 12.3% of women had no ANC visits from any health facility, while 87.7% of women availed ANC services during their pregnancy. The odds ratio is 2.861 times higher as compared to the reference category (no formal education) with a confidence interval (CI 95% 1.750-4.677). This represents an 186.1% increase in visiting ANC for the category of basic education, with highly significant results (P-value.000).

Husbands' education as Secondary & higher indicated that 8.7% of women had no visits during their pregnancy from any health facility whereas 91.3% of women visited for Antenatal checkups to any health facility. The odds ratio is 4.230 times higher as compared to the reference category (no formal education), with a confidence interval (CI 95% 2.761-6.479). This result represents a 323% increase in visiting for ANC in comparison to the reference category (no formal education) and the result is highly significant with a P-value of .000.

In summary, the binary logistic regression results have shown that the partner's educational status has much influence on availing of antenatal care during pregnancy among women. Husbands with formal education are more sensitized to the complications related to pregnancy compared to husbands who don't have formal education. Husband's formal education also develops gender-positive behaviors in the husband's attitude toward his partner, in this way, they cooperate in availing ANC during pregnancy.

Table 3 further explored the influence of the trend of female education in households on accessing Antenatal care services among women in the study area. According to the table, among households where the trend of female education is matriculation, 14.5% of women had no ANC visits whereas 85.5% of women accessed ANC services during their pregnancy. The odds ratio and confidence interval for this category is OR4.713CI 95% 3.015-7.367. The odds ratio 4.713 indicates a 371.3% increase in the outcome variable, visit for ANC compared to the reference category (basic educational facility (primary/Middle)) with highly significant (P-value .000).

Female educational trend as Intermediate & above, 4.6% of women have no ANC visit during their pregnancy, while 95.4% of women availed ANC from any health facility during their pregnancy. The odds ratio and confidence interval for the category female educational trend as Intermediate and above is (OR16.681CI95% 8.837-31.489). The odds ratio is 16.681 times higher compared to the reference category (Primary/Middle) with a highly significant P-Value of .000.

Table 4.2 explains the influence of the absence of girls' educational facilities in the area on women's visits for antenatal care during their pregnancy. Table stated that 47.4% of women have no ANC visits in the absence of educational facilities for girls while 52.6% availed Antenatal care visits during their pregnancy. The odds ratio with confidence interval is (OR.146CI95%.089-.239). The odd is .146 times lower compared to the reference category (available girls' educational facilities) in the area. This result indicates an 85.4% decrease in visiting ANC with a highly significant P-value of .000, in the absence of educational facilities in the area.

In summary, the binary logistic regression results indicated that the availability of educational facilities for girls in the area influenced the utilization of maternal health care services among women, especially availing of ANC services during their pregnancy. Education provides exposure to women regarding the completion of pregnancy-related issues as well as provides information regarding the benefits of availing of ANC during pregnancy.

Table 3 presents the influences of the level of educational facilities on women attending ANC in any health facility during their pregnancy. The level of educational facilities is divided into three categories, no educational facilities, basic (primary & middle) educational facilities, and secondary education (Metric, Intermediate, graduation, university level). No educational facilities have been taken as the reference category.

With basic educational facilities in the area, 17.4% of women had no ANC visits whereas 82.6% of women visited for ANC checkups in any health facility during their pregnancy. The odds ratio with confidence interval for the category is (OR4.063CI95%2.368-6.969). The odd ratio is 4.063 times higher compared to the reference category (no educational facilities for girls). This represents a 306.3% increase in visiting ANC with the availability of Basic educational facilities in comparison to no educational facilities in the area. The P-value is .000, indicating this result is highly significant statistically.

Availability of educational facilities as secondary and above, 8.9% of women having no visits for ANC, while on the other hand, 91.1% of women visited for antenatal Care from any health facility during their pregnancy. The odds ratio is 8.794 times higher as compared to the reference category (no educational facilities) with a confidence interval ranging from 5.169 to 14.963. the binary logistic regression result indicates that a 779.4% change occurred in the outcome variable (visits for ANC) due to the explanatory

variable (availability of secondary and above educational facilities for girls) in comparison to no educational facilities in the area with highly significant P-Value .000.

In summary, the availability of educational facilities in the area was found strongly associated with availing ANC among women. Education plays a pivotal role in women's empowerment as well and education makes women about their reproductive rights, further formal education plays a role in the economic empowerment of women.

Table 4

*Regression Analysis between Women's Involvement in Decision-making in Household Matters (Reproductive,) and Antenatal Care Visits in Baltistan (n=928)*

| Women decision making | Married Women, Visit for (ANC) | | OR, 95% C. I | % Change in Odds | P.Value |
|---|---|---|---|---|---|
| | No | Yes | | | |
| | F (%) | F (%) | | | |
| **Women's opinion is considered when deciding on hospital visits for ANC, PNC, and delivery.** | | | | | |
| Rarely | 52(37.7) | 86(62.3) | 1.00 | | |
| Most often | 84(10.6) | 706(89.4) | 5.082(3.366-7.673) | 408.2 | .000 |
| **Women's preference is considered when deciding the place of delivery.** | | | | | |
| Rarely | 63(29.6) | 150(70.4) | 1.00 | | |
| Most often | 73(10.2) | 642(89.8) | 3.694(2.523-5.407) | 269.4 | .000 |
| **Women's preference is considered when deciding on birth spacing.** | | | | | |
| Rarely | 72(32.9) | 147(67.1) | 1.00 | | |
| Most often | 64(9.0) | 645(91.0) | 4.936(3.371-7.228) | 393.6 | .000 |
| **Women's desire is considered when deciding regarding the use of contraceptives.** | | | | | |
| Rarely | 82(29.8) | 193(70.2) | 1.00 | | |
| Most often | 54(8.3) | 599(91.7) | 4.713(3.223-6.891) | 371.3 | .000 |
| **Women's preference is considered when deciding on Nutrition during and after pregnancy.** | | | | | |
| Rarely | 70(26.6) | 193(73.4) | 1.00 | | |
| Most often | 66(9.9) | 599(90.1) | 3.292(2.266-4.782) | 229.2 | .000 |

Table 3 presents the influence of women's participation in decision-making about reproductive health-related matters on availing ANC during their pregnancy. According to the table, of women who were involved most often in decision-making when deciding to visit ANC and PNC, 10.2% of women had no ANC visits but, the majority (89.4%) took ANC services during their pregnancy. The odds ratio is 5.082 times higher compared to the reference category (women rarely involved in decision-making), with a confidence interval (CI 95% 3.366-7.673). This result represents a 408.2% increase in visiting ANC compared to the reference group( rarely involved in decision making) with highly significant (P-Value .000)

Women who were involved most often when deciding about the place of delivery, the majority (89.8%) of women availed of ANC, while very few (10.2%) had no Antenatal care from any health facility during their pregnancy. The odds ratio and confidence interval (OR3.694CI95% 2.523-5.407) indicated a 269.4% increase in Visit for ANC when women were involved most often in decisions about the selection of place of delivery compared to women who rarely participated in the decision-making process in selecting a place of delivery. The P-value of .000 indicates there is a strong association.

When women's preferences and choices are considered regarding birth spacing, the majority (91.0%) of women visited for ANC services while 9.0% of women had no ANC from any health facility during their pregnancy. The odds ratio with confidence interval (OR4.936CI95% 3.371-7.228) indicates a 393.6% increase in visiting for ANC when women's preference is considered most often about birth spacing rather than the

women whose preference are rarely considered. The P-value of .000 suggests this result is highly significant statistically.

When women's choices are considered most often regarding the use of contraceptives, the majority(91.7) of women availed of ANC services while very few (8.3%) didn't visit for ANC during their pregnancy. The odd ratio with confidence interval (OR4.713CI95% 3.223-6.891), shows a 371.3% increase in visiting ANC compared to the reference group (women whose choice are rarely considered about the use of contraceptives). The P-value of .000 indicates this result is highly significant statistically.

When the women's choice is considered most often during deciding on Nutritional intakes during pregnancy and after delivery, the majority of women (90.1%) availed of ANC services but very few women had no ANC visits during their pregnancy. The odd ratio with confidence interval (OR3.292CI95% 2.266-4.782) indicates that 229.2% increase in visiting ANC compared to the reference category (women whose choices are rarely considered when deciding on nutritional intakes during pregnancy and after delivery). The P-value of .000 suggests that this result is highly significant statistically.

In summary, the binary logistic regression results have shown that the involvement of women in decision-making regarding reproductive-related matters is strongly associated with women availing of antenatal care services during pregnancy.

## Discussion

In the current study, the descriptive analysis found that the majority (52.6%) of women had no formal education while the husband's educational status showed that the majority (50.9%) had secondary and higher education. This result indicates that in the study area, males are more educated than females, these results further revealed that female education was not the priority of concern historically, it is common practice to provide educational facilities, but girls' educational facilities remain the second priority. The descriptive analysis found that in the majority (52.2%) of households female educational trend was Metric level in the study area. This result indicates that after matriculation majority of girls stop their education, there are multiple reasons behind this phenomenon like the lack of higher educational facilities in the area, restricted physical mobility, and early marriage. All these factors prevail in the study area and these factors restrict women from getting higher education. A study conducted by Bengesai revealed that early marriage decreased the chances of completing the first cycle of high school (OR 0.446, 95% CI: 0.374–0.532) (Bengesai et al., 2021). Another study by Mehmood et al also discussed that low literacy rate among girls is triggered by financial limits (37.1%), early marriages (29%), and domestic responsibilities (25%). The study further revealed that boy's preference for girls' education is also a common factor behind the low literacy rate among women in Pakistan (42.6%) (Mehmood et al., 2018).

Another area the current study focuses on is the participation of women in decision-making in reproductive health matters. Descriptive statistics stated that 14.9% of women said that their opinion is rarely considered when deciding on hospital visits for ANC, PNC, and during delivery. 23.0% of women responded that their choice is rarely considered by their partners or other decision makers like other family members while deciding the place of delivery. 23.6% of married women said their preference is rarely acknowledged when deciding about birth spacing-related matters. 29.6% of women replied that their desire/choice is rarely considered in the matters of using contraceptives.

A similar conducted by Mathur found that 16% of women were involved in decision-making about their healthcare and the involvement in decision-making was significantly associated with increased odds of modern contraceptive use (OR 1.36, CI: 1.06 -2.75) (Mathur et al., 2024).

In the current study, Binary logistic regression analysis found that women's educational status, husband's educational status, availability of educational facilities, and trend of girls' education in households

are significantly associated with availing antenatal care services among women in the study area, further women's involvement in decision making especially in reproductive health related matters like decisions in visiting hospital for ANC and PNC checkup, in selecting place for delivery, deciding about birth spacing and use of contraceptive, deciding about nutritional intakes and medication during and after pregnancy, also strongly associated with receiving antenatal care services during pregnancy.

The results are consistent with Another study conducted by Furuta and Salway, which found a significant association between women\s educational attainment and access to maternal healthcare services according to the study, women with a primary education were more likely (2.4) than those without education to get prenatal care (Furuta & Salway, 2006a).

A study conducted by Hamal et al. in India also revealed that women's education was consistently associated with the utilization of maternal health care. According to the study the odds ratios for using ANC and PNC among women with elementary, secondary, and high school education compared to illiterate women were 1.5, 1.9, and 2.7; and 1.3, 1.7, and 2.4, respectively (Hamal et al., 2020).

A study from sub-Saharan Africa by Bain et al., (2022) further found that young women who have some level of formal education were more likely to utilize maternal healthcare, especially ANC and PNC. Women having primary education 1.63times, with secondary education 2.66 times and higher education 6.05times more likely to Use ANC, PNC (Bain et al., 2022)

Husband's educational status also plays a pivotal role in shaping health health-seeking behavior of women, it was discussed earlier that the current study shows a strong association between the husband's educational status and women availing antenatal care during pregnancy. The current study finding is consistent with a study conducted by Adjiwanou et al, (2018), which revealed that Partners' schooling has a significant impact on their spouses' maternal healthcare utilization, particularly when partners have secondary or higher levels of education, according to the results women whose partners had an above-secondary education were 43% more likely to attend at least four antenatal care visits compared to women whose partner had no formal education (Adjiwanou et al., 2018)

Another study conducted by Jungari and Paswan (2019) among the tribal community of Maharashtra India also consistent with the current study findings, The study found that increasing husbands' education level increased wives' use of ANC care services. (OR: 5.75; 95% CI: 2.590-12.800) (Jungari & Paswan, 2019).

The current study shows the trend of higher education among women significantly influencing the utilization of maternal health care services in the study area. A study conducted in Pakistan is consistent with the current study that the coefficients for different categories of women's educational attainment show that women with middle and higher education are more likely to visit a healthcare facility seeking antenatal care at least three times during pregnancy compared to uneducated women. Interestingly, women who have received a formal education, but have not completed middle school, also have a greater probability of making at least three antenatal visits (Afzal & Dar, 2015)

Another area on which the current study focused is the influence of women's involvement in decision-making in reproductive health-related matters on utilization of maternal health care services especially visiting for antenatal care. According to the results, women participate in decision-making about reproductive health-related matters like decisions related to visits for ANC and PNC, decisions related to the selection of birth place, birth spacing-related matters, use of contraceptives, and nutritional intakes and medication during and after pregnancy were strongly associated with availing antenatal care during pregnancy. A study conducted in Nepal by Marie Furuta and Sarah Salway, also revealed the relationship between women's participation in decision-making and utilization of maternal health care services, this study found that the odds of accessing maternal health care services were significantly higher for women who participated in decision-making than for those who did not (odds ratio, 1.3) (Furuta & Salway, 2006b).

## Theoretical Implications

The study findings align with the model's first delay, which is about barriers in deciding to seek care. The binary logistic regression results show that women with higher educational status are more likely to visit for antenatal care than women who have no formal education, in this way, the women whose husbands have higher educational status are more likely to avail of antenatal care services than the women whose husbands have no formal education.

The current study results also support the model first and second delay, which is about delay in decision-making to seek care and delay in reaching health facility to seek care. The study result shows that the women who are most often involved in decision-making about their reproductive health-related matters are more likely to avail of antenatal care than those women who are rarely involved in decision-making regarding their reproductive health-related matters. The results of the current study offer substantial support for the theory but there are certain limitations in the current study that the study focuses only on two main factors women's educational factors and participation in decision-making factors, while the Three D-Model focuses barriers on at the border level.

## Conclusion and Recommendations

The current study findings illustrate that women's educational, husbands' education, availability of educational facilities for girls in the area, the trend of girls' education in households strongly associated with the utilization of maternal health care services, further women's involvement in decision making regarding reproductive health related matters also strongly associated with the utilization of maternal health care services especially availing antenatal care services during pregnancy. Similar studies are also consistence with the current study. Keeping in view the current findings it is strongly recommended that state agencies and non-governmental organizations should focus on female literacy and women empowerment. The provision of higher educational facilities and the autonomy of women will lead to the betterment of reproductive health in the region.

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