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Factors Affecting Place of Delivery in Nepal: Evidence From the Nepal Demographic and Health Survey, 2016

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Research article

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Abstract

Background: Maternal health is still a public health problem in Nepal though it has been improving in the last decade. In Nepal, choosing an institution for delivery and behavior searching for antenatal care (ANC) services have improved since the 1990s. However, a large percentage of women still deliver at home. Studies conducted in developing countries including Nepal presents that various demographic, socio-economic, and economic factors are associated with place of delivery.

Methodology: The study was a cross-sectional study. Nepal Demographic and Health Survey (NDHS), 2016 data set were utilized. The likelihood of utilization of institutional delivery among 3998 ever-married women who had at least one live birth in the five years preceding the survey was analyzed in terms of women's demographic, socio-economic, and empowerment status in Nepal. Bivariate logistic regression analysis technique was used to examine the effects of these variables in the use of institutional delivery.

Results: The study shows that large variation and gaps exist among women in Nepal in the utilization of an institution for delivery. Factors like women's age, parity, age at first birth, level of women's education, husband's education, household wealth status and women's decision making power strongly influence women to choose the place of delivery in Nepal.

Conclusion: This study concludes that different maternal health programs ought to design in order to encourage women for institutional delivery. Coverage along with the quality of interventions that are under operation should be improved. Health programs should be targeted to poor, less educated, young women especially in rural, marginalized, and disadvantaged communities as these particular groups of women are less likely to utilize maternal health services. Finally, there is a need for qualitative research to explore the utilization of maternal health services among women.

Background

Nepal with a population of about 27 million, has been ranked with the highest level of maternal mortality (1). Between 1996 and 2016, the maternal mortality ratio has reduced from 539 to 239 per 100,000 live births (1) (2). However, this reduction ratio is slow. In Nepal, various groups have diverse cultural beliefs concerning pregnancy and delivery care (3). In many communities, being pregnant is taken culturally as a subject of fate. (4). However, in fact, maternal health refers to the health of women during pregnancy, childbirth, and the post-natal period, that encompasses the health care dimensions of family planning, preconception, prenatal and postnatal care in order to reduce maternal mortality and morbidity (5). Similarly, maternal death or maternal mortality is defined by World Health Organization (WHO) as "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any causes related to or aggravated by the pregnancy or its management but not from accidental or incidental causes" (6).

Chiefly, maternal death takes place in developing countries rather than in developed countries. Nepal, like other countries in South Asia, has long been overburdened with maternal health problems (6). According

to Nepal Maternal Morbidity and Mortality Survey (NMMMS) 2008/09, 41% of maternal deaths take place at health institutions, 40% at home, and 14% on the way to health facilities (2) (1). The NMMMS survey also reported that in Nepal 69% of maternal deaths were due to direct causes that include hemorrhage, then eclampsia, abortion-related complications, gastroenteritis, and anemia while 31% were due to indirect causes (7) (8).

As per WHO postpartum hemorrhage, unsafe abortion, infection, preeclampsia, and long obstructive labor are the major causes of maternal death in Nepal. (7).

An important measure to minimize maternal mortality is to make quality maternal health services affordable, accessible, and increase the timely utilization of those services.

Nepal has set a target of 70 percent to achieve all deliveries by SBAs and at institutions by 2020 in order to achieve the SDG target in 2030. Safe motherhood is one of the prioritized program in Nepal and thus promoting safe motherhood through different initiatives such as the provision of the aama and newborn program. Under this program, every woman immediately after institutional delivery gets a cash payment of NPR 3,000 in mountains, NPR 2,000 in hills, and NPR 1,000 in Terai districts as transportation incentives. As 4 ANC incentives, women get NPR 800 on completion of four ANC visits at 4, 6, 8, and 9 months of pregnancy. Institutional delivery and postnatal care services are freely available through birthing centers and hospitals. Further, under the nyano jhola program, every woman who gives birth at health facilities gets two sets of clothes (bhoto, daura, napkin, and cap) for newborns and mothers, and one set of the wrapper, mat for baby, and gown for mother. The provision is made to protect newborns from hypothermia and infections and to improve the utilization of birthing centers located at the local level. Moreover, subsidies are also provided to health facilities for free delivery care based on deliveries conducted (8).

The literature on factors affecting place of delivery showed the effects of various demographic, socio-economic, and empowerment factors either women deliver in an institution or at home. The studies have revealed that various demographic, socio-economic and empowerment factors play an important role to determine the place of delivery in Nepal. Particularly in Nepal, women's age, caste, ethnicity, parity, education of mother and spouse, occupation, household income, time to reach the nearest health facility, decision-making powers, and harmful cultural practices & traditions are the major factors affecting the usage of institutional delivery. (9) (10) (11) (12).

Against this background, this paper aims to answer the research question: **What are the demographic, socio-economic, and empowerment factors among women that could affect the place of delivery in Nepal?**

The Nepal Demographic Health Survey presents information about the place of delivery only on status, trends, and patterns by background information. Whereas further analysis of NDHS reports analyzed data set of women who met both criteria i.e had a live birth in the 5 years preceding the survey and experienced domestic violence. However, this paper presents rigorous analysis derived from cross-

tabulation and logistic regression examining the effect of various demographic, socio-economic, and empowerment factors on the place of delivery. The findings of this study might be helpful for program planners and policy in order to generate policy and design specific maternal health programs aiming at different provinces, rural communities, and different social groups in Nepal.

Methods

Source of data

Nepal Demographic Health Survey (DHS), 2016 data sets were analyzed for this study. This is a nationally representative survey and is the fifth survey carried out in Nepal as a part of the global DHS project.

Sample size

Ever Married Women (EMW) who had at least one live birth within five years before the survey was the unit of analysis for the study. The utilization behavior of maternal health services related to the most recent pregnancy was examined for EMW who had more than one birth within five years. Based on study objectives, the sample size for this study consists of 3998 EMW.

Variables

Dependent variable

“Place of delivery” was taken as a dependent variable. Place of delivery was further categorized as home delivery (for the birth that took place at home) and institutional delivery (for the birth that took place at a hospital or primary health care center or a health facility).

Independent variables

Independent variables in this study were demographic factors, socio-economic factors, and empowerment factors. Demographic factors have included age of women, age at first birth, and children ever born. Socio-economic factors have included distance to the nearest government health facility, availability of female health worker in the health facility, getting money for treatment, educational attainment of women, educational attainment of husband, and wealth quintiles while getting permission to go to the health facility, the decision on large household purchases, the decision on respondent's health care and decision on a visit to family or relatives were among empowerment factors.

Data analysis

The relationship between the dependent and independent variables was examined using bivariate analysis (Pearson’s $\chi 2$ test), while to determine the adjusted effect of every factor on the dependent

variable, a binary logistic regression was done. The result of logistic regression was shown by OR with 95% CI. The statistical analysis was done with the help of SPSS 21 for windows.

Results

Results revealed that among every woman who had given birth more than once in the last 5 years before the survey, 62% of women had delivered in an institution.

Table 1: Percent distribution of respondents by the place of delivery

Description	Number	Percent
Home delivery	1521	38.0
Institutional delivery	2477	62.0
Total	**3998**	**100**

Source: NDHS 2016 data sets.

Weights are applied

The total might not equal to 100.0 as a result of rounding off of cases.

Table 2: Percent distribution and odds ratio from binary logistic regression for the place of delivery by demographic characteristics among ever-married women who had at least one live birth in 5 years preceding the survey in Nepal.

Description	Home delivery	Institutional delivery	Total Respondents	OR (95% CI)	P value
Age Group (N=3998)					
15-24	32.6	67.4	100 (1606)	1	
25-34	40.2	59.8	100 (2033)	0.718 (0.626-0.823)	0.000
35-44	47.9	52.1	100 (340)	0.526 (0.415-0.667)	0.000
45+	94.7	5.3	100 (19)	0.030 (0.004-0.201)	0.000
Total	**38.1**	**61.9**	**100 (3998)**		
Age at First Birth (N=3998)					
10-14	46.0	54.0	100 (63)	1.049 (0.635-1.732)	0.853
15-19	45.1	54.9	100 (1963)	1.667 (1.006-2.762)	0.047
20-24	34.1	65.9	100 (1553)	3.637 (2.080-6.360)	0.000
25-29	19.2	80.8	100 (365)	4.444 (1.850-10.67)	0.001
30+	16.7	83.3	100 (54)	1.00	
Total	**38.1**	**61.9**	**100 (3998)**		
Children Ever Born (N=3998)					
1	33.4	66.6	100 (3031)	2.588 (1.696-3.948)	0.000
2	52.2	47.8	100 (877)	1.190 (0.769-1.841)	0.435
3+	56.7	43.3	100 (90)	1.00	
Total	**38.1**	**61.9**	**100 (3998)**		

Source: NDHS 2016 data sets.

Weights are applied

The total might not equal to 100.0 as a result of rounding off of cases.

Results show that (table 2), more than 2/3rd women (67.4%) delivered in an institution in the age group 15-24. While more than 50% of women in the age group 25-44 delivered in an institution. Similarly, more than 80% of the women who were in their 25 and higher years at the time of their 1st child had delivered in the institution. By parity, more than 2/3rd of women who had only one child had delivered in an institution. Overall findings indicate that women in lower age groups tend to deliver in an institution than the women in higher age groups. While women whose age is above 20 years at the time of their 1st birth

tends to deliver to in the institution than women whose age is below 20 years. Similarly, women who are in their 1st parity tends to deliver in an institution than women who are in their multiple parities.

Logistic regression depicts that, women in the age group 35-44 were 0.53 times less likely to deliver in an institution as compared to women in the 15-24 age group (OR: 0.53; 95% CI: 0.415-0.667). Regarding age at first birth, women between 25-29 years of age were 4.4 times more likely to deliver in an institution as compared to women aged 30 and above at the time of first birth (OR: 4.444; 95% CI: 1.850-10.67). Similarly, women at 1st parity were 2.6 times more likely to deliver in institutions compared with women who were in multiple parities (OR: 2.588; 95% CI: 1.696-3.948). The results are statistically significant at 5% level.

Table 3: Percent distribution and odds ratio from binary logistic regression for the place of delivery by socio-economic characteristics among ever-married women who had at least one live birth in 5 years preceding the survey in Nepal.

Description	Home delivery	Institutional delivery	Total respondents	OR (95% CI)	P Value
Distance to nearest government health facility (N=3997)					
Big problem	45.7	54.3	100 (2328)	0.448 (0.391-0.513)	0.000
Not a big problem	27.4	72.6	100 (1669)	1.00	
Total	**38.1**	**61.9**	**100 (3997)**		
Availability of female health worker in HF (N=3998)					
Big problem	41.5	58.5	100 (2792)	0.607 (0.526-0.702)	0.000
Not a big problem	30.1	69.9	100 (1206)	1.00	
Total	**38.0**	**62.0**	**100 (3998)**		
Get money for treatment (N=3997)					
Big problem	45.3	54.7	100 (2329)	0.471 (0.412-0.538)	0.000
Not a big problem	28.0	72.0	100 (1668)	1.00	
Total	**38.1**	**61.9**	**100 (3997)**		
Educational Attainment of Women (N=3998)					
No Education	60.0	40.0	100 (1257)	1.00	
Primary	46.3	53.7	100 (776)	1.743 (1.455-2.088)	0.000
Secondary or higher	20.8	79.2	100 (1965)	5.731 (4.899-6.705)	0.000
Total	**38.0**	**62.0**	**100 (3998)**		
Educational Attainment of Husband (N=3965)					
No Education	62.5	37.5	100 (542)	1.00	
Primary	38.9	61.1	100 (2680)	2.620 (2.166-3.170)	0.000
Secondary or higher	17.1	82.9	100 (737)	8.076 (6.234-10.46)	0.000
Don't know	66.7	33.3	100 (6)	0.841 (0.150-4.718)	0.841
Total	**38.1**	**61.9**	**100 (3965)**		
Wealth Quintiles (N=3998)					
Poor	54.9	45.1	100 (1660)	1.00	
Middle	37.7	62.3	100 (864)	2.008 (1.697-2.376)	0.000
Rich	19.3	80.7	100 (1474)	5.101 (4.340-5.996)	0.000
Total	**38.1**	**61.9**	**100 (3998)**		

Source: NDHS 2016 data sets.

Weights are applied

The total might not equal to 100.0 as a result of rounding off of cases.

Results illustrate (table 3) that, among every woman who had given birth at least once in the last 5 years before the survey and had delivered in an institution, distance to the health facility was not a big problem

to about 73% women, availability of female health worker was not a big problem to about 70% women and getting money for treatment was not a big problem to 72% women. By education, approximately 80% of women who had secondary or higher levels of education had delivered in the institution, and about 83% of women whose husband had secondary or higher level of education had delivered in the institution. Similarly, regarding the wealth quintile, approximately 63% of women from the middle category and about 81% of women who were from the rich category had delivered in the institution. Overall results indicate that in Nepal accessibility factors like distance to the nearest government health facility, availability of female health workers in HF, and getting money for treatment are not big problems for women to deliver in the institution. Educated and from rich category women and women whose husband are educated tends to deliver in the institution than formally uneducated, poor, and whose husband is formally uneducated.

Logistic regression analysis shows that respondent's education, respondent husband's education, and household economic status had a significant effect on the use of institutional delivery among women. Regarding accessibility factors, the odds of delivering in an institution was higher among women to whom distance to the nearest government health facility was not a big problem, availability of female health worker in HF was not a big problem and getting money for treatment was not a big problem than women to whom distance to the nearest government health facility, availability of female health worker in the HF and getting money for treatment was a big problem respectively. Women who had a secondary or higher degree of schooling were 5.7 times more likely to deliver in institutions compared with women who had no formal schooling (OR: 5.731; 95% CI: 4.899-6.705). Women whose husband had a secondary or higher degree of schooling were 8.08 times more likely to deliver in an institution compared with women whose husband had no formal education (OR: 8.076; 95% CI: 6.234-10.46). Women in the wealthiest class were 5.1 times more likely to had an institutional delivery compared to women in the poorest class (OR: 5.101; 95% CI: 4.340-5.996). The results are statistically significant at 5% level.

Table 4: Percent distribution and odds ratio from binary logistic regression for the place of delivery by empowerment factors among ever-married women who had at least one live birth in 5 years preceding the survey in Nepal.

Description	Home delivery	Institutional delivery	Total respondents	OR (95% CI)	P Value
Getting permission to go to health facility (N=3998)					
Big problem	45.8	54.2	100 (1135)	0.637 (0.554-0.732)	0.000
Not a big problem	35.0	65.0	100 (1863)	1.00	
Total	**38.1**	**61.9**	**100 (3998)**		
Women's participation in decision making					
Decision on large household purchases (N=3966)					
Involvement of Respondent	37.3	62.7	100 (1683)	1.06 (0.931-1.207)	0.380
Without involvement of respondent	38.7	61.3	100 (2283)	1.00	
Total	**38.1**	**61.9**	**100 (3966)**		
Decision on respondent's healthcare (N=3966)					
Involvement of Respondent	35.0	65.0	100 (2036)	1.306 (1.148-1.485)	0.000
Without involvement of respondent	41.3	58.7	100 (1930)	1.00	
Total	**38.1**	**61.9**	**100 (3966)**		
Person who usually decides on visit to family or relatives (N=3966)					
Involvement of Respondent	35.1	64.9	100 (1834)	1.266 (1.113-1.441)	0.000
Without involvement of respondent	40.7	59.3	100 (2132)	1.00	
Total	**38.1**	**61.9**	**100 (3966)**		

Source: NDHS 2016 data sets.

Weights are applied

The total might not equal to 100.0 as a result of rounding off of cases.

Table 4 shows that among every woman who had given birth at least once within the last 5 years before the survey and had delivered in an institution, getting permission to go to the health facility was not a big

problem to about 2/3rd (65%) of the women. Regarding women's involvement in decision making process, about 63% of the women who were involved in the decision-making on large household purchase had delivered in the institution, 65% of the women who were involved in decision making on respondent's health care had delivered in the institution and about 65% of the women who were involved in decision making on a visit to family or relatives had delivered in the institution. Overall results reveal that women with decision-making power tend to deliver in the institution than the women who do not have any role in decision making.

Logistic regression analysis shows that women's role in decision making had a significant effect on the use of institutional delivery among women. Getting permission to go to the health facility was not a big problem for women to deliver in an institution. The probability of being not a big problem was about 37% higher than being a big problem. Women who were involved in making decisions on large household purchases were 1.06 times more likely to deliver in an institution than women who were not involved (OR: 1.06; 95% CI: 0.931-1.207). The result is statistically insignificant at 5% level. Likewise, women who were involved in making decisions on their own health care were 1.3 times more likely to use institutional delivery than women who were not involved (OR: 1.306; 95% CI: 1.148-1.485) which is statistically at 5% level. Similarly, women who were involved in making decisions on visits to family or relatives were 1.3 times more likely to use institutional delivery than women who were not involved (OR: 1.266; 95% CI: 1.113-1.441). The result is statistically significant at 5% level.

Discussion

In 2016, the rate of institutional delivery was 62% based on women who had given birth at least once in the last 5 years before the survey. After controlling available independent factors, young women who were rich, educated, were pregnant for the first time, had decision making power in the family, and had the first child at their higher ages were more likely to choose institutional delivery. The study finds that age, age at 1st birth, parity, level of education, level of husband's education, wealth, and decision making power were potential determinants of institutional delivery.

This study reveals that in Nepal adolescent women (15-24 years) were more likely to search for an institutional delivery in comparison to adult women which is similar to the finding of the study conducted in Nepal using NDHS data 2011 (13). However, another study performed inside the Kaski district of Nepal revealed that women's age was no longer associated with place of delivery (14). The viable reason for the improved use of institutional delivery by adolescent women (15-19 years) might be that they are more conscious of the outcomes of adolescent pregnancy due to the ongoing campaigns to decrease the rates of adolescent pregnancies and enhance maternal health of women in Nepal.

Steady with the findings of different research performed in Nepal and other South Asian nations, this study discovered a sturdy association between parity and use of institutional delivery (13) (15) (16). Women who were pregnant for the first time were more likely to choose an institution for delivery compared to those with 2nd or more pregnancies. The reason behind it could be that women in their first

pregnancy probably are extra cautious and stressed about childbirth because of their inexperience related to pregnancy and delivery. Similarly, if women had not experienced any complications with a previous delivery, then women would possibly choose home delivery for the next pregnancies.

The study finds, odds of getting permission to go to the health facility as not a big problem was higher among women to whom getting permission to go to the health facility was a big problem. The reason behind it could be women are getting more aware due to different campaigns being run in Nepal by the Government of Nepal and other organizations as safe motherhood is one of the priority one programs in Nepal.

Similar to the findings to research performed in Nepal and other South Asian nations, this report also discovered that education was among the most crucial elements influencing institutional delivery in Nepal (13) (15) (16). One of the motives for the improved use of institutional delivery by educated women can be that women with higher levels of education were more aware of maternal health, skilled maternal health services including delivery services, and knew importance of institutional delivery along with quality maternal health services.

Consistent with the findings to other studies, this study showed that wealth is the sturdy predictor of institutional delivery among women (13) (14) (15) (17). Women from the poor category were less likely to choose institutional delivery in comparison to women from the wealthy category, probably because of unseen costs (eg. medicines, transportation) related to institutional delivery as monetary assist from the authorities is insufficient to cover all applicable cost incurred while having delivery in an institution. The other reason could be social and cultural barriers that exist in almost all rural areas of Nepal and is more prevalent among poor women (13).

Finally, this study discovered that women's autonomy in household decisions was significantly related to the usage of institutional delivery which is consistent with the findings of the study performed in Nepal (18). However, another study carried out analyzing NDHS 2011 data confirmed that decision-making autonomy was not related to the place of delivery (13).

Conclusion

This study finally concludes that large variation and gaps exist among women in Nepal in the utilization of institutional delivery service. Several demographic, socio-economic, and empowerment factors like women's age, parity, age at first birth, levels of education, household wealth, and decision-making power has influenced women for the usage of an institutional delivery facility. This might be one of the major reasons for the high maternal mortality ratio in Nepal. Therefore, it is crucial to encourage and ensure the utilization of ANC services as per guidelines and to deliver in institutions by addressing existing variations and gaps among various sub-groups of women.

Abbreviations

ANC Ante-Natal Care

DHS Demographic Health Survey

EMW Ever Married Women

HF Health Facility

NDHS Nepal Demographic and Health Survey

SBA Skilled Birth Attendant

SDG Sustainable Development Goal

WHO World Health Organization

Declarations

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Ethical approval

Publicly available DHS survey data without identifying information of respondents was obtained and used. The study was exempt from review by the ethical review committee. Getting approval from MEASURE DHS, Demographic and Health Survey (DHS) data sets of Nepal were downloaded for the study.

Consent for publication

Agree for its publication.

Availability of data and materials

Nepal Demographic and Health Survey 2016 data set are public and freely available from MEASURE DHS. The data set was downloaded taking the authority of Demographic and Health Surveys (DHS) Program, Rockville, USA, Nepal section.

Competing interests

None

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Authors' contributors

Ganesh Khatiwada conducted the study. Demographic and Health Survey data sets of Nepal of 2016 were used for this study.

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