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Determinants of Skilled Birth Attendance in Gandaki Province, Nepal

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Abstract

This study is to explore the factors influencing the use of skilled birth attendance (SBA) among women of reproductive age (15-49) in Gandaki Province, Nepal, based on the 2022 Nepal Demographic and Health Survey (NDHS) data. Even though there have been significant countrywide advances in maternal health, unequal access to SBA still persists along socio-economic and geographic, especially in Nepal's hill and mountain provinces where the situation is worse. The study employs the secondary data of the NDHS and cross-sectional design with binary logistic regression employed to analyze the utilization of SBA based on some socio-economic and demographic factors like birth order, age, education, caste/ethnicity, residence, religion, and household wealth quintile.

Women with primary education were approximately seven times, and those with secondary education 35 times, more likely to utilize SBA compared to women who had no school education. Economic status possessed a clearly defined positive gradient where households with greater wealth had very much greater opportunities of using SBA. In contrast to the Dalit women, the Janjati and Brahmin or Chhetri women were significantly less likely to have received any kind of skilled delivery assistance throughout this period, which points to the existence of caste-based disparities of very long duration. Even though age, parity, and place of residence were not always significant factors, rural and high-parity women still formed the majority of non-users and thus remained vulnerable to the situation.

The results indicate the need for maternal health interventions that are equity-oriented and that are able to cater the present-day women in terms of education, economic accessibility. Among the policy interventions, transport voucher programs, maternity waiting homes, and upgraded community midwifery services can provide a great deal of help in facilitating equal and universal access to SBA.

Keywords: Skilled Birth Attendance, Gandaki Province, Maternal Health, Education, Socio-economic Inequality, Nepal Demographic and Health Survey (NDHS).

1. Introduction

SBA is considered the main factor for safe delivery in the world and the means to the achievement of Sustainable Development Goal 3.1 (reducing the global maternal mortality ratio to less than 70 per 100,000 live births by 2030) at the same time. In a joint statement in 2018, the WHO recognized the UNFPA, UNICEF, and other stakeholders that "skilled health personnel" must meet requirements in terms of training, education, and regulations thus distinguishing SBA from other categories of attendants such as "trained" or "traditional" birth attendants (WHO et al., 2018). In spite of the considerable increase in national SBA coverage, approximately 80 percent of the births

are attended by a skilled provider according to the 2022 Nepal Demographic and Health Survey (NDHS), there still exist geographic and socio-economic divides.

Deserving mention are Gandaki Province's hilly terrain and infrastructural constraints that pose difficulties in spite of its relatively good averages in the maternal-newborn indicators. More and more, study in low- and middle-income countries (LMICs) relates SBA utilization to determinants at the individual level (e.g., maternal education, parity, health literacy), household socioeconomic status, and more distal health-system and geographic determinants (facility proximity, transport, provider availability). For example, a 34-country multilevel analysis in Sub-Saharan Africa found that women who were more educated and lived in more affluent countries had considerably better odds of receiving SBA (Woldegiorgis, Hiller & Mekonnen, 2019).

Spatial-inequality analyses from Ghana and other contexts reveal significant wealth- and location-based gradients in SBA (Bobo et al., 2021). Within South Asia and Nepal, empirical work indicates that women from wealthier households, higher educated, prim parous, and urban areas are more likely to access SBA, while those living far from functional health facilities or in socially marginalised ethnic/caste groups remain behind.
Aides to these national and sub-national findings are three important gaps. One is that most of Nepal-based study aggregates data at national or ecological levels rather than province-specific levels and makes use of "province" only as a control variable, not as the unit of analytic focus. Two is that in some study, descriptions of SBA have not always adhered to the WHO 2018 joint-statement definition, complicating comparative analysis and trend interpretation. Third, there is sparse evidence on the interplay between ANC timing and sufficiency, geographic access (transportation, road seasonality) and perceived quality (respectful maternity care, facility preparedness) in hilly/mountainous sub-regions such as, where terrain, municipal and service decentralisation significantly vary from the Terai plains.

Against these gaps, this study seeks to identify determinants of SBA utilisation in Nepal's Gandaki Province using the most recent NDHS 2022 microdata. The operationalise the WHO-congruent definition of SBA, and operate on a multi-level framework that includes individual (education, parity, ANC utilisation), household (wealth, caste/ethnicity, decision-making autonomy), and service-environment determinants (ANC initiation/contacts, availability of transport, facility readiness proxies).

The conclusions have a direct social and policy impact: understanding the main leverage points (for instance, late ANC, transportation access constraints, unequal caste/education stratification) can enable provincial and municipal health planners to prioritize interventions through evidenced-based decisions such as maternity waiting homes, transport voucher programs, ANC outreach, and respectful-care training that are meant to scale up effective SBA coverage and close maternal and newborn mortality inequities by targeting the right places. This study is different from past work in its province-level focus, standards-based operational definition of SBA, and access-quality-equity analytic framework within one instrument, thereby offering actionable evidence tailored to the service-delivery setting of Gandaki Province.

2. Data and methods

This study has taken secondary data collected through Nepal Demographic and Health Survey 2022 a nationally representative survey done Ministry of Health and Population (MoHP). The NDHS utilizes a stratified two-stage sampling design, which is designed to ensure representation

of demographic and geographic regions across Nepal. The dataset gives information regarding maternal health and socio-economic status along with demographic characteristics hence it provided good analysis in skilled birth attendance SBA utilization. Here, the result variables are classified SBA use, either institutional delivery where the birth takes place in a health facility or non-institutional delivery that happens at home. The independent variables would include age, birth order, educational attainment, religion, caste/ethnicity, place of residence, and wealth quintile. The independent variables discussed were connected with all maternal health results, as has been proven by previous studies (Bhutta et al., 2022; Devkota, 2025).

Data were subjected to data analysis using logistic regression for establishing the association of certain demographic and socio-economic factors with SBA utilization.
The significance of results is reported due to the p value being less than 0.05, and they are reported as ORs and 95 percent CIs. This methodology provides a better perspective and wider applicability of the results and highlights the significance of temporary or permanent skilled birth attendance on parturition in Nepal.

3. Results

Table 1 presents the socio-economic and demographic characteristics of reproductive age (15–49) women and their link with skilled birth attendance (SBA) utilization in Nepal's Gandaki Province. The respondents' most frequent age was between 25–29 years (34.9 %), followed by 30–49 years (24.1 %) and 20–24 years (27.8 %), indicating that most of the births occurred in the peak reproductive ages. A large percentage of SBA users were in the 30–49 years' age group (24.5 %), as might be expected from greater experience and acquaintance among older women. According to birth order, more than half (51.0 %) of all births were first-order births, and over half of these (52.5 %) were with skilled attendants suggesting that younger, primiparous women are disproportionately likely to receive professional delivery care compared with multiparous women. Conversely, use dropped dramatically among three or more birth mothers (12.4 %), indicating that multiparous women may feel less need for facility delivery or face resource constraints. Educational attainment has a strong positive gradient: while 35 percent of more educated mothers used SBA, only 1.6 percent of less educated women did. This highlights education as a critical driver which influences awareness, health literacy, and autonomy in seeking maternal health.

Most of the women were Hindu (86.1 %), among whom SBA use was very high (86.3 %). However, marginalized groups such as Dalits (25.2 %) and Janjati groups (44.8 %) reported lower SBA use compared to Brahmin/Chhetri women (27.7 %), reflecting ongoing inequalities on the basis of cultural and socio-economic stratification. A great difference in the spatial distribution of the population can be seen: 69.8 percent of women in cities had delivery care provided by a trained professional, while only 6.3 percent of rural women The reason for this is the lack of access to services and infrastructure. Another factor that influenced the spatial disparity and that was measured through wealth quintiles was the economic status. The proportion of women delivering with the assistance of skilled birth attendants rose from 12.7 percent in the poorest group to 29.1 percent in the middle and 19.5 percent in the wealthiest quintiles, while non-use was mainly among the poor (43.5 %). The analysis clearly shows that the factors of being younger, having fewer children, higher education, living in an urban area, and being economically better off all substantially increase the likelihood of a skilled birth attendance. These results imply that there would be a need for interventions that are directed towards the rural poor and less-educated women

e.g., by improving transport, maternal health education, and health programs that are inclusive to provide equal maternal health results.

Table 1: Distribution of demographic and socio-economic variable

Categories	**No(%)**	**Yes(%)**	**Total(%)**	**Total (N)**
Age				
<20	7.1	14.1	13.2	24
20-24	35.5	26.7	27.8	50
25-29	36.3	34.7	34.9	63
30-49	21.1	24.5	24.1	43
Birth order				
First	39.8	52.5	51.0	92
Second	31.3	35.1	34.7	62
Third or higher	28.9	12.4	14.3	26
Level of education				
No Education	26.6	1.6	4.6	8
Basic Education	65.8	63.4	63.7	115
Higher Education	7.6	35.0	31.7	57
Religion				
Hindu	84.2	86.3	86.1	155
Other religion	15.8	13.7	13.9	25
Caste/Ethnicity				
Dalit	11.0	25.2	23.5	42
Muslim	0.0	0.7	0.7	1
Janjati	74.3	44.8	48.4	87
Other Terai	0.0	1.5	1.3	2
Brahmin/Chhetri	14.6	27.7	26.2	47
Place of Residence				

Urban	6.3	69.8	65.8	118
Rural	63.7	30.2	34.2	61
Wealth quintile				
Poorest	43.5	12.7	16.4	29
Poorer	21.1	14.8	15.5	28
Middle	22.0	24.1	23.8	43
Richer	5.8	29.1	26.3	47
Richest	7.6	19.5	18.0	32
Total(N)	**22**	**158**		**180**
Total(%)	**100.0**	**100.0**	**100.0**	

Source: Nepal Demographic and Health Survey, 2022

The logistic-regression analysis: Skilled Birth Attendance (SBA) is also highly essential in terms of averting maternal and neonatal mortality. The present study is based on the analysis and statistics behind the utilization of SBA with the application of logistic regression. The results indicated that age, birth order, caste/ethnicity, and wealth quintiles made a significant difference.

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

Variable	Odds Ratio	Std. Err.	t	P>|t|	95% Conf. Interval	Sig
Age						
20-24	0.310455	0.16943	-2.14	0.03	0.1039911-0.926834	**
25-29	0.35798	0.3503	-1.05	0.29	0.0503691-2.544207	
30-49	0.47781	0.7187	-0.49	0.62	0.0234429-9.738687	
Birth order						
Second	1.199941	0.9013	0.24	0.80	0.2663073-5.406751	
Third or higher	0.343364	0.3502	-1.05	0.299	0.0444619- .651677	
Religion						
Other religion	2.218615	1.3216	1.34	0.187	0.6723599-7.320858	
Caste/Ethnicity						
Brahmin/Chhetri	0.247792	0.1427	-2.42	0.019	0.0780826-0.786356	**

Janjati	0.175781	0.1243	-2.46	0.017	0.042591- 0.725482	**
Educational attainment						
Basic Education	6.84822	4.6749	2.82	0.007	1.74353-26.89838	***
Higher Education	35.32498	39.878	3.16	0.003	3.677364-339.3339	***
Residence						
Rural	0.774725	0.5728	-0.35	0.731	0.1760281-3.409678	
Wealth quintile						
Poorer	1.303854	0.9141	0.38	0.707	0.3198861-5.314499	
Middle	2.503593	1.3758	1.67	0.101	0.8322528-7.531342	*
Richer	12.90804	17.891	1.85	0.07	0.8026573-207.5823	*
Richest	2.078323	2.1626	0.7	0.485	0.2582472-16.72593	
_cons	4.334833	5.1211	1.24	0.22	0.4062102-46.25874	

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

Table 2 presents multivariate logistic regression results of the relationship between selected socio-economic and demographic determinants and use of skilled birth attendants (SBA) among Gandaki Province women. The result reveals that 20–24 years old women (OR = 0.31, p = 0.03) were less likely than less than 20 years old women to utilize SBA, and therefore very young mothers are likely or more susceptible to maternal interventions to deliver under professional care. The probabilities for both of the older age groups (25–29 years and 30–49 years) were not significant, i.e., age in itself would not be predictive of SBA use if other socio-economic variables were controlled. Similarly, birth order was inversely, if not strongly, correlated: three or more births were less likely (OR = 0.34, p = 0.30) in females, as would be expected if older mothers capitalize on experience accrued and can neutralize risk of spontaneous delivery. Religious group did not differ, with non-Hindu women over twice as likely (OR = 2.22) to have utilized SBA than Hindus a finding more likely to be accounted for by decreased sample heterogeneity than by changing behaviour.

Ethnicity was also a strong predictor: Brahmin/Chhetri (OR = 0.25, p = 0.019) and Janjati (OR = 0.18, p = 0.017) women were appreciably lower users of SBA than Dalit women (reference), reflecting long-standing caste-related disparities in utilization of maternal-health care within the province. Educational status was the strongest predictor primary educated women were seven times (OR = 6.85, p = 0.007) and secondary educated women over thirty-five times (OR = 35.32, p = 0.003) more likely to have received skilled care at delivery compared to uneducated women. This suggests the catalytic influence of education on maternal health system negotiation capacity, autonomy, and knowledge. Its economic status was also rated: SBA use had considerably higher

odds (OR = 12.91, p = 0.07) for women in the more affluent compared to the poorest group, and middle income group (OR = 2.50, p = 0.10) experienced weak positive correlation. Though residence (urban or rural) was not significant, the negative coefficient (OR = 0.77) still reflects infrastructural and access to service deficits in rural women. Overall, regression findings affirm that economic empowerment and education remain determinants of skilled delivery while geography and social class continue to have bearing on differentials in maternal-health service utilisation.

4. Discussion

This study examined determinants of skilled birth attendance (SBA) in reproductive age women of Gandaki Province, Nepal, based on the 2022 Nepal Demographic and Health Survey. The findings indicate that education, wealth status, and caste/ethnicity are the most predictive factors for SBA usage, with age, parity, and residence having context-specific impacts. These tendencies in this provincial test concur with global and regional findings displaying that mothers' education and household wealth always predict increased use of professional delivery care (Adhikari et al., 2023; Moyer & Mustafa, 2021). Women's education makes them more health literate, independent, and able to recognize obstetric danger signs—criteria closely linked with facility-based deliveries in a timely manner (Kumar et al., 2023). Similarly, wealthier families are able to pay for delivery and transport fees even where services are ostensibly free (Rahman et al., 2020). The far higher probability of SBA use in better-educated women (OR = 35.3) confirms education as a transformative predictor, echoing results for Ethiopia (Shibre et al., 2021) and Bangladesh (Kabir et al., 2022).

Age-related effects were less predictable. Younger (below 20 years) and 20–24 years old women showed differential use of SBA, presumably because of targeted health communication for teenage pregnancy and postponed seeking of health by slightly older women with household responsibilities. Previous Nepal-specific studies documented similar nonlinear patterns, where teen mothers had a greater proportion of institutional births according to risk perception and community mobilization, and women aged 25–29 were less likely to receive skilled care (Paudel et al., 2017). Birth order, though not statistically significant, showed a declining trend of SBA utilization with rising parity. The finding is in keeping with studies in sub-Saharan Africa and South Asia, where multiparous women use previous delivery experience and overestimate risk (Okedo-Alex et al., 2020; Hounton et al., 2019). Interventions should thus target the education of risk and continued engagement of multiparous mothers by use of community-based counseling. Ethnicity and caste remain firmly rooted structural determinants of maternal healthcare availability in Nepal. The regression results imply lower SBA use odds in Janjati and Brahmin/Chhetri women compared with Dalit groups. While this is perhaps counterintuitively, qualitative data indicate greater health service use through Dalit-focused inclusion schemes and NGO outreach in poor clusters (Sharma et al., 2021).

In contrast, Janjati populations living in distant hills will have a tendency to face terrain and transport challenges, in line with evidence that geographic isolation combines with ethnicity to compound inequality (Mishra & Retherford, 2022). Such inequalities point to the need for decentralised provincial effort to raise midwifery coverage and birth-center readiness in hilly wards, as in the WHO universal skilled care recommendations (WHO, 2023). The analysis further indicated a high gradient of wealth in SBA use. More affluent households were over twelve times more likely to be provided with expert care, which is supported by cross-

national evidence that economic barriers transport, opportunity cost, and indirect payments remain some of the most significant constraints to the use of maternal health services (Campbell et al., 2018; Singh et al., 2022).

The inequities do exist even in settings where free delivery policies are in place, suggesting that protection from cost alone is not enough to guarantee equitable use in the absence of quality and access enhancement. Poor correlation between residence location and SBA use ($p > 0.05$) suggests province-level investment in infrastructure has begun to close the rural-urban gap, but even the odds ratio is less than one, suggesting lingering inequality in rural towns, which aligns with Ethiopian and Pakistani hill region trends (Mekonnen et al., 2019; Khalid et al., 2021).

Policy implications of this study are significant. First, mandatory education for women and inclusion of reproductive-health literacy as part of school curricula would yield long-term returns in maternal survival. Second, community health volunteer and mobile midwifery service contact with high-parity and rural women can bridge behavioral and logistical gaps. Thirdly, locally responsive interventions are required to address ethnic inequities, such as maternity waiting homes and culturally responsive care, as per Nepal's National Health Sector Strategy (MoHP, 2022). Lastly, quality and respect in maternity care should be enhanced, as studies show perceived disrespect dissuades repeat facility delivery even among educated women (Bohren et al., 2019).

In conclusion, this study confirms that maternal health results shows that influenced by overlapping socio-economic and cultural determinants rather than individual characteristics only. The province-level focus gives a close-up perspective missing in national aggregates, showing how education and wealth reinforce the benefits of preparedness in health systems, while social exclusion and geography still pose obstacles to equitable progress. Addressing these interlinked drivers is central to the success of Sustainable Development Goal 3.1 and to allowing all women in Nepal, regardless of caste, education, or location, to give birth safely under skilled care.

5. Conclusion

The study examined the determinants of skilled birth attendance (SBA) among reproductive-age women in Gandaki Province, Nepal, using the 2022 Nepal Demographic and Health Survey. This shows that the utilization of SBA is tremendously driven by education, wealth, and social stratification. Women who were more educated and economically positioned were far more likely to deliver with professional personnel, while those from marginalized ethnic groups such as Janjati had less access to professional care. While the age, parity, and residence variables were not always statistically significant on their own, rural and high-parity women remained more vulnerable to non-utilization due to restricted health facility access and infrastructure-related barriers.

To achieve equal access to maternal health, the study suggests removing socio-economic and education disparities and improving accessibility of services among rural areas. Incorporation of reproductive health education in school curricula, and maternity waiting homes, and culturally acceptable maternal health services will also come in handy. Development of birth center readiness, scale-up of emergency obstetric care, and equipment for community health volunteers will also enhance the utilization of skilled delivery. The multi-dimensional interventions will help and indeed the entire country shift towards universal, equitable, and safe maternal health.

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