Determinants of institutional delivery among young married women in Nepal: Evidence from the Nepal Demographic and Health Survey, 2011

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ABSTRACT

Objectives To identify the determinants of institutional delivery among young married women in Nepal.
Design Nepal Demographic and Health Survey (NDHS) data sets 2011 were analysed. Bivariate and multivariate logistic regression analyses were performed using a subset of 1662 ever-married young women (aged 15–24 years).
Outcome measure Place of delivery.
Results The rate of institutional delivery among young married women was 46%, which is higher than the national average (35%) among all women of reproductive age. Young women who had more than four antenatal care (ANC) visits were three times more likely to deliver in a health institution compared with women who had no antenatal care visit (OR: 3.05; 95% CI: 2.40 to 3.87). The probability of delivering in an institution was 69% higher among young urban women than among young women who lived in rural areas. Young women who had secondary or above secondary level education were 1.63 times more likely to choose institutional delivery than young women who had no formal education (OR: 1.626; 95% CI: 1.171 to 2.258). Lower use of a health institution for delivery was also observed among poor young women. Results showed that wealthy young women were 2.12 times more likely to deliver their child in an institution compared with poor young women (OR: 2.107; 95% CI: 1.53 to 2.898). Other factors such as the age of the young woman, religion, ethnicity, and ecological zone were also associated with institutional delivery.
Conclusions Maternal health programs should be designed to encourage young women to receive adequate ANC (at least four visits). Moreover, health programs should target poor, less educated, rural, young women who live in mountain regions, are of Janajati ethnicity and have at least one child as such women are less likely to choose institutional delivery in Nepal.

Strength and limitations of the study

► One of the strengths of this study is the use of data from the most recent nationally representative survey (the Nepal Demographic and Health Survey (NDHS) 2011), so the findings can be generalized to national and regional populations in Nepal.
► One limitation is the cross-sectional study design which does not confirm a causal relationship between dependent and independent variables.
► Moreover, this study does not explain any programmatic and socio-cultural factors of the determinants of institutional delivery as the NDHS did not collect data related to these factors.
► Recall bias, a potential limitation of the NDHS, could have limited the study findings.

830 women still die during pregnancy and childbirth. The majority (99%) of these deaths occur in developing countries.[2] After sub-Saharan Africa, countries in Southern Asia (including Nepal) have the highest maternal mortality rates.

Several studies have shown that compared with adult women, young women (aged 15–24 years) including adolescent (aged 10–19 years) girls are at higher risk of pregnancy and delivery complications, and even death.[2] Preterm delivery, systemic infection, low birth weight, perinatal death and maternal mortality are common among young women, particularly among adolescents.[3–5]

An important strategy for decreasing maternal mortality is to utilise adequate, quality maternal health services in a timely manner. Delivery complications and death can be averted by a hospital or institution-assisted delivery with the assistance of skilled care providers within an enabling environment, and by effective referral systems.[6–9]

The government of Nepal has been implementing a free delivery policy since 2009,

INTRODUCTION

Over the past 25 years, the global maternal mortality ratio (MMR) has fallen by nearly 44% from an estimated 385 maternal deaths per 100 000 livebirths in 1990 to an MMR of 216 in 2015.[1] Despite the significant reduction in maternal mortality, every day about

providing incentives to women who choose to deliver in a designated health facility.[9] However, the country continues to have a high MMR (229 per 100 000 live births),[1 10] with underutilization of maternal health services one of the reasons contributing to this high maternal death rate in Nepal.[11] Recently, a nationwide survey showed that about 6 in 10 pregnant women received antenatal care (ANC) from skilled providers, while only 35% of childbirths occurred in health institutions.[10]

The literature showed that several socio-demographic, economic and cultural factors play a role in determining whether women in Nepal use skilled birth attendants and institutional delivery. Women's education, ethnicity, area of residence, autonomy, involvement in a community group and wealth, together with poor infrastructure and lack of services appear to be major factors affecting utilisation of institutional delivery in Nepal.[6 9 12–20] However, most studies included all women of reproductive age (15–49 years). So far, no study has explicitly focused on young women's use of institutional delivery and factors influencing their utilisation of maternal health services (ie, institutional delivery).

As most existing studies conducted in Nepal have examined all women of reproductive age, a broader range of data needed to be collected at a national level and for specific age groups, such as young women (aged 15–24 years). Therefore, this study aimed to identify the determinants of institutional delivery among young women in Nepal.

As the survey (Nepal Demographic and Health Survey (NDHS)) did not collect pregnancy or delivery-related information from unmarred young women, this study only included married young women. The findings of the study may be useful for health programme managers and policy makers for generating policy and designing maternal health programs targeting young (including adolescent) women in Nepal.

METHODS

Source of data

We analysed the NDHS 2011 data set for this study. NDHS is a nationally representative survey which aims to provide reliable and current data on fertility, family planning, child health and nutritional status, use of maternal health services, domestic violence, and HIV/AIDS-related information. NDHS was conducted under the guidance of the Population Division of the Ministry of Health and Population, Nepal.

Sample size

A total of 12 674 women of reproductive age completed interviews for NDHS 2011. Of those, 4148 had had at least one live birth in the 5 years preceding the survey. Given our study objective, our analysis was based on the 1662 ever-married young women (15–24 years of age) who had had at least one birth in the 5 years preceding NDHS 2011.

Variables

Dependent variable

We used 'place of delivery' as a dependent variable. We categorised this variable into home delivery (when birth took place at home) and institutional delivery (when birth took place at a hospital or primary healthcare centre or a health post or sub-health post).

Independent variables

The independent variables included in this study were: age, ethnicity, educational level, religion, ecological zone, place of residence, wealth, parity, sex of the head of household, the woman's involvement in a community group, number of ANC visits for the most recent live birth, and the woman's autonomy in household decisions. In the NDHS, the wealth variable has five categories: poorest, poorer, middle, richer and richest. However, for better explanation and given our specific sample, we recoded the variable into three categories where 'poor' included 'poorest' and 'poorer', 'middle' included 'middle', and 'rich' included 'richer' and 'richest'. The variable 'woman's autonomy in household decisions' was categorised based on whether a young woman participated in decision making in the areas of: (1) her healthcare, (2) making major household purchases, and (3) visits to her family and relatives. The category 'no decision' meant that none of the three decisions were taken by the woman, 'moderate autonomy' indicated that a woman participated in making at least one or two decisions in the three mentioned areas, and 'higher autonomy' showed that a woman participated in decision making in all three areas.

Data analysis

Bivariate analysis (Pearson's χ^2 test) was done to assess the relationship between the dependent and independent variables. A binary logistic regression analysis was carried out to determine the adjusted effect of each factor on the dependent variable (place of delivery) taking into account the survey design (strata and sampling weights) and clusters. Multicollinearity was checked before logistic regression. The final logistic regression model was constructed theoretically and included those variables identified in the literature as important for determining the utilisation of maternal health services. The results of the logistic regression analysis were presented by OR with 95% CI. All statistical analyses were performed using SPSS 16.1 for Windows.

RESULTS

Results showed that among all young women who had given birth at least once within the last 5 years preceding the survey, 80% of them were between 20 and 24 years of age. About one-third of the young women did not have any formal education, approximately 85% were Hindu and more than 90% were living in a rural area. Almost 41% of the young women fell into the poorest socio-economic category, 55% had received at least four ANC visits

and 43% did not have any household decision-making autonomy (table 1).

About 46% of the young women chose an institutional location for their most recent delivery. Young women between 15 and 19 years (adolescents) of age had more institutional deliveries than young adult women (aged 20–24 years) (56% vs. 44%). Other socio-demographic variables which appeared to be associated with place of delivery included ethnicity, level of education, religion, place of residence, wealth, parity, number of ANC visits, and woman's autonomy in household decisions. Young women who were poor, not pregnant for the first time, had received less than four ANC visits, had a lower level of education, lived in a rural area, and those from the mountain region had the lowest number of institutional deliveries (table 1).

Multivariate analysis (table 2) showed that age had a significant effect on the use of institutional delivery among young women. After controlling for other socio-demographic variables, women between 15 and 19 years of age had a significantly higher percentage of institutional deliveries than young women aged 20–24 years (OR: 1.41; 95% CI 1.050 to 1.895). The probability of institutional delivery was approximately 30% higher among young women belonging to the Brahmin/Chhetri ethnic group compared with women belonging to the Janajati ethnic group. Young women who had a secondary or above level of education were 1.63 times more likely to have an institutional delivery compared with young women who had no formal education (OR: 1.626; 95% CI: 1.171 to 2.258). Young Muslim women were 1.82 times more likely to deliver at an institution compared with young Hindu women. Regarding their place of residence, the probability of giving birth in an institution was about 69% higher among young urban women compared with rural women. Young women from the Terai region were 1.7 times more likely to choose institutional delivery than those from the mountain region (OR: 1.695; 95% CI: 1.044 to 2.751).

Young women in the wealthiest category were 2.12 times more likely to deliver in an institution compared with young women in the poorest category (OR: 2.107; 95% CI: 1.53 to 2.898). Young women who were pregnant for the first time were more likely to choose institutional delivery than those who had given birth previously. Regarding the use of ANC, young women who had received four or more ANC visits were about three times more likely to choose institutional delivery compared with young women who had received less than four ANC visits (OR: 3.049; 95% CI: 2.402 to 3.870).

DISCUSSION

Although institutional delivery rates (46%) were higher among young women compared with the national average (35%) among all women of reproductive age, there were disparities among young women in choosing a health institution for delivery.

According to NDHS 2011, after controlling for available independent factors, young women who were poor, less educated, between 20 and 24 years of age, resided in rural areas, were from a mountainous region, were of Janajati ethnicity, had received less than four ANC visits and had a previous delivery were less likely to give birth in an institution. On the other hand, young women from urban area who were rich, educated, had received at least four ANC visits, were pregnant for the first time, were of Brahmin/Chhetri ethnicity and from the Terai region were more likely to choose institutional delivery.

The use of ANC is strongly associated with institutional delivery among young married women in Nepal. Age, ethnicity, level of education, religion, place of residence, wealth and parity were also potential determinants of institutional delivery.

Consistent with the results of other research conducted in Nepal and in other developing countries among all women of reproductive age, this study showed that the use of ANC was positively associated with institutional delivery.[6 9 21–24] Studies conducted in Nepal among all women of reproductive age also showed that frequency of ANC visits was associated with the use of institutional delivery.[9 25]

Adequate use of ANC is likely to raise pregnant women's awareness of possible complications and safe delivery practices, which ultimately encourages them to seek institutional delivery.[23 26–30] However, counselling during ANC has been shown to be poor in many settings and reduced ANC effectiveness for increasing institutional delivery.[31]

The literature revealed that adolescents were less likely to seek skilled maternal health services including institutional delivery compared with adults and young adults.[32–35] Inconsistent with the findings of other reports, this study revealed that in Nepal, adolescent women (aged 15–19 years) were more likely to seek institutional delivery compared with older young women (20–24 years) and adult women. However, another study (n=644 women) conducted in the Kaski district of Nepal showed that the woman's age was not significantly associated with place of delivery.[9] One possible reason for the increased use of institutional delivery by adolescent girls (aged 15–19 years) may be that they are more aware of the consequences of adolescent pregnancy because of the ongoing campaigns to decrease the rates of adolescent pregnancies and improve the maternal health of adolescent women in Nepal.[36] However, it could also be that adolescent women are typically referred to deliver at a health institution as they are at higher risk of delivery complications compared with adult women.[37 38]

This study showed that young women of Brahmin/Chhetri ethnicity were more likely to choose delivery at a health institution compared with young women of Janajati ethnicity, which can be explained by the higher socio-economic status of those with Brahmin/Chhetri ethnicity compared to those with Janajati ethnicity.[39] However, it should be noted that another study conducted

Table 1 Background characteristics of married young women who had at least one live birth in the 5 years preceding the survey and characteristics by place of delivery for the most recent live birth, NDHS 2011

Demographic and socio-economic characteristics	Number	Percentage (%)	Home delivery(%)	Institutional delivery (%)
Age***				
15–19	333	20.0	44.4	55.6
20–24	1329	80.0	56.0	44.0
Ethnicity***				
Brahmin/Chhetri	449	27.0	45.4	54.6
Janajati	635	38.2	58.4	41.6
Dalit	301	18.1	56.9	43.1
Other	276	16.6	53.1	46.9
Educational level***				
No education	524	31.5	70.8	29.2
Primary	397	23.9	58.2	41.8
Secondary or above	741	44.6	39.2	60.8
Religion*				
Hindu	1401	84.3	52.8	47.2
Buddhist	142	8.5	66.4	33.6
Muslim	83	5.0	48.0	52.0
Kirat/Christian	36	2.2	54.4	45.6
Ecological zone***				
Mountain	116	7.0	66.1	33.9
Hill	610	36.7	60.0	40.0
The Terai	935	56.3	48.1	51.9
Place of residence***				
Urban	146	8.8	22.3	77.7
Rural	1516	91.2	56.7	43.3
Wealth***				
Poor	679	40.9	70.7	29.3
Middle	410	24.7	53.5	46.5
Rich	572	34.4	33.7	66.3
Parity***				
One	959	57.7	42.4	57.6
Two	505	30.4	67.0	33.0
Three	165	10.0	76.0	24.0
Four or more	33	2.0	65.4	34.6
Sex of head of household				
Male	1246	75.0	54.0	46.0
Female	415	25.0	53.0	47.0
Involvement in a community group				
Not involved in any community group	1128	67.9	53.5	46.5
Involved in a community group	534	32.1	54.2	45.8
Number of ANC visits for the most recent live birth***				
Less than 4 visits	745	45.0	72.0	28.0
4 or more visits	917	55.0	39.0	61.0
Decisions on own healthcare***				

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Table 1 Continued

Demographic and socio-economic characteristics	Number	Percentage (%)	Home delivery(%)	Institutional delivery (%)
Without involvement of respondent	831	50.0	58.7	41.3
Involvement of respondent	831	50.0	48.7	51.3
Decisions on making large household purchases				
Without involvement of respondent	1092	65.7	54.8	45.2
Involvement of respondent	570	34.3	51.5	48.5
Decisions on visits to family or relatives				
Without involvement of respondent	1046	62.9	54.3	45.7
Involvement of respondent	616	37.1	52.7	47.3
Women's autonomy in household decisions**				
No autonomy	708	42.6	58.9	41.1
Moderate autonomy (involved in 1 or 2 issues)	528	31.8	48.5	51.5
High autonomy (involved in all 3 issues)	426	25.6	51.6	48.4
Total	**1662**	100.0	**53.7**	**46.3**

***p<0.001, **p<0.01 , *p<0.05.
ANC, antenatal care.

in Nepal showed that ethnicity was not associated with place of delivery.[40]

Consistent with the findings of other studies in Nepal and Southern Asia, this report also showed that education was one of the most important factors influencing institutional delivery among women of all ages.[13 18 22 32 40–42] Women with a higher level of education (who were often wealthier) knew more about maternal health and were more aware of skilled maternal health services including institutional delivery.[32 43 44] Also, a study conducted in Nepal showed that women with a higher level of education had greater decision-making autonomy concerning their health and well-being.[20] However, this study found that women's autonomy in household decisions was not significantly associated with the use of institutional delivery. This variation in results could be due to differences in the sample sizes of the studies. This study considered only young women (n=1662) while another considered women of all ages (n=4148).

The literature showed that the accessibility and availability of quality maternal health services influence the use of an institution for delivery.[8 9 28 31 45 46] This study demonstrated that young women from the mountain region were less likely to choose institutional delivery compared with women in the Terai region. This could be due to poor access to and availability of quality health services in the mountain region of Nepal. However, another study conducted using NDHS 2011 data showed that region of residence was not associated with place of delivery[25]: however, the variation in sample sizes among studies might have influenced the results. This study only considered young women, while the other study[25] considered all women of reproductive age. Other reasons might be the lack of education and awareness concerning maternal health among young women living in the mountain region.

Studies revealed that the place of residence showed a significant association with institutional delivery among women of reproductive age including young women, which was also identified in other studies.[13 19 22 42] Women residing in rural areas are less likely to choose institutional delivery than women living in urban areas. Increased rates of institutional delivery in urban settings could be due to easier accessibility to and better availability of medical facilities for maternal and child healthcare in urban compared with rural settings.

Similar to the findings of other reports, this study also found a strong positive association between women's wealth and their use of institutional delivery.[9 13 22 32 34 47] A qualitative study conducted in Nepal showed that financial problems were one of the reasons women did not chose a health institution for delivery.[46] Irrespective of their place of residence (rural/urban), wealthy young women always received better health services, such as institutional delivery. Although the government of Nepal subsidises the cost of institutional delivery, poor young women were less likely to choose institutional delivery compared with more wealthy young women, possibly because of hidden costs (eg, medicines, transport) associated with institutional delivery or other cultural barriers that may exist among poorer women. It was found that financial support from the government was not sufficient to cover all relevant costs incurred when delivering in an institution.[46]

Finally, this study found that parity is a strong predictor of institutional delivery among young women, which is consistent with the results of other studies among all women of reproductive age.[6 32 42] Women who were pregnant for the first time were more likely to choose institutional delivery than those with second or later pregnancies. Young women in their first pregnancy might be more careful or anxious about childbirth due to their

Table 2 Adjusted odds ratios (aOR) from multivariable logistic regression for institutional delivery among young women during the 5 years before the survey

Demographic and socio-economic characteristics	Institutional delivery	
	OR	95% CI
Age group		
15–19	1.410*	1.050 to 1.895
20–24	1.000	
Ethnicity		
Brahmin/Chhetri	1.000	
Janajati	0.697*	0.509 to 0.954
Dalit	0.923	0.643 to 1.343
Other	0.814	0.515 to 1.285
Educational level		
No education	1.000	
Primary	1.292	0.934 to 1.789
Secondary or above	1.626**	1.171 to 2.258
Religion		
Hindu	1.000	
Buddhist	0.818	0.517 to 1.295
Muslim	1.820*	1.017 to 3.258
Kirat/Christian	0.850	0.406 to 1.778
Ecological zone		
Mountain	1.000	
Hill	0.956	0.597 to 1.530
The Terai	1.695*	1.044 to 2.751
Place of residence		
Urban	1.000	
Rural	0.311***	0.197 to 0.492
Wealth		
Poor	1.000	
Middle	1.611**	1.197 to 2.169
Rich	2.107***	1.532 to 2.898
Parity		
One	1.000	
Two	0.436***	0.335 to 0.567
Three	0.360***	0.228 to 0.567
Four or more	0.730	0.319 to 1.670
Sex of head of household		
Male	1.000	
Female	0.997	.0.764 to 1.300
Involved in community group		
Not involved in a community group	1.000	
Involved in a community group	0.867	0.675 to 1.115
Number of ANC visits for the most recent live birth		

Continued

Table 2 Continued

Demographic and socio-economic characteristics	Institutional delivery	
	OR	95% CI
Less than 4 visits	1.000	
4 or more visits	3.049***	2.402 to 3.870
Women's autonomy in household decision		
No autonomy	1.000	
Moderate autonomy (involved in 1 or 2 issues)	1.255	0.955 to 1.648
High autonomy (involved in all 3 issues)	1.239	0.923 to 1.664

***p<0.001, **p<0.01, *p<0.05.
ANC, antenatal care.

inexperience regarding pregnancy and delivery. Young women including adolescents might be more aware of the risks and potential complications of pregnancy and delivery because of several campaigns and maternal health projects in Nepal, Therefore, if the first pregnancy occurs during adolescence, it might influence young women to seek institutional delivery. In addition, if there were no complications with a previous home delivery, then the woman might again prefer a home delivery for subsequent pregnancies.

The main strength of this study was the use of a nationally representative data set. However, a limitation was that NDHS did not provide information about accessibility (ie, distance to a health facility) or the quality of healthcare providers which might influence the use of institutional delivery among young women. The fact that the data used in this study were a few years old was also a limitation. However, we analysed the data of the latest NDHS conducted in Nepal, and believe that the study findings are still relevant because of the importance of the topic and the rigorous analysis. We hope that the findings will be relevant and useful for programme planners and policy makers in order to increase the rate of institutional delivery and improve the maternal health of young women in Nepal.

CONCLUSIONS
This study showed that inequality exists in the use of institutional delivery among young married women in Nepal. Several factors were associated with and influenced young women's use of institutional delivery. Among all factors, receipt of an adequate number (at least four) of ANC visits had a strong and positive association with the use of institutional delivery. Therefore, it is important to encourage and ensure the use of at least four ANC visits for young pregnant women in Nepal. Moreover, rural, poor and less educated women from the mountain region and of Janajati ethnicity should be included in health interventions as these particular groups of young women were less likely to choose institutional delivery. Coverage as

well as the quality of existing interventions needs to be improved for this group of young women. Young women who have already given birth should also be included in the health intervention as they were more reluctant to deliver in an institution. Finally, there is a need for more qualitative research, particularly among young women, to explore their utilisation of maternal health services.

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Correction: *Determinants of institutional delivery among young married women in Nepal: Evidence from the Nepal Demographic and Health Survey, 2011*

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One of the author names is spelled incorrectly. 'Azucena Bardaj' it should be spelled 'Azucena Bardají'.

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