DETERMINANTS OF ANTENATAL CARE UTILIZATION AMONG REPRODUCTIVE AGE WOMEN IN LUMBINI PROVINCE, NEPAL

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Abstract

This study examines the factors influencing Antenatal care (ANC) utilization among women aged 15–49 in Lumbini Province, Nepal, using data from the 2021 Nepal Demographic and Health Survey (NDHS). Logistic regression analysis identifies significant determinants of ANC attendance, including age, birth order, education, and wealth. This study shows that in a similar meter from the previous, women in the age group of 20-24 years are at a risk of almost 4.78 times greater for attending ANC visits than women below it. The odds continue to increase as with an all-time high validation for women aged 30-49 years (OR = 11.75, p = 0.017). Where birth order sometimes negatively affects ANC usage, women with three or more children will less likely seek ANC (OR = 0.344, p = 0.063). There is a positive association between the ANC use and education because those women with better education are 2.83 more likely to access ANC services, although it is not very significant. Indeed, differences in the economics that do exist show that poorer women attend ANC as showed to by an OR of 0.384, which denotes that they are 0.384 times less likely to attend ANC compared to the poorest (OR = 0.384, p = 0.045): with wealth, indirect influences of religion, caste/ethnicity, and location using socio-economic factors being biased toward ANC use. It shows that, it should to improve ANC for young mothers, women with higher birth orders, and income. Addressing these gaps therefore needs a multi-faceted approach in terms of strengthening education, financial support, and healthcare infrastructure. The findings provide the much needed evidence and policymakers to strategize around maternal health equity and SDG pathways that give detail in regard to addressing maternal and child health issues in Lumbini Province.

Keywords: ANC visits, Lumbini Province, Determinants, Maternal Health, Utilization

Introduction

Antenatal care (ANC) is one of the essential parts of maternal healthcare that assures the health and well-being of mothers and new-borns. The relations during regular ANC visits allow healthcare providers to view the progress of pregnancy, manage emerging complications, and expose the mother

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to related health education. Across the globe, ANC is viewed as an important involvement strategy for minimizing maternal and neonatal mortality numbers as stressed in the Sustainable Development Goals (SDGs) (World Health Organization (WHO), 2016). Despite all the efforts made toward this involvement, there have been differences in low-and middle-income countries, including Nepal, where healthcare lacks central attention among different regions divided by variations of socio-economic groups and demographic categories.

Women of reproductive age (15-49 years) in these areas are exposed to many barriers to ANC access. There are various factors limiting women's access to timely, quality maternal health services: age, order of birth, religion, caste/ethnicity, education, wealth status, and location of residence (Chaurasiya et al., 2018). ANC factors are organized, which means that the most disadvantaged socio-economic groups, marginalized ethnic communities, and women from rural areas are at greater risk for lower use of maternal health services. Understanding such factors is essential to designing evidence-based involvements to improve the coverage of ANC as well as reducing disparities in maternal and neonatal health.

This study attempts to find factors that influence the utilization of ANC service among women of reproductive age in Lumbini Province by using the data from NDHS, 2021. NDHS is a nationwide representative survey that gives the most important data on resources available to provide comprehensive analysis regarding demographic, health, and socio-economic conditions (MoHP, 2021). It also uses logistic regression analysis to find the major determinants associated with ANC attendance that relate to demographic, socio-economic, and contextual variables. The research is specifically done to expose what factors are associated with antenatal care visits among the women of Lumbini Province while assessing what might have slowed them from using these services.

Literature review

ANC is essential for maternal and neonatal health services involvements which monitor pregnancy progression, identify potential complications, and healthy education to expectant mothers. Utilization of ANC services varies widely across different regions and within different demographic and socio-economic variables. ANC refers to services under maternal health targeted at mothers and new-borns receiving medical care. At a global organization, the World Health Organization (WHO) believes it is required for pregnant mothers to visit health facilities at least eight times during their entire period of pregnancy to ensure that their health status is optimized (WHO, 2016). This study shows that among many other determinants of ANC utilization namely: Socioeconomic, demographic, cultural, and healthcare-related ones, particularly from Lumbini Province.

Women are more likely to use ANC services when they have more SES because they have more financial resources and awareness regarding access to ANC services. Acharya et al. (2018), that wealthier households in Nepal are associated with having a considerably higher percentage of ANC utilization. The education attainment among women and their husbands positively affected the number of ANC visits as well as the quality of care received by the couples (MoHP, 2022). Educated women are therefore much aware of the need for ANC and are thereby better placed to make informed decisions about their health (Dhakal et al., 2020).

Age, parity, and residence appear to have considerably contributed effects on ANC utilization. Young women, for instance, those adolescents, should highly be disadvantaged when it comes to

ANC accessibility, mostly arising out of limited autonomy and societal norms. Alternatively, old women may regard themselves as experienced and dismiss ANC visits (Ghimire et al., 2019). The rural-urban divide in obtaining ANC services is, unfortunately, more marked in Lumbini Province, where rural women are denied numerous ANC services as a result of insufficient geographical and healthcare infrastructure factors (Karkee & Lee, 2016).

Patriarchal societal structures often reign in women's decisions, as these often require spousal or family consent. Some traditional beliefs associated with pregnancy and childbirth in Lumbini Province further discourage some women from seeking ANC services. For instance, Sharma et al. (2021) highlighted that cultural taboos around revealing a pregnancy before a particular stage postpone the starting date for ANC.

Availability, accessibility, and quality of healthcare services are the main issues for seeking ANC. Limited health infrastructure, especially in rural parts of Lumbini Province, poses severe limitations. Health facilities and a skilled health provider have a strong bearing on ANC attendance (Baral et al., 2018). Bad service quality and disrespectful treatment meted out by healthcare providers are deterrents for women attending ANC services (Paudel et al., 2020).

Socio-economic, demographic, cultural, and systematic reasons comply with sub-optimal levels of ANC use in Lumbini Province. Policymakers need to prepare very localized plans that can ensure equitable access to ANC services, which will, in turn, improve maternal and neonatal health status. The women of reproductive age in Nepal have multiple interrelated factors that influence the ANC utilization status.

Data and methods

This study is based on the analytic test of NDHS, a nationally representative survey with the support of MoHP and ICF international. It covers various demographic, health, and socioeconomic indicators regarding maternal and child health, fertility, and access to healthcare services (MoHP, 2021). This survey relates stratified two-stage cluster sampling design to ensure making the sampling is representative across provinces including Lumbini Province. It has been purposely used to study factors that determine ANC utilization among women whose ages are between 15 and 49 years. The independent variables were demographic (age, birth order), socio-economic (wealth index, educational attainment), and contextual variables (religion, caste/ethnicity, and place of residence). The logistic regression analysis was the statistical method used to determine the odds of attendance in ANC visits and the strength and direction of the association between independent variables and attendance in ANC using the odd ratios. Statistically significant differences were evaluated at the 5 percent level of confidence (MoHP, 2021).

Results and discussion

Age: Maternal health-seeking behaviour is reflected by the age distribution of ANC visits, which is seen among younger mothers by age group. The age group of 15-19 shows less association with the visits for ANC mainly due to the absence of all basic socio-economic education facilities. The older mothers (35 years and above) suffer from health risks greater than those of others, thereby requiring frequent visits for ANC.

Figure 1: Distribution of ANC visits by age
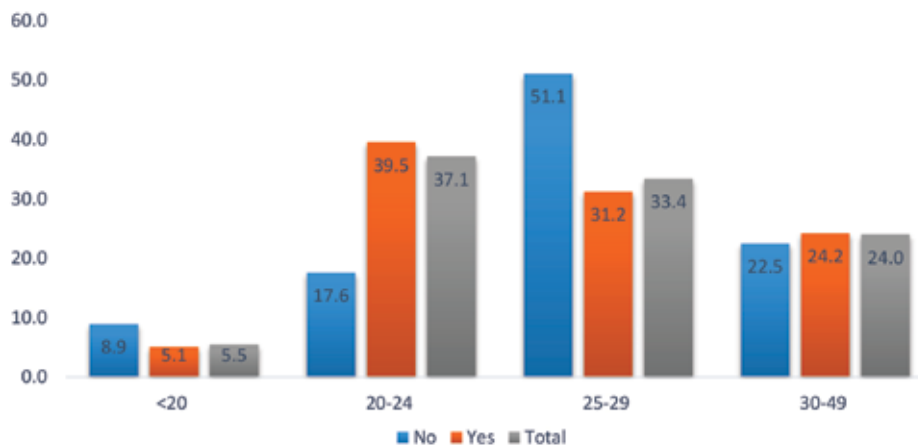
Source: Nepal Demographic and Health Survey, 2022

Figure 1 shows that ANC visits according to age group based on proportions defining Yes and No. It is observable that most ANC attendees belong to the age group of 20-24 years, 39.5 percent coming to seek care. This study shows that awareness of this age group and the ideal conditions for bearing children. For the 25-29 age a drop down ANC visits, where 31.2 percent report attending and 51.1 percent do not. Among adolescents, women below 20 years of age have the lowest ANC utilization rate of 5.1 percent, possibly due to socioeconomic and cultural barriers. Aged 30-49 years are almost evenly matched- (24.2% Yes and 22.5% No) in terms of ANC utilization. Within this age group, therefore, variations in access to healthcare and concerns related to pregnancy arise.

Religion: Religion is the most objective antenatal care visits tend to reflect in achieving maternal health. Women from the highest income religious conservative educational groups enjoy most of the access-related advantages of ANC. The knowledge of available health care services, a positive attitude toward modern health services, and perceptions or norms of masculinity or femininity relative to particular religions, can affect the behavior of ANC.

Table 1: Distribution of ANC visits by religion

Religion	No		Yes		Total	
	Number	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Hindu	45	85.8	397	92.7	442	91.9
Other religion	8	14.2	31	7.3	39	8.1
Total	**53**	**100.0**	**429**	**100.0**	**481**	**100.0**

Source: Nepal Demographic and Health Survey, 2022

Table 1 shows that the distribution of antenatal care (ANC) visits among different religions mentions that healthcare utilization varies with different religions. Among Hindu women, there were 92.7

percent actually went to visit ANC while 85.8 percent of them did not go for any treatment. Hence, most of the women fall in high utilization. Women from other religions had less ANC attendance. 92.7 percent of women had attended the ANC. This group also accounted for 14.2 percent of non-attendance.

Birth order: Most of the other mothers have adduced fewer ANC visits because after seeing prior experiences with childbirth they usually have a lot more economic constraints because of childcare and housework responsibilities. Socioeconomic factors, educational matters of the mother, and the availability of health services further determine ANC attendance by birth order and highlight the need to earmark high-parity mothers for targeted indicators for effective programming. In terms of such mitigated sources as several visits per birth order, ANC shows a mother the most blatant difference in her maternal caring behavior. The first-time mothers are frequently present in ANC, usually because there is an increased concern over health and awareness.

Table 2: Distribution of ANC visits by birth order

Birth order	No		Yes		Total	
	Number	**Percent**	**Number**	**Percent**	**Number**	**Percent**
First	15	28.6	196	45.8	212	44.0
Second	13	24.2	143	33.4	156	32.4
Third or higher	25	47.2	89	20.8	114	23.7
Total	**53**	**100.0**	**429**	**100.0**	**481**	**100.0**

Source: Nepal Demographic and Health Survey, 2022

Table 2 shows that ANC visits to birth order, and antenatal healthcare visits are highlighted, reflecting wide variation in maternal care utilization levels. First-time mothers had the highest ANC attendance rate, with 45.8 percent of them attending visits because they are generally more health conscious and seeking care during the first pregnancy. Mothers who had given birth before and who were expecting a second child, at 33.4 percent, were found to be much less frequently attending antenatal care. Again, women with three or more orders of birth were found to have the lowest utilization of ANC, with only 20.8 percent disclosing visits and 47. 2 percent having no access to care at all.

Caste/ethnicity: The distribution of ANC shows the most significant health disparities, socio-economic, as well as cultural and structural inequalities. Generally, women from privileged castes and ethnic groups, for instance, Brahmin/Chhetri, tend to have better access to education and healthcare as well as financial resources, which makes ANC services more easily available to them. As for marginalized groups, such as Dalits, Indigenous communities, and ethnic minorities, they get lower attendance at ANC setups due to poverty, geographical isolation, discrimination, and sociocultural barriers.

Table 3: Distribution of ANC visits by caste/ethnicity

Caste/Ethnicity	No		Yes		Total	
	Number	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Dalit	9	17.1	103	24.1	112	23.4

Muslim	8	14.6	18	4.2	26	5.4
Janjati	19	36.1	145	33.8	164	34.0
Other Terai	10	19.1	61	14.2	71	14.7
Brahmin/Chhetri	7	13.1	102	23.7	108	22.5
Total	**53**	**100.0**	**429**	**100.0**	**481**	**100.0**

Source: Nepal Demographic and Health Survey, 2022

Table 3 reveals that ANC visits are disparities in utilization of maternal health care are evidenced in ANC visit patterns among Janjati women, with 33.8 percent reporting ANC visits as highest among all categories and 36.1 percent not seeking such care. Dalit women, at 24.1 percent, report the highest attendance while 17.1 percent attend without. Brahmin/ Chhetri women do not differ much at 23.7 percent attendance rates. In stark contrast, Muslim women score worst at 4.2 percent attendance rates showing the great barriers that lie in access to health care facilities.

Educational attainment: ANC attendance shows distribution concerning educational qualifications, so there is a sharp positive correlation between education and utilization of healthcare services by mothers. A high education level makes a woman recognize the importance of ANC visits and time care seeking with less reluctance or therefore an obstacle. Educated mothers tend to have better access to health information, more decision-making autonomy, and stronger awareness of pregnancy-related risks. However, most women with minimal education or none at all are prevented from accessing ANC because it shows limited health literacy and socio-economic status views defined by one's gender. Therefore, female education should be promoted to improve maternal healthcare and related obstetric events.

Figure 2: Distribution of ANC visits by educational attainment
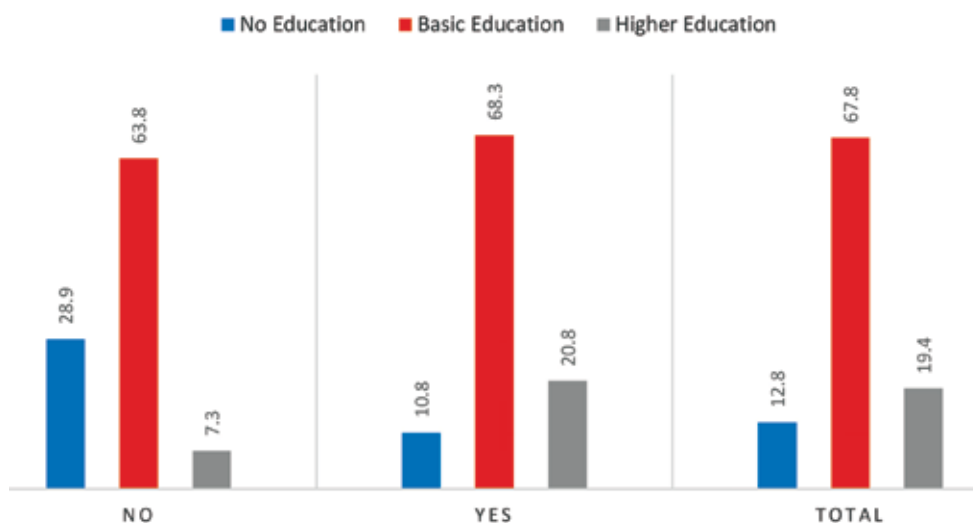
Source: Nepal Demographic and Health Survey, 2022

Figure 2 shows that the distribution of ANC visits according to educational level indicates how education influences maternal use of health services. While 20.8 percent of ANC visits were by higher education women, only 10.8 percent were made by women with no education. A majority of

participants in ANC visits fell within the category of basic education, accounting for 68.3 percent of the attendees, thus showing that indeed it contributes to a large proportion of the population. The highest proportion of non-attendance emerged from women with no education, a disturbing 28.9 percent. This study shows the importance of educational access and awareness, which will quickly increase ANC attendance and improve maternal health.

Urban/ rural residence: Antenatal visits, however, have a variance in them according to place of residence; significant differences are observed in rural and urban areas. The higher attendance of ANC visits by women in urban areas could be due mainly to the closeness of these women to health facilities, mode of travel, and access to health information. Urban areas typically present more health care providers, shorter distances to travel, and greater exposure to maternal health services. On the contrary, many barriers hold down rural women from attending ANC such as remote locations, poor infrastructure, and socio-economic hindrance; this reduces their ANC visits.

Table 4: Distribution of ANC visits by urban/ rural residence

Place of Residence	No		Yes		Total	
	Number	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Urban	29	55.6	231	53.9	260	54.1
Rural	24	44.4	198	46.1	221	45.9
Total	**53**	**100.0**	**429**	**100.0**	**481**	**100.0**

Source: Nepal Demographic and Health Survey, 2022

Table 4 shows that the distribution of antenatal care visits according to place of residence, that is, between rural and urban differences. Of urban residents, 53.9 percent attended ANC; 55.6 percent did not, illustrating this moderate-use characteristic despite better access to healthcare services. About 46.1 percent visited ANC in rural areas, showing very minimal geographical isolation and poor healthcare infrastructure making them less accessible.

Wealth index: The variance within the distributions of ANC visits concerning the wealth index indicatively puts inequalities between accesses to maternal healthcare. The financial status of women from higher wealth quintiles enables them to use ANC visits compared with poorer women. Inequities access socio-economic health services affects both maternal and child health access. Financial support needs to be targeted using insurance and integrated into community health services to address these gaps and enhance access to ANC. The angrier quintile of women harbors many financial access barriers in the health-facility contact and ANC vis-à-vis less income availability to afford transport.

Table 5: Distribution of ANC visits by wealth index

Wealth index	No		Yes		Total	
	Number	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Poorest	8	15.8	78	18.3	87	18.0
Poorer	17	31.8	80	18.6	97	20.1
Middle	15	28.9	95	22.2	110	22.9
Richer	8	14.4	103	24.0	110	22.9
Richest	5	9.2	73	17.0	78	16.1

Total	53	100.0	429	100.0	481	100.0

Source: Nepal Demographic and Health Survey, 2022

Table 5 shows an analysis of antenatal care visits by wealth index, highlighting differences in the use of maternal care services broken down according to the wealth of women. The richest reported the highest antenatal attendance rates, at 24.0 percent, closely followed by the middle group at 22.2 percent. The poorer recorded moderate attendance at 18.6 percent while the poorest reported the lowest at 18.3 percent, indicating barriers such as financial constraints and access hurdles. The richest are accounted for after only 17.0 percent of visits, probably because of their small population size.

Determinants associated with antenatal care: The results from the survey logistic regression analysis give an awareness of the relationship between predictor variables and the probability of getting care during ANC. In total, 408 observations were surveyed from the 69 primary sampling units (PSUs) belonging to a population size of 480.23 as per the survey design. The model with the two strata yielded an F-statistic of 2.76 (degrees of freedom of 19) with a design-adjusted significance level of $p = 0.0022$, indicating that the predictors associated with ANC visits as a model have a statistically significant association. Therefore, it is important to understand how demographic, and socio-economic determinants usually affect maternal healthcare utilization.

Table 6: Regression analysis for four ANC component

Variable	Odds ratio	Std. Err.	T	P>|t|	[95% Conf. Interval]		Sig
Age							
<20	1	.	.	.	.	.	
20-24	4.781	3.628	2.06	0.043	1.051	21.742	**
25-29	1.643	1.185	0.69	0.494	0.389	6.934	
30-49	11.752	11.858	2.44	0.017	1.568	88.069	**
Birth order							
First	1	.	.	.	.	.	
Second	0.753	0.364	-0.59	0.559	0.287	1.977	
Third or higher	0.344	0.194	-1.89	0.063	0.111	1.063	*
Religion							
Hindu	1	.	.	.	.	.	
Other religion	7.429	17.229	0.86	0.39	0.073	760.854	
Caste/ethnicity							
Dalit	1	.	.	.	.	.	
Muslim	0.044	0.104	-1.32	0.19	0	4.878	
Janjati	0.535	0.242	-1.38	0.171	0.217	1.32	
Other Terai	0.482	0.234	-1.5	0.138	0.183	1.272	
Brahmin/Chhetri	0.805	0.502	-0.35	0.729	0.232	2.798	
Educational attainment							

No Education	1	.	.	.	.	.	
Basic Education	1.819	1.044	1.04	0.301	0.578	5.719	
Higher Education	2.837	2.212	1.34	0.186	0.598	13.45	
Urban/ rural residence							
Urban	1	.	.	.	.	.	
Rural	1.46	0.604	0.92	0.363	0.639	3.335	
Wealth index							
Poorest	1	.	.	.	.	.	
Poorer	0.384	0.18	-2.04	0.045	0.151	0.978	**
Middle	0.442	0.23	-1.57	0.121	0.157	1.248	
Richer	1.523	1.074	0.6	0.553	0.373	6.223	
Richest	1.01	0.754	0.01	0.989	0.228	4.481	
Constant	4.847	4.13	1.85	0.068	0.885	26.55	*

*** $p<.01$, ** $p<.05$, * $p<.1$

The model of logistic regression estimates the likelihood of attending ANC visits concerning various demography, the realities of socio-economic conditions as well as contextual issues. The age group 20-24 years had odds that were 4.78 times higher relative to the reference group and were statistically significant at the 5 percent level (p=0.043). Women aged 30-49 would seem to show a significant association for ANC visits, with an odds ratio of 11.75 (p=0.017). On the other hand, ANC visits were found to be less likely when it comes to higher-order births (third and above) having an odds ratio of 0.34 (p=0.063), which is significant at the 10 percent level. With one p-value of more than 0.05 but less than 0.10, religion did not affect the ANC attendance; neither did caste/ethnicity variables, e.g., Muslim, Janjati, and Brahmin/Chhetri groups. One inference from the educational attainment is that this would cause a positive trend: women with higher education were found to be 2.83 times more likely to undertake ANC visits, because of which the association remained statistically non-significant (p=0.186). With poor women being less likely to attend ANC in comparison with the poorest group, the wealth index results have an odds ratio of 0.38 (p=0.045), significant at 5 percent. In a rural-urban comparison, the location of residences did not significantly affect the likelihood of ANC compared to that of urban residences (p=0.363). Model-wise however, it seems that there is statistical significance, as indicated by the F-statistic of 2.76 (p=0.0022), which reveals that collectively, the predictors explain variation in ANC visits. The analysis underscores the need to sensitize stakeholders on the disparities that need to be addressed in ANC utilization by age, wealth, and birth order to provide access to improved maternal healthcare.

Discussion

The logistic regression model in Lumbini Province identifies the factors influencing visits for antenatal care visits, which gives one a detailed understanding of how factors such as age, birth order, religion, caste/ethnicity, education, place of residence, and wealth in their different combinations are defining maternal healthcare service use. Age has a significant effect on ANC attendance. The 20-24-year-old women are 4.78 times more likely to visit ANC compared with women under 20 years, with a 5 percent significance level (p = 0.043). This age group is an important period for first

pregnancies and for heightened awareness concerning maternal health needs. Women aged 30- 49 years, with odds ratios of 11.75 (p = 0.017), are hence expected to show even higher attendance at ANC, which may be due to the rising risks of complications in late pregnancies. All these findings agree with the results from Joshi et al. (2014), who noted that women during prime childbearing years were more likely to visit ANC services than those associated with higher maternal risk.

Families' order is another important influence on attendance at ANC clinics. An odds ratio of it is 0.34 (p = 0.063), significant at the 10 percent level, whereby those with higher-order births are less likely to ever attend ANC visits. This trend shows confidence in past experiences and reduced perceived need for care among multiparous women. Deo et al. (2015) also observed that first-time mothers are more proactive in looking for ANC services due to increased caution and newness of the experience. This gap needs a more specific intervention, such as counseling and outreach programs to make ANC popular irrespective of parity.

Religion and caste/ethnic identity do not seem to have any important effects directly influencing ANC use. The odds ratio for women of other religions to Hindus being 7.429 and the data of p being 0.39 does not make it statistically significant. Likewise, with caste/ethnicity variables without making any statistically significant association with ANC attendance like Muslim, Janjati, and Brahmin/Chhetri groups. The results continue to differ from the general national studies like those of Thapa and Upreti (2022) which mention religion and caste as barriers to health care due to systemic discrimination and practices. This suggests that there is little direct effect in Lumbini Province; however, one must also consider indirect ones such as socioeconomic status and geographic location.

The negative or positive relationship to ANC visits is great but statistically insignificant. Higher-educated women are 2.83 times (p = 0.186) more likely to attend ANC visits, while women with only basic education are 1.819 times (p = 0.301) more likely to attend ANC visits. Education improves health literacy, which helps women recognize the importance of ANC and efficiently navigate the different healthcare systems. Rijal et al., (2020) said that maternal education boosts ANC attendance but mostly in women who had secondary or higher education. The gap in Lumbini Province needs to be bridged by effective female education and health education in school curricula at an early age.

Rural residence is not significantly related to ANC use, contrary to expectations, with an odds ratio of 1.46 (p = 0.363): differences between the two and other Nepalese regions suggest less dissimilarity in their geographical distributions for Lumbini Province. Access is still important, as Alem et al. (2022) stated, about transportation and proximity to health facilities which affect maternal health behaviors. This is to be accompanied by ensuring an efficient healthcare system in a remote area.

The wealth index served as an important determinant of ANC usage. Compared to the poorest group, women in the "poorer" category were less likely to attend ANC visits, with an odds ratio of 0.384 (p=0.045). This inconsistency might show the existence of specific subsidies for the poorest households Chaurasiya et al. (2018). There is no significant statistical difference in attendance at ANC for women in the middle and richer categories. Significant is the logistic regression for ANC utilization, where the model has been seen to yield an F-statistic of 2.76 (p = 0.0022), which gives evidence that together the predictors variables would explain variations in ANC visits. These analyses affirm the complexity of the study subject concerning maternal healthcare utilization, which is influenced by demographic, and sociocultural factors.

These factors include age, birth order, education, and wealth, which play very important roles regarding the ANC utilizations of the reproductive-age women in Lumbini Province, Nepal. Younger females and those born higher in the order births face less conducive conditions to attend ANC service, but they continue to enjoy the differences that remain inevitable despite the involvement. Policymakers should therefore be inclined to education programs, incentives, and infrastructure improvements to have equal access to ANC. Future research intends to analyze the indirect effects of cultural and systemic factors, plus the impact of ongoing policy measures, which may inform evidence-based.

Conclusion

It has been possible to establish that there are some demographic and socioeconomic components like age, birth order under which they are born, educational attainment, and wealth index, which can highly explain the situation concerning the utilization or access of antenatal care services by women of childbearing age in Lumbini Province, Nepal. Logistic regression analysis on ANC utilization indicates that it is more likely to service women in the reproductive ages 20-24 and 30-49, while higher-order women are less likely to seek the facility. This study showed wealth disparities to be also a critical determinant whereby very poor women attend ANC quite less than the poorest of the poor. Further, the study finds that caste, religion, level of education, and place of a house do not have statistically significant effects on antenatal usage pointing out the composite nature of such determinants. The targeted and evidence-based involvements can only address these differences complemented by education improvement, economic empowerment, and high-level strengthening of health status. Such action is necessary for defining equitable access to maternal healthcare, narrowing inequalities, and improving women's and children's health. All that can be handled multi-sectored in a way that involves the policymakers, healthcare providers, and community-level health workers to make ANC services accessible to all.

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