

# Determinants of Utilization of Institutional Delivery Services in East Nepal: A Community-Based Cross-Sectional Study

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**Date of Submission :** March 07, 2018

**Received in Revised Form :** March 26, 2018

**Date of Acceptance :** April 12, 2018

**Date of Publishing :** July 30, 2018

## ABSTRACT

**Background:** In this study, we expected to evaluate the utilization rate of institutional delivery services in Eastern Nepal. We also analyzed the socio-economic factors associated with institutional delivery and assessed the reason for their utilization.

**Methods:** A cross-sectional quantitative study was conducted in Sunsari district of Eastern Nepal. Three hundred and seventy two women, who delivered their baby within period of one year preceding this study, were interviewed through household visit. Focus group discussions (FGDs) were also done to gather qualitative data.

**Results:** We interviewed 368 women. The prevalence of institutional delivery was 55.1%. Logistic regression analyses revealed that women having good knowledge about importance of SBA utilized institutional delivery services more than nine times than women having poor knowledge (AOR=9.02, 95% CI: 2.61-31.09). Similarly, women exposed to media (AOR=6.56, 95% CI: 2.10-21.21), women from advantaged ethnicity (AOR=5.85, 95% CI: 1.78-19.74), women having higher level of autonomy (AOR= 5.93, 95%CI: 1.18-29.53) and richer women (AOR=3.30, 95% CI:

1.24-8.72) were more likely to have institutional delivery than women unexposed to media, women from relatively disadvantaged ethnicity, women having low level of autonomy and poorer women respectively.

**Conclusions:** Good knowledge on importance of SBA, completion of 4 ANC service, media exposure with maternal health service related messages, relatively advantaged ethnicity, higher rank of women's autonomy and higher wealth rank were found significantly associated with institutional delivery service utilization. Provisions of community ambulance system can also be helpful to address the transportation problem. Encouraging women to complete their schooling and teaching/encouraging women to have antenatal care frequently are also important to increase institutional delivery services.

**Keywords:** Determinants, Factors, Institutional delivery, Nepal

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## INTRODUCTION

Improvement of maternal health is one of the eight millennium development goals (MDGs) adopted by United Nations in September 2000 and it calls for reducing maternal mortality. In 2008, developing countries encountered 99% (355 000) of the estimated 358 000 maternal deaths worldwide. Almost three fifths of the maternal deaths (204 000) occurred in the Sub-Saharan Africa region alone, followed by maternal deaths (109 000) in South Asia.<sup>1</sup>

Nepal has been working for improving maternal health and dropping maternal mortality for years. Regardless of remarkable progress in last 15 years, Nepal still has high maternal mortality ratio (MMR) compared to many developed countries.<sup>2</sup> The MMR represents the number of maternal deaths per 100 000 live births. The Nepal demographic and health survey (NDHS) 2006 showed that the MMR was 281 per hundred thousand live births. In Nepal, maternal mortality accounts for 11 percent of deaths among women of reproductive Age, 15-49 years.<sup>3</sup>

A key indicator to evaluate the MDG fifth goal is the proportion of births attended by skilled health personnel.<sup>1</sup> But in Nepal, the majority (63.1 per cent) of births still occur at home with 51.7 per cent of women being assisted by traditional birth attendants and relatives.<sup>4</sup> Only 35.5% of pregnant women have been assisted by skilled birth attendants at their delivery in Nepal which is quiet less (59.3%) than the south-east Asia region.<sup>5</sup>

Skilled attendants at birth is directly proportional to decreased maternal deaths.<sup>6</sup> The utilization of delivery services by skilled attendants also contributes to better neonatal health outcomes. Neonatal death may be due to maternal complications in labour. Three-fourth of neonatal deaths occurs in the first week, and the highest risk of death is on the first day of life. Preterm birth (28%), severe infections (26%) and asphyxia (23%) are main causes of neonatal deaths globally. These figures emphasize contribution of the delivery process to neonatal deaths.<sup>6</sup> Therefore, the neonatal mortality isn't expected to reduce without improving the women's access to delivery services.<sup>1</sup>

The safe motherhood program (SMP) has been a priority program in Nepal since the safe motherhood conference in Nairobi in 1987, and the formulation of National Health Policy in 1991.<sup>7</sup> The national safe motherhood plan (2002-2017) sets a target of reducing MMR to 134 per hundred thousand live births by 2017. The safe motherhood and neonatal health long term plan (2006-17) focused equity and access efforts to ensure that most needy woman could access the services they need.<sup>8</sup> A policy on skilled birth attendance 2006 identified the importance of skilled birth attendance at every birth.<sup>9</sup>

Major activities carried out as part of the SMP is antenatal, delivery, post natal, new born care and emergency obstetric care. Delivery care includes provision of skilled birth attendants at community level, provision of obstetric first aid (safe delivery kit) at home, identification and management of complications during delivery referral to appropriate health facility and emergency obstetric care.<sup>10</sup>

To raise demand for and progress access to maternity services, the Government of Nepal launched maternity incentives scheme in 2005 and provide each woman a set amount of money to cover transportation costs, based on ecological region. Thus, women in the mountainous, hilly, and plain Terai regions obtain 1,500, 1,000, and 500 Nepalese rupees (Rs.) (1 US\$≈Rs. 99 in February 2014), respectively, for each birth delivered in government health institutions. Apart from this, a woman obtains additional incentives (Rs.400) for four antenatal care (ANC) visits, institutional delivery and first postnatal care (PNC). The government has also started the Aama Suraksha (Mothers' Safety) Programme and birth preparedness package (BPP) in all 75 districts to promote institutional delivery. This programme combines free of charge delivery services at any government health facility and several private facilities with the maternity Incentives schemes.<sup>11, 12</sup>

In order to reduce the risks associated with pregnancy, childbirth and neonatal health; government has adopted strategies to expand 24 hour emergency obstetric care services, encourage institutional delivery and promote

birth preparedness and complication readiness.<sup>7</sup> In spite of government's intensive endeavours, there are wide disparities in delivery service utilization among women living in rural part and belonging to lowest wealth quintiles.<sup>4</sup>

Improving maternal delivery service utilization is the key to reduce maternal mortality of country.<sup>7</sup> Along with strengthening the obstetric care service; socio cultural influences in seeking health services, economic and physical accessibility of mothers to the health facility are the important factors that must be taken into consideration to improve the delivery service utilization.<sup>3</sup>

The objectives of this study were to evaluate utilization rate of institutional delivery services, to assess reason for the utilization and to analyze the factors that determine the utilization of delivery services by pregnant women in Sunsari district of east Nepal.

## MATERIALS AND METHODS

A cross-sectional study was carried out in three village development committees (VDCs) of Sunsari district in East Nepal. The VDCs were taken randomly. Women who delivered within period of one year preceding this study and who gave informed consent were interviewed. Sample size was calculated by using the formula:

$$N = 1.96^2 PQ / L^2$$

P is the prevalence of institutional delivery from NDHS 2011, Q is the complement of P, i.e.,  $Q = 100 - P$ , L is precision/allowable error, which is taken to be 5% in this study.

$$= (1.96^2 * 1.96 * 35.5 * 64.5) / 5^2 \\ = 351.85 \dots 352 (\text{approx})$$

Thus, adjusting by 5% for possible non-response, the final sample size is  $352 + 18 = 370$ .

A written permission was taken from district health office (DHO), Sunsari, before the mothers were approached through sub health posts. Sub health posts (SHPs) are government run health institutions which work under DHO. These are the institutions that are accessed first in a VDC. The SHP in-charges were approached to get updated list of children born and immunized during last one year period. A list of children was

prepared from immunization register maintained by village health workers (VHWs) of respective VDCs. A complete list of children was expected from immunization register as the VDCs had 100 percent BCG coverage in the recent years. The exhaustive list of 1064 household heads having less than one year children (children born during the period -5th June 2011 to 6th July 2012) was arranged from the immunization register from the three VDCs. A total of 1064 children born during the period and immunized in the three VDCs. List of the parents (head of household) was prepared to mark out the household with mothers having under one year children. A total of 372 households out of 1064 were recognized through systematic random sampling method. From these households, women who delivered within period of one year preceding this study were interviewed through household visit.

In case of non response, plan was prepared to move to another immediate mother in the list. A total of 16 mothers could not convene during household visit. Successive mothers in the list were interviewed instead of them. .

Structured questionnaire was originally arranged in English and later translated into local language, Maithili and was used to gather the quantitative data. The questionnaire was set through reviewing available literatures and focusing on objectives of the study.

Data checking, editing and coding was carried out by the researcher each day. Data entry was carried out in Epi Data version 3 and analysis was finished in SPSS 17. Data coding, recording and cleaning was continuously carried out to ensure data quality.

Descriptive analysis and bivariate analysis of service utilization and associated factors were completed as per the study variables at the initial stage. Chi-square test was used to test whether the factors were significantly associated ( $p$  value  $< 0.05$ ) with service utilization at 95% confidence interval (95% CI). Odds ratio (OR) with 95% CI was also considered to quantify the associated risk factors. The significant variables at 90 % CI ( $p$ -value  $< 0.1$ ) observed in bivariate analysis was subjected to multivariate analysis

(logistic regression). Adjusted odds ratio (AOR) was calculated to measure the net effect size of variables. Hosmer and Lameshow Chi- square test was applied to test the goodness of fit for regression model. A finding of non significance with p values ( $p > 0.05$ ) was concluded that the model sufficiently fits the data.

The analysis was fitted in the logistic regression model given below:

$$Z = b_0 + b_1X_1 + b_2X_2 + \dots + b_kX_k$$

Where Z is the log odds of the dependant variable,  $b_0$  is the constant, X is the independent variable, K is the number for independent variables and b is the logistic regression coefficient.

The study also used qualitative data from focus group discussions (FGDs). Two FGDs were conducted; one with recently delivered women, and another with mother-in-law of the socially disadvantaged community (Dalit and Muslim). Each FGD consisted of eight women. Semi structured open ended and non directive (FGD) guide was considered in order to triangulate responses obtained by the structured questionnaire on the reason for utilizing and non-utilizing institutional delivery services. For the qualitative study, non probabilistic purposive sampling technique was used.

Ethical approval was obtained from the Institutional Ethical Review Board, Institute of Medicine (IOM). Informed consent was obtained from each respondent.

The outcome variable was place of delivery which was responded as institutional deliveries (delivery at any Health facilities) or home deliveries. The explanatory variables were socio-cultural factors (ethnicity, religion, education of mother and her husband, women's autonomy, first contact in illness, family type and size, belief in traditional healer's practice), economic factors (wealth quintiles or wealth rank, occupation of mother, occupation of husband) and perceived benefit/need of service utilization (birth preparedness, media exposure, information on utilization of Skilled Birth Attendant, information on Ama Surkhaya Program (ASP), contact with FCHV,

obstetric complication, sex of previous child). Women's autonomy was measured by analyzing three key areas: control over finances, decision making power and the extent to which they have freedom to movement using 10 variables. Household was categorized into three groups using factor analysis from low autonomy to high autonomy. Wealth quintile and wealth rank was composite measure in socioeconomic status. It involves principle component analysis (PCA) of details of household assets and expenditures. Based on this, households were categorized into five groups comprising lowest, second, middle, fourth and highest wealth quintiles.

## RESULT

### Socio-demographic profile of mothers

A total of 372 mothers were approached for interview. Four women refused to participate. Rest 368 women were interviewed. More than six percent of respondents were below 20 years of age. Forty-four percent of the respondents were from 20-24 years age group, 27 percent from age group 25-30 years while 22 percent were 30 years or older. More than three quarter women (77.2%) were Hindus while rests were Muslims. Most of the mothers (72.3%) were multi-parous while 27 percent were primi-parous. Almost 50 percent of the mothers were from nuclear family. Nearly half (48.1%) of the respondents were from disadvantaged ethnic group and most of them (73.9%) were farmers. More than one third (38.2%) of the respondents didn't ever go to school in their life and only 4.6% of the respondents were educated to secondary school or upper level. Nearly two third (62.4%) of respondents expressed their belief in traditional healer. About 45.7 percent of respondents had exposed to media depicting message related to maternal health service while about 76 percent had exposure with such media for at least once a week. The findings showed that about 60 percent mothers had information of free delivery service while about 69 percent mothers had information on transportation incentive on utilization of institutional delivery service. Among the interviewed mothers, almost 66 percent of mothers were in contact with FCHV during last delivery. About 32 percent of mothers had experienced complications during last or previous pregnancies and deliveries.

### Institutional delivery

In total, 205 women (55.1%) benefited from Institutional delivery. Only 1.1% women delivered on the way to health institution while 43.8% women delivered at home. Almost six out of every ten (59.1%) women received assistance of SBA during delivery, while 23.1% women got assistance of relatives/friends which was followed by assistance of TBA (10.2%), of Female community health volunteer (FCHV) (5.4%) and of other health workers (2.2%).

### Main reasons for utilization of institutional delivery services

The main reasons shared by mothers for utilizing institutional delivery service was for better health of mother and baby (58.5%), for safe delivery (44.8%) and for incentive (20%). About 51.2 percent of mothers shared that they were advised by FCHV for the utilization of institutional delivery services (Figure 1).

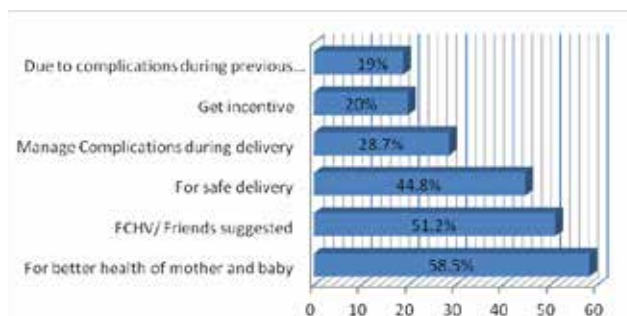


Fig. 1: Reasons shared by mothers for utilization of delivery services (% of mothers utilizing institutional delivery; n=205; multiple response)

Supporting above finding one of the FGD participants said, “If you go to health institution you will get the delivery services free of cost

and government also provides some money as incentive.”

Another FGD participant said “some women want to deliver at hospital but usually they deliver at home because you can’t predict labour and it may arise suddenly without warning.

### Main reasons for un-utilization of institutional delivery services

Among the 165 women, who did not have institutional delivery during their last birth, reported reason for non-utilization includes no problem/ complication encountered (62.5%), lack of money (28.2%) and lack of transportation 20.8% (Figure 2). Also in the FGDs the majority of participants agreed the main reasons for non-utilization of institutional delivery were lack of money/poverty, family restriction, and problem of transportation.

Supporting aforementioned finding, a participant of FGD shared: “We would go to health posts for check up or delivery only if any problem/complication occurred.” Another Dalit woman shared in FGD: “We are poor people, we can’t afford money to hire ambulance, and the amount given at hospitals is not enough for us to cover all costs.”

### Determinants of utilization of Institutional delivery services

Table 1 showed that mothers from relatively advantaged ethnicity were more likely to have institutional delivery than disadvantaged (Dalit and Muslim) ethnic group (OR=12.07, 95% CI: 7.35-19.83). Religion was significantly associated

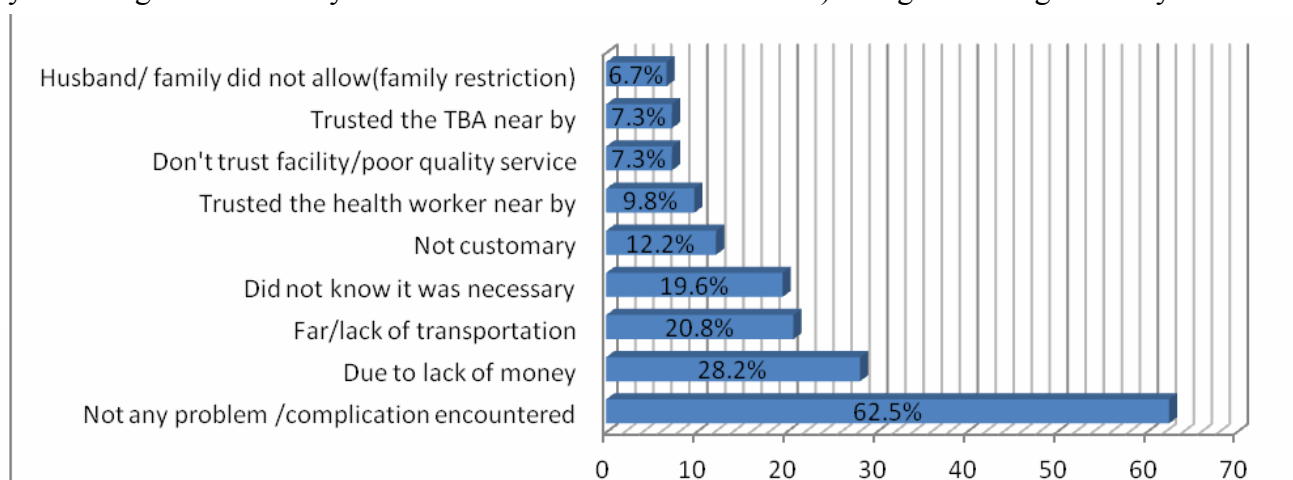


Fig. 2: Reasons shared by mothers for non utilization of delivery services (% of mothers not utilizing institutional delivery; n=165; multiple response)

with ANC service utilization. Muslim mothers were less likely to have institutional delivery than Hindus (OR=0.19, 95%CI: 0.11-0.38).

Table 1: Association of demographic and socio-cultural factors with utilization of institutional deliver services

Characteristics	Home N=163	Institution N=205	P Value	OR (95% CI)
<b>Age of respondent</b>				
Less than 20	8	15		1
20-24	70	95	0.487	0.72(0.29-1.80)
25-29	47	54	0.309	0.61(0.23-1.57)
30 and above	38	41	0.262	0.57(0.21-1.51)
<b>Parity</b>				
Primiparous	25	78		2.63(1.58-4.38)
Multiparous	123	146	0.001	1
<b>Type of family</b>				
Nuclear family	81	105		1
Joint and extended family	82	100	0.771	0.94(0.62-1.42)
<b>Size of family</b>				
Less than six	59	99		1
six and more	104	106	0.020	0.60 (0.39-0.92)
<b>Ethnicity</b>				
Disadvantaged	129	49		1
Relatively advantaged	34	156	0.000	12.07 (7.35-19.83)
<b>Religion</b>				
Hindu	100	183		
Muslim	63	22	0.000	0.19 (0.11-0.38)
<b>Education of respondent</b>				
Illiterate	17	5		
Literate	146	200	0.000	4.65 (1.68-12.91)
<b>Education of husband</b>				
Illiterate	36	8		
Literate	133	197	0.000	5.55 (2.47-12.49)
<b>Occupation of respondent</b>				
Service/Business	15	30		
Agriculture/ wage labour	148	175	0.114	0.59 (0.30-1.14)
<b>Occupation of husband</b>				
Service/Business	63	98		
Agriculture/ labour	100	107	0.079	0.68 (0.45-1.04)
<b>Belief in traditional healer's practices</b>				
No	53	84		
Yes	110	121	0.095	0.69 (0.45-1.06)
<b>First contact in illness during pregnancy (n=120)</b>				
Traditional healer	27	11		
FCHV/health worker	7	75	0.001	6.29 (9.25-74.75)
<b>Wealth quintile</b>				
First (poor)	56	17		
Second	45	29	0.039	2.12 (1.03-4.34)
Third	26	43	0.001	5.44 (2.62-11.29)
Four	23	57	0.001	8.16 (3.95-16.95)
Fifth (Rich)	13	59	0.001	14.95 (6.55-33.87)

Characteristics	Home N=163	Institution N=205	P Value	OR (95% CI)
<b>Women's autonomy</b>				
Poor	87	35		
Medium	41	83	0.001	4.20 (2.48-7.13)
High	27	87	0.000	8.01 (4.46-14.34)

As shown in Table 2; Mothers exposed with media depicting maternal health service related message during last pregnancy were more likely to utilize institutional delivery service (OR12.7, CI (7.7- 20.9)). Contact with FCHV and obstetric complication during last or previous pregnancy was found significantly associated with institutional delivery service utilization while sex of previous child was not found significantly associated with institutional delivery service utilization. Knowledge on maternal health service and incentive program upon completion of four ANC visit was found significantly associated with institutional delivery service utilization.

Table 2: Association of perceived need/benefit related factors with utilization of delivery services

Characteristics	Home N=163	Institution N=205	P value	Odds Ratio (95% CI)
<b>Media exposure</b>				
No	125	42		
Yes	38	163	0.000	12.76 (7.76-20.98)
<b>Frequency of media exposure</b>				
At least once a week	39	146		
< once a week	38	20	0.001	0.14 (0.07-0.26)
<b>Knowledge on transportation incentive</b>				
No	80	32		
Yes	83	173	0.001	5.21 (3.20-8.45)
<b>Birth preparedness</b>				
No preparation	60	59		
Some preparation	45	62	0.148	1.43 (0.88-2.33)
Good preparation	58	84	0.324	1.31 (0.72-2.19)
<b>Contact with FCHV</b>				
No	89	32		
Yes	74	173	0.000	6.52 (3.99-10.58)
<b>Frequency of contact</b>				
One time	57	78		
Two or more time	17	97	0.001	4.17 (2.27-7.77)
<b>Pregnancy/obstetric complication</b>				
Yes	121	109		
No	42	96	0.000	2.53 (1.25-3.61)
<b>Sex of previous child</b>				
Male	52	91		
Female	87	59	0.000	0.38(0.21-0.63)
<b>Information on importance of SBA</b>				
Poor	87	30		
Medium	54	89	0.001	4.70 (2.79-8.13)
High	22	86	0.000	11.36 (6.06-21.94)

Characteristics	Home N=163	Institution N=205	P value	Odds Ratio (95% CI)
<b>ANC Service</b>				
Less than four ANC	90	22		
four or more ANC	73	183	0.001	10.92 (5.77-17.00)
<b>Knowledge on maternal health services</b>				
Poor	73			
Medium	38	94	0.984	0.63(0.44-1.76)
High	52	63	0.497	1.19(0.71-1.82)

Table 3 shows Logistic regression analyses which revealed that women having good knowledge about importance of SBA utilized institutional delivery services more than nine times than women having poor knowledge (AOR=9.02, 95% CI: 2.61-31.09). Similarly, women exposed to media had more than six times higher chance of receiving institutional delivery services (AOR=6.56, 95% CI: 2.10-21.21) than unexposed women. Similarly, women from advantaged ethnicity had nearly six times higher chance of having institutional delivery services than respondents who were from disadvantaged ethnicity (AOR=5.85, 95% CI: 1.78-19.74). Similarly, women having higher level of autonomy were nearly six times more likely to have institutional delivery services than the women having lower level of autonomy (AOR= 5.93, 95%CI: 1.18-29.5). Similarly richer women were three times more likely to have institutional delivery than poorer women (AOR=3.30, 95% CI: 1.24-8.72).

Table 3: Multivariate analysis of socio cultural and perceived benefit/need related factors associated with delivery service utilization

Characteristics	Home N=163	Institution N=205	Adjusted OR (95% CI)	P value
<b>Media exposure</b>				
No	125	42		
Yes	38	163	6.56 (2.10-21.21)	<0.05
<b>Frequency of media exposure</b>				
At least once a week	39	146		
Less than once a week	38	20	0.30 (0.07-1.29)	>0.05
<b>Knowledge on transportation incentive</b>				
No	80	32		>0.05
Yes	83	173	1.92 (0.62-5.93)	
<b>Contact with FCHV</b>				
No	89	32		
Yes	74	173	0.72 (0.51-2.14)	>0.05
<b>Knowledge on importance of SBA</b>				
Poor	87	30		
Good	54	89	9.02 (2.61-31.09)	<0.05
<b>ANC service</b>				
Less than 4 ANC	90	22		

Characteristics	Home N=163	Institution N=205	Adjusted OR (95% CI)	P value
4 or more ANC	73	183	6.15 (4.97-10.06)	<0.05
<b>Women's autonomy</b>				
Low	87	35		
High	68	170	5.93 (1.18-29.53)	<0.05
<b>Ethnicity</b>				
Disadvantaged	129	49		
Relatively advantaged	34	156	5.85 (1.78-19.74)	<0.05
<b>Wealth rank</b>				
Low(Poor)	56	17		
High (Rich)	107	188	3.30 (1.24-8.72)	<0.05

The model was fit as shown by Hosmer and Lameshow test of significance (P=0.236). The regression line can be depicted from the equation. Institutional delivery =Constant + Media exposure +Women's autonomy + Ethnicity+ Knowledge on importance of SBA + 4 ANC +Wealth rank

### DISCUSSION

In structured interviews conducted in three VDCs of Sunsari district, Nepal, every second women (55.1%) reported delivering their last child in a health institution. This was higher than other recent national study<sup>4</sup> which might indicate some progress. Nearly two third (62.5%) participants responded that they didn't seek institutional delivery because they didn't encounter any problem or complication. Nearly three in every ten participants emphasized lack of money as the reason for not having institutional delivery. This finding was suggested by some other studies.<sup>13, 14</sup> One in every five Participants reported lack of transportation as the reason for not seeking institutional delivery care which is comparable with other studies.<sup>13, 14</sup>

These are also supported by FGD findings of this study. According to women of both FGDs groups, the main reasons for not utilizing institutional delivery services are transport problem, lack of money, unexpected delivery and family restriction. The FGDs participants also indicated that some women opt for institutional delivery in seek of monetary incentive, for safe delivery and to manage complications. Another studies also reported similar reasons.<sup>13,14,15</sup> It has been found in this study that primiparous women or women with less number of children were more likely to utilize institutional delivery services. This

finding is in accordance with other studies.<sup>16,17,18</sup> This study has shown that education of mother was significantly associated with institutional delivery service utilization. Literate mothers were more likely to have institutional delivery services than illiterate mothers. This finding is in line with other studies.<sup>1,6,14,16,17,19,20</sup> Education is associated with higher level of health awareness and greater knowledge of available health services. It is also a means that affects decision making as well as enhance level of autonomy. Education improves ability and freedom to make health-related decisions, including choice of maternal services to use.<sup>1</sup>

Studies in Nepal and India have shown that ethnicity affected delivery services utilization. The upper caste group has better institutional service utilization compared to Dalit and other socially disadvantaged castes.<sup>20,21</sup> In line with these studies, our study also showed association between ethnicity and institutional delivery service utilization. Mothers from relatively disadvantaged ethnic group (Muslim and Dalit) were less likely to have institutional delivery services. But this is contrary to findings of a study<sup>18</sup> that deny our findings. Researches done in Nepal have also shown the significant association of ethnicity and place of delivery.<sup>22,23</sup> We found no significant relationship between age and institutional service utilization which is in line with the study from Nigeria which also denied the association between age and use of skilled assistance during delivery.<sup>14</sup> It is in contrast to the observations made by another study.<sup>6,19</sup>

The current study confirmed an association between knowledge on importance of SBA and institutional delivery (i.e., mothers having good knowledge on importance of SBA were more likely to have institutional delivery compared to those who had poor knowledge). The knowledge of mothers regarding the importance of SBA and institutional delivery would be upgraded by educating mothers during ANC and through Mass Media. This is suggested in this study that ANC visit and media exposure are the crucial factors for having institutional delivery services. ANC practice of four or more times was significantly

associated with institutional delivery. It can be inferred from the finding that improving ANC practice in community increases the probability of institutional delivery. This finding is in line with other studies.<sup>1, 7, 14, 18, 19, 20, 23</sup>

In the current study, exposure to media with maternal health service related message was found significantly linked with institutional delivery services similar to the other studies<sup>19, 24</sup> that showed the association of media exposure with delivery service utilization. It can be inferred from the study that media exposure provides opportunity for mothers to know the importance of maternal health services and upgrade their knowledge regarding ANC and SBA; which, in turn, makes them to complete 4 ANC visit. Regular and frequent ANC visit provide furthermore opportunity for mothers to have knowledge on importance of SBA; which, in turn, enables to have institutional delivery. It can also be reasoned that women who once come in contact with health facilities during ANC were motivated by health workers for institutional delivery.

Mothers from higher economic status were found more likely to utilize institutional Delivery service which supports the study done in Nepal.<sup>18, 19</sup> Women's autonomy status was found significantly associated with delivery service utilization. Mothers from high women's autonomy status were found more likely to utilize institutional delivery service. This finding is similar to study from Pakistan and Nepal.<sup>14, 15, 19, 23</sup> Multivariate regression analysis in our study confirmed the significant association between institutional delivery services with Good knowledge on importance of SBA, completion of 4 ANC service, media exposure with maternal health service related messages, relatively advantaged ethnicity, higher rank of women's autonomy and higher wealth rank.

This study has a number of strengths. It used quantitative as well as qualitative data source. Women who had live birth within 1 year prior to the interview were interviewed during this study. This reduced the magnitude of recall bias by the participants. It also employed a standardized



questionnaire format which was carefully developed to ascertain accurate responses and information from the participants. The analysis used the NDHS-wealth index, a systematically developed composite index, to measure the economic status of the participants. The study used relevant measurements of women's autonomy, which was measured by analyzing three key areas: control over finances, decision making power and the extent to which they have freedom. Limitations of our study included the cross-sectional study design, due to which the temporal association could not be established. The source of data was based on the self-report of respondents, and provided no validation of obtained information with any objective source such as health facility cards. Social desirability bias may also be an issue in cases that women feel they need to respond in a way expected of them. The statistical power of this study is low, which is evident from the width of CIs.

Based on the findings of this study, several recommendations can be made. The first recommendation is to educate mothers on the importance of ANC and institutional delivery. In addition, efforts can be made to reinforce women's autonomy. Provisions of community ambulance system can also be helpful to address the transportation problem. Encouraging women to complete their schooling and teaching/encouraging women to have antenatal care frequently are also important to increase institutional delivery services.

## CONCLUSION

Good knowledge on importance of SBA, completion of 4 ANC (Antenatal care) service, media exposure with maternal health service related messages, relatively advantaged ethnicity, higher rank of women's autonomy, and higher wealth rank were found significantly associated with institutional delivery service utilization.

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