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Factors Associated with Skilled Birth Attendance in Nepal

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Abstract

The purpose of this study is to examine the prevalence and factors associated with skilled birth attendance among married women aged 15-49 years in Nepal. This study uses data from the Nepal Multiple Indicator Cluster Survey (MICS) 2019 and is a nationally representative cross-sectional survey. More than three-quarters of women had a skilled birth attendant at delivery. The prevalence of skilled birth attendance varies widely among women of demographic and socioeconomic backgrounds. Adjusted logistic regression analysis revealed that women in Sudurpaschim province, migrant women, women who attained secondary and higher education levels, women in poor, middle, rich, and richest household status, women with health insurance, and women who attended at least four ANC visits had higher odd of skilled birth attendance at delivery. Women with two, three, and four or more parity, women from the Terai caste, Muslim women, and women from Madhesh province had lower odds of skilled birth attendance at delivery. All programs and interventions should prioritize multiparous women, women from disadvantaged groups and low socio-economic status, and expansion of health insurance to improve skilled birth attendants at delivery.

Keywords: Bivariate analysis, factors associated, multivariate analysis, Nepal multiple indicator cluster survey, skilled birth attendance

Introduction

Despite the advancements in maternal health services and other initiatives, maternal health remains an important concern in developing countries. Sustainable Development Goal 3 aims to reduce the global maternal mortality ratio to less than 70 per 100,000 live births by 2030 (United Nations, 2015). In low-and middle-income countries, maternal mortality is high (Alkema et al., 2016). More than 90 percent of global maternal deaths occurred in low-and middle-income countries

and 20 percent in Southern Asia (World Health Organization, 2019). Reducing maternal mortality depends on the utilization of maternal health services during pregnancy, childbirth, and after delivery. The use of skilled birth attendants during delivery, in particular, is essential for reducing maternal mortality and morbidity (Ahinkorah et al., 2021; Denise et al., 2019).

Maternal health services refer to the health care that a woman receives during her pregnancy, during childbirth, and immediately after delivery, which is vital to the well-being of the mother and newborn children. The use of maternal health services is increasing in Nepal but is still lower than in India and the Maldives. In 2016, 58 percent of births in Nepal were assisted by skilled birth assistants (Ministry of Health et al., 2017). Similarly, in India, 81 percent of births were assisted by skilled birth attendance (International Institute for Population Sciences & ICF, 2017) and 99 percent of births were assisted by a skilled birth attendance in Maldives (Ministry of Health & ICF, 2018).

A study using data from the 2018 Guinea Demographic and Health Survey found that the use of skilled birth attendance is influenced by a range of socio-economic and contextual factors. This study found that women's education, parent's education, household wealth status, religion, pregnancy intention, place of residence, parity, health care decision-making, media exposure, and sex of household head were significant predictors of skilled birth assistance service utilization among women in Guinea (Ahinkorah et al., 2021). A study from Kenya revealed that skilled birth attendance was associated with a woman's age, education level, average family income, parity, distance to the health facility, timing of initiation of antenatal care (ANC), birth preparedness status, and level of facility attended during pregnancy (Gitonga, 2017). Another study from Tanzania showed that 4+ANC visits, having a secondary and above level of education were associated with increased skilled birth attendance use during childbirth. Women having two or three more children, and increased distance to health facilities were less likely to have skilled birth attendance during childbirth (Damian et al., 2020).

A cross-sectional study conducted in South West Shao Zone of Ethiopia found that urban residence, household wealth status, parity, knowledge of required ANC visits, perceived quality of care, pregnancy/delivery problems, decision on delivery place, and birth preparedness were significantly associated with skilled birth attendants (Wilunda et al., 2015).

A study from India showed that place of residence, education level, exposure to media, religion, body mass index, household wealth status, tetanus shot status,

ANC visits, and birth order were associated with skilled birth attendance during home delivery (Islam et al., 2024) .

A study from Nepal showed that parity, maternal education, ANC visits, birth planning, and distance to health facilities were significant determinants of skilled birth attendance. Primiparous mothers, mothers with secondary or higher education, mothers with at least one ANC visit, mothers with good birth planning, and mothers living near the health facility were more likely to use skilled birth attendance during delivery (Shah & Simoes, 2022).

Another study by Chalise et al. (2019) showed that place of residence, ecological region, ethnicity, head of household education, wealth index, women's education, access to media, and the number of births were significantly associated with the continuum from ANC services to skilled birth attendants at delivery. Another community-based survey found that women's education, the number of children, and the distance to health facilities were significantly associated with the utilization of maternal health services (Ghimire et al., 2021).

Skilled birth attendance is crucial for the timely identification of signs of complications and management of factors influencing childbirth (Jacobs et al., 2017). The 2022 Nepal Demographic and Health Survey showed that 81 percent of births were assisted by a skilled provider such as a doctor, nurse, or midwife, and 2 percent of births were assisted by a health assistant, maternal and child health worker, and female community health volunteer, 6 percent of births take place with the assistance of traditional birth attendants, and 10 percent of births are assisted by relatives or another person (Ministry of Health Population & ICF, 2023).

The 2019 Nepal Multiple Indicator Cluster Survey showed that 77 percent of births are assisted by skilled birth attendants such as a doctor, nurse, or midwifery, 6 percent of births are assisted by a health assistant, maternal child health worker, rural health worker, and female community health volunteer, 2 percent of births assisted by traditional birth attendants and 16 percent of birth to women were delivered by relatives or other people (Central Bureau of Statistics, 2020).

The objective of this study is to examine the prevalence and factors associated with skilled birth attendance of women aged 15-49 at delivery in Nepal.

Materials and Methods

This cross-sectional study used data from the Nepal Multiple Indicator Cluster Survey (MICS) 2019. Data for analysis were extracted from individual

women and household record files, which are publicly available to researchers. The dataset is obtained with permission from the UNICEF/MICS website (http://mics.unicef.org/surveys). This survey was conducted by the Central Bureau of Statistics in 2019 with technical and financial support from the United Nations Children's Fund (UNICEF) under the sixth round of the Global MICS program. This survey aimed to collect data on reproductive health, child health, education, water and sanitation, social protection, early marriage, access to media, and demographic, socioeconomic, and geographical characteristics at individual and household levels for monitoring the situation of children and women at the national level.

This survey used a two-stage sampling design. The first stage involved the selection of enumeration areas (EAs) from each sampling stratum. In the second stage, a sample of households was selected from the list of households within the selected EA. In this survey, 12800 sample households were selected from 512 enumeration areas. However, only 12655 households were interviewed, and 15019 women aged 15-49 years were identified. Of these, 14805 women were successfully interviewed, representing a response rate of 98.6 percent. A detailed description of the sampling design in MICS and its methodology can be found in the Nepal MICS 2019 Survey Finding Report (Central Bureau of Statistics, 2020). The study population consists of married women of childbearing ages 15-49 who had a live birth within the last two years of the survey. The analytical sample population for this study is limited to 1950 married women (weighted).

Independent Variables

The selection of independent variables is based on the evidence from previous studies. The independent variables include the age of women, women's education level, parity, place of residence, province, exposure to mass media, caste/ethnicity, religion, mother's age at most recent live birth, wealth index quintile, migration status, ANC visits, and health insurance.

Table 1.
Categorization of Study Variables

Study variable	Categories
Dependent variable	
Skilled birth attendants (SBA)	0 = delivery conducted by unskilled birth attendants 1 = delivery conducted by skilled birth attendants
Independent variables	
Age of women	1= 15-19; 2= 20-24; 3= 30-39
Mother's age at recent birth	1= <20; 2= 20-30; 3= 35-49
Parity	1= 1 parity; 2= 2 parity; 3= 3 parity; 4= 4 or more parity

Caste/ethnicity	1= Brahman/Chhetri; 2= Terai caste; 3= Dalit; 4= Janajati; 5= Muslim
Religion	1= Hindu; 2= Buddha; 3= Muslim; 4= Others
Province	1= Koshi; 2= Madhesh; 3= Bagmati; 4= Gandaki; 5= Lumbini; 6= Karnali; 7= Sudurpaschim
Migration status	1= Urban migrants; 2= Rural migrants; 3= Urban non-migrants; 4= Rural non-migrants
Women's education	0= No education; 1= Basic education (Grade 1-8); 2= Secondary education (Grade 9-12); 3= Higher level education
Wealth index quintile	1= Poorest; 2= Poor; 3= Middle; 4= Rich; 5= Richest
Health insurance	0= No: 1= Yes
Exposure to media	0= Not exposed; 1= Exposed
ANC visit	0 = less than 4 ANC visit, 1= 4 or more ANC visit

Outcome Variables

SBA is the main dichotomous outcome variable. Delivery of the most recent birth performed by health assistants, maternal child health workers, rural health workers, traditional birth attendants, female community health volunteers, relatives, and others in the two years preceding the survey was considered unskilled birth attendants, which is coded as '0', and delivery of most recent birth assisted by doctors, nurses or midwives in the two years before the survey was considered as skilled attendants and are coded as '1'.

Data Analysis

This study employed univariate, bivariate, and multivariate analysis. Univariate analysis is used to analyze the background characteristics of women. The bivariate analysis is used to observe the association of independent variables with skilled birth attendants. Multivariate logistic regression is employed to examine the factors associated with skilled birth attendance during delivery. All the variables are considered statistically significant at $p<0.05$. Multi-collinearity test was performed among all the statistically significant variables in the bivariate analysis. The results of multivariate logistic regression are expressed as unadjusted and adjusted odds ratios with 95% confidence intervals. Analysis of data was performed using STATA version 15.1.

Results and Discussion

Socio-Demographic Characteristics

Table 2 shows the demographic characteristics of the respondents. More than two-thirds of women were in the 20-29 age group, while one-fifth of women

were in the 30-39 age group. Three-quarters of the women had given birth to their last child at the age of 20-34 years. About 44 percent of women had one child and 33 percent of women had two children. One-third of the women belonged to Janajati (35%), followed by Brahman/Chhetri (28%). Most of the women were Hindu (84%), from Madhesh province (21%) followed by Bagmati (20%), Lumbini (19%), and Koshi (16%)., rural migrants (71%), had secondary education (40%), were from poor household status (44%), did not have health insurance (95%), were exposed to media (62%), and made ANC visits (78%).

Table 2

Distribution of Women Who Had a Birth in the Last Two Years

Characteristics	%	N
Age of women		
15-19	10.3	201
20-29	67.6	1318
30-39	19.9	388
40-49	2.2	43
Mother's age at birth		
<20	17.0	331
20-34	77.8	1517
35-49	5.3	103
Parity		
One	43.7	851
Two	33.0	644
Three	12.8	250
Four or above	10.5	205
Caste/ethnicity		
Brahman/Chhetri	27.7	540
Terai caste other	15.4	300
Dalit	15.9	310
Janajati	34.8	679
Muslim	6.3	122
Religion		
Hindu	84.1	1640
Buddhist	6.3	123
Islam	5.5	108
Other	4.1	80
Province		

Characteristics	%	N
Koshi	15.7	306
Madhesh	21.4	417
Bagmati	19.7	384
Gandaki	7.9	153
Lumbini	19.0	371
Karnali	6.8	132
Sudurpaschim	9.6	187
Migration stream		
Urban migrants	19.5	381
Rural migrants	71	1385
Urban non-migrants	5.7	111
Rural non-migrants	3.8	73
Women's education		
No	20.7	405
Basic	30.7	600
Secondary	39.7	775
Higher	8.8	171
Wealth quintile		
Poorest	22.7	442
Poor	21.2	414
Middle	19.7	384
Rich	19.7	384
Richest	16.7	327
Health insurance		
No	95.2	1856
Yes	4.8	94
Media exposure		
Not exposed	38.1	743
Exposed	61.9	1207
ANC visit		
No	22.2	433
Yes	77.8	1517
Skilled birth attendance		
No	22.8	444
Yes	77.2	1506
Total	100.0	1950

Source. Nepal Multiple Indicator Cluster Survery 2079

More than three-quarter of women had a skilled birth attandent at delivery. However, the prevalence of skilled birth attendance varied widely among women of different demographic and socioeconomic identifications.

Factors Associated with Skilled Birth Attendance

Table 3 shows that skilled birth attendance at delivery was higher among women of younger age, women who were less than 20 years old at birth, women of first parity, women belonging to Brahaman/Chhetri, women belonging to Hindus, and women from Bagmati province followed by Gandaki province. Rural non-migrants, educated women, women from rich wealth quintiles, women with health insurance, women with media exposure, and women who had received an ANC visit had a higher proportion of skilled birth attendance.

Table 3

The Proportion of Skilled Birth Attendance at Delivery

	Skilled birth attendance		Unadjusted		Adjusted	
Variables	%	[95% CI]	OR	95% CI	aOR	95% CI
Age group						
15-19	79.7	[72.6-85.4]				
20-29	78.1	[74.8-81.1]	0.91	[0.61-1.35]		
30-39	73.7	[68.9-77.9]	0.71	[0.46-1.09]		
40-49	69.1	[54.8-80.5]	0.57	[0.27-1.19]		
Mother's age at birth						
<20	80.9	[76.0-85.0]				
20-34	76.8	[73.7-79.7]	0.78	[0.59-1.03]	1.08	[0.74-1.57]
35-49	70.8	[61.5-78.6]	0.57*	[0.34-0.96]	1.64	[0.78-3.43]
Parity						
One	87.2	[84.1-89.7]	1.00		1.00	
Two	78.8	[75.0-82.2]	0.55***	[0.41-0.73]	0.54***	[0.38-0.77]
Three	58.2	[51.6-64.6]	0.21***	[0.15-0.29]	0.33***	[0.22-0.49]

	Skilled birth attendance		Unadjusted		Adjusted	
Variables	%	[95% CI]	OR	95% CI	aOR	95% CI
Four or above	53.9	[46.4-61.3]	0.17***	[0.12-0.25]	0.38***	[0.22-0.64]
Caste/ethnicity						
Brahman/Chhetri	87.1	[83.4-90.1]	1.00		1.00	
Terai caste	63.8	[55.7-71.2]	0.26***	[0.17-0.41]	0.45**	[0.26-0.80]
Dalit	71.1	[65.5-76.2]	0.37***	[0.25-0.53]	0.74	[0.48-1.14]
Janajati	79.5	[74.1-83.9]	0.57**	[0.38-0.86]	0.70	[0.45-1.09]
Muslim	69.4	[59.7-77.6]	0.34***	[0.20-0.56]	1.98	[0.79-4.96]
Religion						
Hindu	78.5	[75.6-81.1]	1.00		1.00	
Buddhist	76.3	[66.0-84.3]	0.88	[0.52-1.50]	0.97	[0.53-1.77]
Muslim	62.7	[52.6-71.9]	0.46***	[0.30-0.71]	0.19***	[0.08-0.50]
Other	71.6	[53.1-84.8]	0.69	[0.31-1.51]	0.65	[0.35-1.22]
Province						
Karnali	65.8	[56.4-74.0]	1.00		1.00	
Koshi	79.2	[70.4-86.0]	1.98*	[1.07-3.68]	0.91	[0.46-1.81]
Madhesh	63.6	[56.7-70.0]	0.91	[0.56-1.49]	0.44*	[0.22-0.87]
Bagmati	86.6	[79.5-91.5]	3.36***	[1.76-6.40]	0.63	[0.31-1.28]
Gandaki	86.4	[80.1-91.0]	3.32***	[1.81-6.10]	0.65	[0.34-1.26]
Lumbini	77.2	[70.3-82.9]	1.76*	[1.03-3.01]	0.66	[0.36-1.24]
Sudurpaschim	85.5	[79.4-90.0]	3.08***	[1.72-5.50]	1.87*	[1.01-3.48]
Migration status						
Rural non-migrants	91.9	[87.9-94.6]	1.00		1.00	
Urban migrants	73.7	[70.6-76.5]	5.72***	[3.03-10.79]	2.07*	[1.08-4.00]

	Skilled birth attendance		Unadjusted		Adjusted	
Variables	%	[95% CI]	OR	95% CI	aOR	95% CI
Rural migrants	78.5	[64.9-87.8]	1.41	[0.88-2.28]	1.06	[0.64-1.76]
Urban non-migrants	66.4	[55.1-76.1]	1.85	[0.80-4.24]	1.28	[0.54-3.04]
Women's education						
No education	53.0	[47.3-58.5]	1.00		1.00	
Basic	75.3	[70.7-79.3]	2.70***	[2.03-3.59]	1.36	[0.96-1.94]
Secondary	86.7	[83.4-89.5]	5.81***	[4.19-8.06]	1.55*	[1.04-2.32]
Higher	98.3	[95.7-99.3]	49.98***	[19.31-129.39]	5.01**	[1.70-14.78]
Wealth quintile						
Poorest	57.7	[51.7-63.4]	1.00		1.00	
Poor	72.4	[66.9-77.3]	1.92***	[1.39-2.67]	3.13***	[2.01-4.90]
Middle	80.5	[75.3-84.8]	3.03***	[2.05-4.47]	5.72***	[3.48-9.39]
Rich	87.0	[82.3-90.7]	4.93***	[3.18-7.65]	7.39***	[4.13-13.23]
Richest	94.4	[89.9-96.9]	12.36***	[6.29-24.29]	7.90***	[3.67-17.04]
Health insurance						
No	76.3	[73.3-79.0]	1.00		1.00	
Yes	95.3	[90.0-97.9]	6.36***	[2.80-14.45]	3.59**	[1.49-8.63]
Media exposure						
No exposed	65.0	[60.5-69.3]	1.00		1.00	
Exposed	84.7	[82.0-87.1]	2.99***	[2.33-3.84]	1.11	[0.81-1.52]
ANC visit						
No	49.1	[43.5-54.8]	1.00		1.00	
Yes	85.2	[82.7-87.5]	5.97***	[4.53-7.88]	3.04***	[2.21-4.19]

Note. *** p<0.001, ** p<0.01, * p<0.05

The results of bivariate logistic regression analysis showed that the mother's age at birth, parity, caste/ethnicity, religion (Muslim), province, migration status (urban migrants), women's education, household wealth quintile, health insurance, and ANC visit were significantly associated with a skilled birth attendant during delivery. In the multivariate logistic regression analysis, all variables except the mother's age at birth and media exposure continued to have a statistically significant effect on the likelihood of women using skilled birth attendants during delivery. Women with parity two, three, and four or more were 46 percent, 67 percent, and 62 percent less likely to have skilled birth attendants (aOR=0.54, 95% CI: 0.38-0.77), (aOR=0.33, 95% CI: 0.22-0.49), (aOR=0.38, 95% CI: 0.22-0.64) than women with parity one. The result indicates that multiparous women are less likely to have a skilled birth attendant at delivery compared with primiparous women. This result is similar to previous studies from Ghana (Manyeh et al., 2017) and Cameroon (Yaya et al., 2021). Higher parity women have experience and self-confidence in childbirth, and they believe that childbirth is a natural process. Therefore, they are less likely to use skilled birth attendants at delivery.

Women from other Terai castes were significantly less likely to have skilled birth attendants (aOR=0.45, 95% CI: 0.26-0.80) than women from Brahman/Chhetri. Similar to this finding, a previous study showed that women belonging to other Terai castes were less likely to utilize safe motherhood services (Adhikari, 2017). Muslim women were 81 percent less likely to have a skilled birth attendant during delivery (aOR=0.19, 95% CI: 0.08-0.50) compared to Hindu women. This is consistent with previous studies (Sk et al., 2017), which emphasize that religious belief could be one of the reasons for the lower use of skilled birth attendants among Muslim women. Studies from Guinea (Ahinkorah et al., 2021) and India (Singh et al., 2021) showed that Muslim women were less likely to use a skilled birth attendant. A review by Baral et al. (2010) found that some socio-cultural and religious beliefs regarding pregnancy have prevented women from accessing and utilizing the assistance of skilled birth attendants during delivery. The study also stated that Brahman/Chhetri and Newar were more likely to give birth with the assistance of skilled birth attendants than other social groups in Nepal.

Women living in the Madhesh province were less likely to have skilled birth attendants (aOR=0.44, 95% CI: 0.22-0.87), whereas women living in the Sudurpaschim province were more likely to have skilled birth attendants (aOR=1.87, 95% CI: 1.01-3.48) than women living in Koshi province. Madhesh province appeared to be more disadvantaged, whereas Sudurpaschim province appeared to be better off in terms of skilled birth attendance at delivery. A possible explanation for these results could be the socioeconomic and cultural factors of the respective provinces. This finding requires further explanation.

The odds of skilled birth attendance were higher for urban migrant women (aOR=2.07, 95% CI: 1.08-4.00) compared to rural non-migrant women. The possible explanation for this result is that urban areas have access to maternal healthcare facilities and skilled providers. Urban migrants may have better education and better economic opportunities and be able to afford delivery services. This, in turn, leads to a greater use of skill birth attendance at delivery among urban migrants.

Women with secondary education have 1.55 times higher odds) of skilled birth attendance at delivery and women with higher levels of education have 5.01 times higher odds (aOR=5.01, 95% CI: 1.70-14.78) of skilled birth attendance at delivery than those with no education. These findings are similar to previous studies from Nepal (Choulagai et al., 2013; Sk et al., 2017), Cameroon (Yaya et al., 2021), Guinea (Ahinkorah et al., 2021), and India (Kumar, 2018; Singh et al., 2021), which concluded that women's education strongly predicts skilled birth attendance during delivery. This is because education improves women's health literacy and their ability to make appropriate health decisions, which can positively impact the use of skilled birth attendance during delivery.

According to the findings of the analysis, women in poor household wealth have 3.13 times, women in middle household wealth have 5.72 times, women in rich household wealth have 7.39 times, and women in richest households have 7.90 times higher odds of skilled birth attendance at delivery compared to women in the poorest household wealth. The results suggest that women from wealthier households had a higher propensity to use skilled birth attendants at delivery than women from poor households. The results of previous studies showed that women from the richest household wealth were more likely to have a skilled birth attendance than women from poor household wealth (Ahinkorah et al., 2021; Kumar, 2018; Manyeh et al., 2017; Singh et al., 2021; Sk et al., 2017). Women belonging to wealthier households are better educated, have high incomes and living standards, and can afford the costs of delivery and medications. In contrast, women from poor households are often uneducated, have low living standards, and are unable to pay delivery costs, making it difficult for them to access skilled birth attendants at delivery.

Women with health insurance have 3.96 times higher odds of skilled birth attendance at delivery (aOR= 3.59, 95% CI: 1.49-8.63) compared to women without health insurance. This result is consistent with previous studies of Ghana (Amoakoh-Coleman et al., 2015; Khan & Singh, 2016) and Togo (Mati et al., 2018). However, this finding contradicts previous studies from Sierra Leone, Niger, and Mali (Ameyaw & Dickson, 2020) and Madagascar (Armah-Ansah et al., 2023).

Women who attended four or more ANC visits had higher odds of skilled birth attendance (aOR= 3.04, 95% CI: 2.21–4.19) compared with women who attained less than four ANC visits. This finding is similar to previous studies of Northern Nigeria (Afape et al., 2024), Sierra Leone, Niger, and Mali (Ameyaw & Dickson, 2020) and Tanzania (Damian et al., 2020).

Antenatal care visits inform women and families about the complications of pregnancy and the risk of delivery. Therefore women who visit ANC tend to undergo delivery with the assistance of a skilled health care provider (Central Bureau of Statistics, 2020).

The major strength of this study is the use of nationally representative data from the Nepal Multiple Indicator Cluster Survey 2019, which facilitates the generalisability of the findings. However, as the data are cross-sectional, it is not possible to establish the causal relationship between the outcome variable and independent variables.

Conclusion

The analysis revealed that parity, women's education, household wealth status, health insurance, media exposure, and ANC visits are important predictors, as they are independently associated with skilled birth attendance. Women having two or more births are less likely to utilize four or more ANC visits and skilled birth attendants at delivery. Therefore, health intervention should prioritize multiparous women to improve skilled birth attendance at delivery. Women's education and household wealth status are positively associated with skilled birth attendants. Therefore, all programs and activities should focus on education and income-generating programs for women to improve their status and utilization of skilled birth attendance. Women from disadvantaged groups should be targeted for health promotion, social mobilization, and community awareness programs. Given the low coverage and positive impact on the use of skilled birth attendants, the health insurance program should be expanded to all communities, with a focus on underserved communities and low socio-economic status.

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