Determinants Of Antenatal Care Utilization In Sudurpashchim Province, Nepal

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Abstract: Maternal health remains a important health priority in Nepal, where antenatal care (ANC) is essential in ensuring safe pregnancy results. However, there are an excessive amount of regional differences regarding ANC utilization, particularly in the socio-geographically disadvantaged Sudurpashchim Province. The objectives of this study are to examine the demographic and socio-economic factors influencing ANC utilization among women in Sudurpashchim Province.

Using NDHS 2022 data, this cross-sectional study investigated women aged 15-49 years who had at least one live birth within 5 years prior to the survey. Samples for Sudurpashchim were chosen using stratified random sampling. The study employed a combination of descriptive statistics and logistic regression to identify associations between ANC utilization and variables, such as age, education, birth order, wealth status, caste/ethnicity, and residence type. ANC service utilization was the primary result variable, and adjusted odds ratios with 95% CI were calculated for determining significant predictors.

ANC utilization was highest among women aged 20-24 years (44.3%) and 25-29 years (30.6%) while lowest for younger or older women. ANC service uptake was higher among women with basic education (64.2%) than women without education. First-time mothers and women in upper wealth brackets also had a higher uptake of ANC services. Logistic regression found that being 20-29 years, having basic education, residing in a rural area, being in the middle or richer wealth quintiles, all significantly associated with ANC utilization. Higher birth orders (three or more) were inversely associated with ANC service utilization. Caste and religion were not significant predictors.

In Sudurpashchim, factors influencing ANC utilization follow the line of age, education, birth order, residence, and wealth. Younger, educated, and wealthier women are more likely to utilize the service. Policy efforts should target maternal health awareness among multiparous and less-educated women, while access should be improved among economically and socially marginalized groups through targeted and inclusive outreach strategies.

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1. Introduction

Maternal health covers a dynamic aspect of public health and development in most key under- and middle-income countries, including Nepal. Antenatal Care (ANC) is a comprehensive term that describes the varied services provided to pregnant women during their reproductive lives. It associated detection and management of complications, health education, promotion, and through safer motherhood practices (WHO, 2016). Maternal and neonatal morbidity and mortality can be averted more so if early recognition and management are in place since most of these correlated risks arise from pregnancy (Bhutta et al., 2014). Although the world has changed a lot regarding maternal healthcare, in Nepal, access to these ANC services remains inadequate and unequally distributed among geographically and socioeconomically diverse provinces.

In Nepal, over the last few years, various programs and policies have been framed by the government catering to maternal health issues such as the Safe Motherhood Programme, National Health Policy, etc. These policies have been instrumental in gradually improving service coverage, but the uptake remains very inequitable across the geographical and population segments. Studies have established a number of determinants of ANC utilization, including maternal education, household income, place of residence, parity, and cultural beliefs (Tuladhar et al., 2013; Acharya et al., 2015). Although most of these studies have concentrated largely on national-level data or major urban cities, few have even considered the varied socio-demographic dynamics of far-western Nepal Sudurpashchim Province-where in maternal health indicators are found to lag behind the national averages significantly (NHRC, 2020).

High rates of poverty, sharp territory, low maternal education, and strong gender roles have led to disparities in maternal health service provision in Sudurpashchim Province (Adhikari & Paudel, 2019). The intersectionality of caste, ethnicity, and wealth gives rise to a complex web of barriers on the access of healthcare to marginalized communities within this province. Yet, little has been done to study ANC utilization in this province using descriptive and inferential statistical techniques. This study has generalized findings across provinces or have failed to analyze how combinations of socio-demographic factors influence maternal care behavior in the context of this region (Bhandari et al., 2021). Evidence-based local insight is needed most urgently to inform the region-specific health planning and resource allocation.

This study aims to fill the different in such research by asking determinants of ANC utilization among women of Sudurpashchim Province. There are descriptive patterns and also outputs of logistic regression; this study has all these among others show how age, education, wealth, caste, and the place of residence affects maternal health behavior in one of the most underappreciated provinces in Nepal. Unlike previous national-data-focused studies, the specificity of this study will allow it to capture the local disparities and develop recommendations according to Sudurpashchim's unique social status. However, the findings not only help resolve the knowledge gap but also create important implications for policy and society- such as guiding provincial health authorities about where they should design targeted interventions and how to create inclusive client-customer-centered policies for improving maternal health.

This study, ANC use in Sudurpashchim is very much studied province under desertion of the national context as far as research goes. So far, previous studies have combined infrequently a descriptive and an inferential approach in studies within this particular province. They have also not examined deeply related intersectional factors, such as caste, education, and wealth, in a single model. The study is expected to impact health policy and social interventions by revealing the most critical levers for creating equity in maternal health in Nepal.

2. Data and methods

The primary criterion for inclusion in the study is the dataset's national representation. NDHS 2021 as Nepal's ninth countrywide health survey and fifth large-scale agricultural population and property survey. In the wider context of the global DHS project, it presents alleviating insights into the national authority, especially on maternal and child health areas of rural Nepal (Ministry of Health and Population [MOHP], 2021).

The study population involves a woman aged between 15- 49 years who had at least one live birth in the five years before the survey; as per the eligibility criteria, the study subjects were those who met services of maternal health services during the latest delivery (MOHP, 2021). The concentration of the study was on multivariate

analysis. The categories were combined into different variables to measure the use of/by non-use of maternal health services. So, a woman was coded as 1 for antenatal care, if registered; if not, 0. A likewise code was attached for delivery and postnatal case. Logistic regression analyses evaluated the associations between the dichotomous dependent variable and one or more independent variables. Logistic regression is expressed as:

logit $P(x) = \alpha + \Sigma\beta_i x_i$

$\exp(\beta_i)$ representing the odds ratio of a person with characteristic i or without, is the individual parameter. The β is the log(OR) some denote as parameter, and as a variable added to complete the evaluation, α is an additional constant. Not only p-values but also confidence intervals (CIs) provided most comprehensive information, eliminating a variety of hypotheses. Independent variables included age, birth or religious affiliations, ethnic groups, level of education, type of residence, and wealth index categories. The employed the chi-square statistics to determine whether the variables were independent or correlated. Non-stratified R2 analytical summaries allowed a comparison among many categorical independent variables. Simple logistic regression proceeded to assess the strength of associations between the independent variables and the result in an analysis of additive models:

$\ln(p_i/(1-p_i)) = \mu + \alpha_i$

where p_i denotes the probability of result occurrence, μ is a constant, and α_i represents the effect of exposure. The adjusted probabilities of discontinuation were calculated using:

$P_{ijk} = 1/(1+\exp(-(\mu+\alpha_i+\beta_j+...\gamma_k)))$

The Deviance (D), with lower values indicating better fit, while there are also those who employ pseudo-R2 values (which means the larger the value, the better the fit). For example, Troycheem (2006) discussed these values.

3. Results

Antenatal care utilization among women in Sudurpashchim Province, Nepal, is studied in the context of various socio-demographic determinants as shown in Table 1. These statistics reveal that ANC service utilization is highest among women aged 20-24 (44.3%), followed by women aged 25-29 (30.6%), indicating that women in the early reproductive age group are likely to use ANC services. Conversely, women who are younger than 20 years and older than 30 years have also shown low usage. From the perspective of birth order, the chance of using ANC services declines with an increasing number of children 43.9% for the first birth, 35.6% for the second birth, and only 20.4% for the third or further births. This indicates that the more children that a woman has, the lesser the perception of need or the lesser the barriers to care.

Educational status also emerges as a strong indicator of ANC use. Women with basic education (64.2%) and higher education (20.6%) used ANC services more than women with no education (15.2%). Castes and ethnicity have shown discrepancies as well; Brahmins/Chhetris availed it more (60%); Dalit and Janjati, comparatively low figures. There are not so many differences in the religion; almost all ANC users and non-users are Hindus. Women from urban areas (60.4%) utilized ANC services more than those from rural areas (39.6%), showing the contemporary differences in accessing health between urban and rural areas. Wealth quintile, too, indicated a definite gradient in that ANC use increases with wealth, with the richest richest using it most (9.8%); the poorest still form the largest proportion (38%) utilizing ANC services.

Table 1: Distribution Antenatal care of respondents

Variable	No		Yes		Total	
	Number	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Age						
<20	4	14.9	17	7.2	21	7.9
20-24	8	33.0	106	44.3	114	43.3
25-29	6	26.5	73	30.6	79	30.2

30-49	6	25.6	43	18.0	49	18.7
Birth order						
First	7	30.0	105	43.9	112	42.7
Second	6	26.7	85	35.6	91	34.8
Third or higher	10	43.4	49	20.4	59	22.5
Level of education						
No Education	8	34.0	36	15.2	45	17.0
Basic Education	12	51.1	153	64.2	165	63.0
Higher Education	4	14.9	49	20.6	53	20.1
Religion						
Hindu	24	100.0	231	97.0	255	97.3
Other religion	0	0.0	7	3.0	7	2.7
Caste/Ethnicity						
Dalit	5	19.9	31	13.1	36	13.7
Muslim	0	0.0	1	0.3	1	0.3
Janjati	3	11.8	61	25.6	64	24.3
Other Terai	0	0.0	3	1.1	3	1.0
Brahmin/Chhetri	16	68.4	143	60.0	159	60.8
Place of Residence						
Urban	17	71.4	144	60.4	161	61.4
Rural	7	28.6	94	39.6	101	38.6
Wealth quintile						
Poorest	11	47.2	91	38.0	102	38.8
Poorer	6	24.3	57	23.9	63	23.9
Middle	2	7.7	35	14.6	37	13.9
Richer	5	20.8	33	13.8	38	14.4
Richest	0	0.0	23	9.8	23	8.9
Total	24	100.0	238	100.0	262	100.0

Source: Nepal Demographic and Health Survey, 2022

Table 2, but indeed it talks about the findings of a logistic regression analysis so that such type of analysis would investigate the association of demographic and socio-economic characteristics with antenatal care (ANC) utility in Sudurpashchim Province. The study results indicated that a woman aged 20-24 (OR=4.65, p=0.026) or 25-29 (OR=5.65, p=0.011) were extremely likely to access ANC services as opposed to a woman below the age of 20. However, of course, those aged 30-49 years had a greater likelihood (OR=5.61); however, the relationship here was marginally significant (p=0.066). Birth order was negatively related to ANC utilization, with regard to a greater number of transitions, particularly three or more children (OR=0.23, p=0.054), which implies that multiparous women are less likely to seek ANC.

The second thing is that educational attainment turned out to be a very important factor, as the women with just basic education around three times (OR=2.78, p=0.047) more likely to using ANC services compared with women who do not have any education at all. The effects of higher education were positive but not statistically significant (p=0.144). Clearly demonstrated is the fact that rural residence enables usage of ANC services (OR=3.15, p=0.013), which might reflect the effects of targeted outreach programs. Wealth status was also shown to significantly influence ANC uptake with middle (OR=2.32, p=0.034) and richer (OR=3.10, p=0.032) quintiles showing greater odds of utilization compared to poorest quintiles. Thus, caste/ethnicity, along with being in the "poorer" wealth quintile, did not show any statistically significant relationship, indicating that moderating impacts from other intersecting factors are possible.

Table 2: Factors association of demographic and socio –economic variable

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Variable	Odds Ratio	Std. Err.	T	P>|t|	95% Conf. Interval	Sig
Age						
20-24	4.648508	3.123782	2.29	0.026	1.21153-17.83582	**
25-29	5.654055	3.711093	2.64	0.011	1.520441-21.0257	**
30-49	5.613152	5.162567	1.88	0.066	0.8911372-35.35648	*
Birth order						
Second	0.6867194	0.3576226	-0.72	0.473	0.2422253-1.94688	
Third or higher	0.2291164	0.1717807	-1.97	0.054	0.0511099-1.027088	*
Caste/Ethnicity						
Janjati	1.646376	1.364059	0.6	0.55	0.313708-8.640372	
Brahmin/Chhetri	0.738667	0.4232868	-0.53	0.599	0.2346732-2.325059	
Educational attainment						
Basic Education	2.780485	1.40353	2.03	0.047	1.012645-7.634559	**
Higher Education	2.064836	1.011594	1.48	0.144	0.77471-5.503412	
Residence						
Rural	3.148662	1.411047	2.56	0.013	1.284344-7.719171	**
Wealth quintile						
Poorer	1.143216	0.5722798	0.27	0.79	0.4198621-3.112788	
Middle	2.322224	0.9022884	2.17	0.034	1.069505-5.042262	**
Richer	3.100555	1.606842	2.18	0.032	1.102348-8.720873	**
_cons	1.248587	0.835498	0.33	0.741	0.3272722-4.763526	

4. Discussion

By this study, it was found that socio-demographic and economic factors are the key determinants of ANC utilization by women in Sudurpashchim Province, Nepal. The descriptive statistics indicated a higher usage of ANC among women aged 20-24 and 25-29 years. This follows to other studies where women in early reproductive ages use maternal health services more readily (Khatri et al., 2020; Neupane & Doku, 2013). Likewise, first mothers had the highest ANC utilization compared to those with higher birth orders, consistent with the discovery of Chanda et al. (2019), revealing there was less maternal care with increasing parity. The low utilization by older and multiparous women could reflect perceived acquaintance with the process, loss of motivation or resource constraints. Moreover, education would prompt a more significant role; quite evidently much higher ANC usage was among women with basic education or higher, which concurs with former evidence: education enhances health literacy and service utilization (Joshi et al., 2014).

The findings from logistic regression reinforced these patterns. Women who belong to the age group 20-29 are more likely as compared to the younger bunch under 20 years to utilize ANC services as found with odds ratios above 4.5. The finding is in congruence with the descriptive result, which translates to perhaps reproductive maturity has a relationship with increase in awareness or autonomy on the latter. It is noteworthy that there exists an association of higher education with greater use of ANC. However, only primary education could demonstrate that statistically significant effect most probably because of sample distribution or contextual differences in Sudurpashchim. Similarly, negative was the relationship with birth order, particularly in relation to third or higher births. It was also statistically significant and further indicated the tapering off of care-seeking among experienced mothers, as noted also by Singh et al. (2022).

The regression model also produced an odd result since being rural corresponded with high ANC utilization, which is opposite to the national and global trend (WHO, 2016; Paudel et al., 2018). This could be either due to the successfully conducted outreach activities by community health programs in rural Sudurpashchim or because perhaps urban areas with poor access to other health services were directing eligible rural women toward government-supported ANC visits. Wealth, without a doubt, was an important factor; ANC was used

more by women from middle and richer-income households, as supported by existing literature that draws attention to economic capability as a key determinant of actual access to maternal health services (Adhikari & Khanal, 2014).

In general, findings somewhere support the fact that being younger with a lower order of birth, educated, and in favorable economic conditions enhances ANC use. There are, however, odds tending toward ANC in rural areas that need further study. This might mean either successful interventions being played out on the ground or hidden inequities in urban health access. The non-significant effect of caste/ethnicity in regressions, albeit contrasting markedly in the descriptive statistics, suggests these identities may affect service access at a surface level but are likely mediated by education, wealth, and residence in multivariate contexts. The improving knowledge in women and community ANC promotion for high-parity women can perhaps, contribute in narrowing the gradient of maternal health inequities in the province.

Strength of the study lies in that the findings could apply in general to Sudurpashchim Province, as being based on a nationally representative survey, the NDHS 2022. Furthermore, the study takes a step toward a more nuanced understanding of patterns of ANC utilization through the use of both descriptive and inferential statistics. Yet, being cross-sectional, it does limit far-reaching causal inference. In addition, variables such as culture, beliefs, and autonomy in decision-making, very important to maternal health behavior, were not included in the modeling, potentially underestimating their effects.

5. Conclusion

Age of mother, birth order, educational level, wealth status, and place of residence have a significant impact on antenatal care (ANC) utilization among women within Sudurpashchim Province, Nepal. Women aged twenty to twenty-nine years, those with basic education, and those who hailed from middle or richer households had a higher ANC service utilization than those of higher birth order-not an entirely unexpected finding. Surprisingly, it was indicated that the rural women demonstrated the odds of ANC utilization in comparison to their urban counterparts. The reason could probably be due to successful outreach or some form of community-based health intervention at the household level. These findings are in combination with other previous national and international studies emphasizing how education and empowerment lead to changes that promote the use of maternal health services.

This disparity shall call for formulating policies that would encourage targeted awareness-raising programs for the under-educated, multiparous women, further strengthening rural and urban community health outreach, as well as provision of financial support mechanisms for the economically disadvantaged. Therefore, a holistic approach to improving ANC use must incorporate maternal health programs into education, poverty alleviation, and culturally sensitive community outreach.

Author contributions

Bijaya Mani Devkota and Suresh Acharya contributed to the study's conception, data extraction, data analysis, and drafted the manuscript. Nava Raj Aryal, Ramchandra Dahal, Tantrika Raj Khanal and Sanjita Khatiwada supported the preparation of the manuscript. At last, manuscript was critically revised by Bijaya Mani Devkota to ensure its quality and accuracy. All authors agreed to submit the article in its current form.

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Conflict of interest

The authors declare no potential conflict of interest with respect to the research, authorship, and/or publication of this article.

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Ethics statement

The study was reviewed and approved by the ICF and NHRC; all ethical norms are followed thoroughly during and after the research.

Data availability statement

The data used in this study are publicly available from the Demographic and Health Surveys (DHS) Program. The 2022 Nepal Demographic and Health Survey dataset can be accessed upon request at https://dhsprogram.com.

Conflict of Interest

The authors declare no conflict of interest related to this study.

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