

# Factors Associated with Utilization of Institutional Delivery Service During Covid-19 Pandemic

Radha Devi Dhakal,<sup>1</sup> Shobhana Nepal,<sup>1</sup> Namuna Thapa,<sup>1</sup> Sushma Sapkota,<sup>1</sup> Sita KC,<sup>2</sup> Prativa Adhikari<sup>3</sup>

## ABSTRACT

**Background:** The utilization of institutional delivery services is pivotal to improve maternal health and reducing maternal mortality amid childbirth. But COVID-19 pandemic is posturing considerable challenges to maintain essential maternal and newborn health services. So study aims to assess the factors associated with the utilization of institutional delivery during the COVID -19 pandemic.

**Methods:** Data was collected from the 116 mothers of Kalika Municipality, Chitwan. The total enumerative sampling technique was used to include mothers who delivered a baby during lockdown (March 21 to August 21, 2020). Collected data were analysed by using descriptive and inferential statistics like chi-square test, logistic regression analysis.

**Results:** Out of 116 mothers, 76.6% had their delivery in the health facilities. Logistic regression analysis showed several factors associated with utilization of institutional delivery such as ethnicity, respondents education status, distance to the nearest health facility, fear of traveling, fear to visit health facility (AOR= 4.923; 95% CI =1.475-16.432, p=0.001), perception on the risk of covid-19 to mother, and intrauterine transmission of COVID-19 (AOR= 19 5.472;95% CI 1.35-22.175;p= 0.017) was found to be statistically significant with the utilization of institutional delivery during COVID-19 pandemic.

**Conclusions:** Several factors have been associated with the utilization of institutional delivery during pandemic. Women preferred not to seek healthcare due to the fear of being infected, lack of awareness, and misperception about COVID-19 and pregnancy. Therefore, the concerned authority should need to deliver a separate message to the pregnant women for a regular check-up and deliver a baby at a hospital.

**Keywords:** COVID-19 pandemic; institutional delivery; and utilization

## INTRODUCTION

Institutional delivery service utilization is one of the keys and proven interventions to improve maternal health and reduce maternal mortality.<sup>1</sup> The COVID-19 pandemic is posing considerable challenges to maintain the high quality, essential maternal and newborn health services.<sup>2, 3</sup> Alarming declines in the use of health services and quality of care are being reported.<sup>4</sup> Declining use of maternity services estimated an 8.3%-38.6% increase in maternal deaths per month across 118 Low middle-income countries.<sup>5</sup> In Nepal, institutional birth rates declined by almost 50%, in selected hospitals between January and May 2020.<sup>4,6</sup> pregnant women may

experience fear and difficulties to visit health facilities due to inaccessibility, lack of transport, disruption of the healthcare system, and the stay-at-home policy have affected maternal outcomes.<sup>2,6-9</sup> This study aims to assess the factors associated with the utilization of institutional delivery services during the COVID-19 pandemic.

## METHODS

A cross-sectional analytical research design was conducted to find out the factors associated with the utilization of institutional delivery services during the COVID-19 pandemic among mothers residing in

**Correspondence:** Radha Devi Dhakal, Shree Medical and Technical College, Bharatpur, Chitwan Nepal. Email: radhadhakal2012@gmail.com, Phone: +9779849512264.

## Author Affiliations

<sup>1</sup>Shree Medical and Technical College, Bharatpur, <sup>2</sup>College of Medical Sciences, Bharatpur, Chitwan, Nepal, <sup>3</sup>Narayani Public Institute, Bharatpur, Chitwan, Nepal.

Kalika Municipality. Out of 5 municipalities of Chitwan District, Kalika municipality. At first, Kalika municipality was selected purposefully where the health services are relatively less accessible. It is located in the northeastern part of Chitwan in the Bagmati province, the current area of the municipality is 149.08 sq. The municipality is geographically flat and has some hilly terrain. It has total 11 wards, ward number 1 to 8 is in plain terrain and 9 to 11 is in hilly terrain. Furthermore, three wards from plain terrain and one ward from hilly terrain were selected by lottery method as the study area. In each ward, there were three Female Community Health Volunteers (FCHVs) who keep a record of all pregnant women and mothers who have given birth. The FCHVs of the selected wards were visited first at their homes and a list of mothers who had given birth during lockdown was developed from their records and a total enumerative sampling technique was used to include mothers who delivered babies during lockdown (March 21 to August 21/2020) and living in 4 different wards of Kalika Municipality.

All married women who delivered babies during lockdown 2020 march 21 to August 21 and living in Kalika Municipality were included in the study, women who unwilling to participate, mentally ill or disabled (dumb/deaf) were excluded.

Before data collection, ethical approval was obtained from the Institutional Review Committee SMT-IRC-20210111-71 and formal permission was obtained from concerned ward offices of Kalika Municipality. Written informed consent was taken from respondents. The researcher herself collected the data. A face-to-face interview method was used to collect the information. Semi structured interview schedule tool was developed to collect data. Content validity of tool was maintained by thoroughly reviewing the literature, consulting with the subject expert. The tool was first developed in the English language and translated to Nepali version and back translate to English. Pre-testing of the tool was done among 10% of the respondents at the adjoining

ward of the municipality. Modification on the tool was done as per the findings of pretesting. A pretested tool was used to collect information to measure the research variable. The research tool consisted of three parts: Part I: questions related to socio-demographic factors, Part II questions related to obstetrics, health service, Pandemic, and transportation-related factors, and Part III: questions related to COVID-19 awareness and perception related factors.

The collected data was checked, reviewed, and organized for accuracy and

completeness on daily basis. Data were entered in Microsoft Excel 2016 for cleaning and coding and later imported to Statistical Package for Social Sciences (version-20.0) for statistical analysis. Descriptive statistics (frequency, percentage, mean and standard deviation) and inferential statistics (chi-square test, logistic regression) were used for statistical analysis.

Table 1. Status of Utilization of Institutional Delivery Services during COVID-19 Pandemic.		n=116
Birthplace		Frequency (%)
District hospital		45(38.6)
PHC/birthing center		22(19)
Private hospital		22(19)
Home		27(23.4)

## RESULTS

Table 1 shows, Out of the total of 116 respondents, 89 (76.6%) of the respondents had delivered their last child in a health care facility while 27(23.3%) had home delivery. Of those who delivered in a health care facility, 45 (50.6%) had delivered in a district hospital, 22 (24.7%) delivered at a private level, and 22 (24.7%) in the primary level health facility.

**Table 2. Association between Utilization of Institutional Delivery Service during COVID-19 Pandemic and Sociodemographic related Factors.**

Variable	Category	Utilization of Institutional Service		UOR (95% CI)	p-value	AOR (95% CI)	p-value
		Yes	No				
Age in years	≤25	27(32.2)	15(9.8)	1		1	
	> 25	62(83.80)	12(16.20)	2.870(1.18-6.944)	0.017*	5.473(1.250-23.960)	0.035*
Ethnicity	Janajati	65(72.2)	25(27.8)	1		1	
	Other than janajati	24(92.3)	2(7.7)	4.615(1.015-20.986)	0.033*	16.493 (0.94 286.77)	0.048*
Religion	Hindu	70(77.80)	20(22.20)	0.776(0.286-2.106)	0.617	0.627 (0.127-3.1)	0.567
	Other than Hindu	19(73.10)	7(26.90)	1		1	

Respondent education status	Literate	87(84.50)	16(15.50)	0.033(0.007-0.165)	<0.001*	0.027(0.004-0.209)	0.001*
	Illiterate	2(15.40)	11(84.60)	1		1	
Husband education status	Literate	88(80)	22(20)	0.05 (0.006-0.45)	<0.001*	0.566(0.039-8.106)	0.675
	Illiterate	1(16.70)	5(83.30)	1		1	
Respondent occupation	Paid	2(18.20)	9(81.80)	21.75(4.33-109.252)	<0.001*	89.933(7.785-1038.915)	<0.001*
	Unpaid	87(82.90)	18(17.10)	1		1	
Husband occupation	Paid	50(69.40)	22(30.60)	3.432(1.192-9.881)	0.018*	1.662(0.356-7.75)	0.518
	Unpaid	39(88.60)	5(11.40)	1		1	
Type of family	Single	33(89.2)	4(10.8)	3.388(1.078-10.654)	0.038*	7.568(1.166-49.116)	0.034*
	Joint	56(70.1)	23(29.90)	1		1	

\*statistically significance at  $\leq 0.05$  level, 1=reference group, significant at 95% CI, UOR =Unadjusted odds Ratio, AOR = adjusted odds ratio.

Table 2 shows, data result delineate, that respondents socio-demographic factors such as age (AOR=5.473; 95%CI= 1.250-23.960; p=0.035), ethnicity (AOR =16.493; 95% CI = 0.94-286.77;p=0.048) respondents education (AOR= 0.027; 95% CI = 0.004-0.209; p=<0.001, respondents occupation ( AOR 89.933; 95% CI = 7.785-1038.915;p=<0.001), type of family (AOR =7.568 95% CI=1.166-49.116;p=0.034) were found to be influential factors significant for utilization of institutional delivery during COVID-19 pandemic.

**Table 3. Association between Utilization of Institutional Delivery Service during COVID-19 Pandemic and Obstetric Related Factors.**

Variable	Category	Utilization of Institutional Service		UOR (95% CI)	p-value	AOR (95% CI)	p-value
		Yes	No				
Number of pregnancy	One time	45(95.1)	2(4.30)	07(0.017-.0350)	0.001*	0.117(0.014-0.953)	0.045*
	>One time	44(63.80)	25(36.20)	1		1	
Number of child	One child	85(81)	20(19)	0.134(0.0360.504)	0.001*	0.102(0.012-0.878)	0.038*
	>One child	4(36.40)	7(63.60)	1		1	
Pregnancy plan	Yes	69 (82.10)	15(17.90)	0.362(0.146-0.898)	0.025*	0.888(0.178-4.423)	0.885
	No	20(62.50)	12(37.50)	1		1	
Decision on the place of delivery	Self	48(69.60)	21(30.4)	2.99(1.102-8.114)	0.032*	2.932(0.703-12.299)	0.140
	others	41(87.2+0)	6(12.80)	1		1	
Advice given by health worker for institutional delivery	Yes	83(88.30)	11(11.70)	0.05(0.016-0.154)	<0.001*	0.056(0.008-0.376)	0.003*
	No	6(27.30)	16(72.70)	1		1	
Aware about delivery incentive	Yes	67(85.90)	11(14.10)	0.226(0.091-0.559)	<0.001*	0.228(0.056-0.924)	0.038*
	No	24(54.50)	20(45.50)	1		1	

Table 3 showed that number of pregnancy (AOR= 0.117; 95% CI 0.014-0.953; p=0.045), number of child (AOR= 0.102; 95% CI 0.012-0.878; p=0.038) , advice received for institutional delivery (AOR=0.056; 95% CI 0.008-0.376; p= 0.003) and aware about delivery incentive (AOR= 0.228; 95% CI 0.056-0.924; p=0.038) were found to be statistically significant with utilization of institutional delivery during COVID-19 pandemic.

**Table 4. Association between Utilization of Institutional Delivery Services during COVID-19 Pandemic with Transportation and Pandemic related Factors.**

Variable	Cate- gory	Utilization of Institu- tional Service		UOR (95% CI)	p-value	AOR (95% CI)	p-value
		Yes	No				
Distance to nearest health facility	≤30 min	69(88.50)	9(11.50)	14.609(4.132-51.653)	<0.001*	32.582(5.303-200.18)	<0.001*
	>30min	20(52.60)	18(47.40)	1		1	
Availability of transport at home	Yes	48(85.70)	8(14.30)	3.029(1.249-7.346)	0.02*	0.546 (0.146-2.04)	2.04
	No	41(68.30)	19(31.70)	1		1	
Difficulty in reaching health facilities due to lockdown	Yes	57(85.10)	10(14.90)	1		1	
	No	32(65.30)	17(34.70)	0.33(0.135-0.807)	0.013*	2.556(0.764-8.544)	0.128
Difficulty to get ambulance due to lockdown	Yes	44(80)	11(20)	1		1	
	No	45(73.80)	16(26.20)	1.422(0.594-3.405)	0.428	0.469(0.134-1.644)	0.237
Fear to visit the health facility	Yes	58(85.30)	10(14.70)	1		1	
	No	31(34.60)	17(35.40)	3.181(1.3-7.781)	0.009*	4.923(1.475-16.432)	0.001*
The fear with health worker	Yes	48(76.20)	15(23.80)	1		1	
	No	41(77.40)	12(22.60)	0.937(0.394-2.227)	0.882	0.547(0.156-1.92)	0.346
Fear to traveling	Yes	45(88.2)	6(11.8)	1		1	
	No	44(67.7)	21(32.3)	2.73(1.005-7.415)	0.009*	3.136(0.903-10.896)	0.042*
Interruption in health services	Yes	16(80)	4(20)	1		1	
	No	73(76)	23(24)	0.793(0.241-2.613)	0.622	0.97(0.188-5.008)	0.971

Furthermore, Table 4 shows that distance to nearest health facility (AOR= 32.582; 95% CI =5.303-200.18; p=<0.001), fear to visit health facility (AOR= 4.923; 95% CI =1.475-16.432, p=0.001), and fear to travelling (AOR= 3.136; 95% CI= 0.903-10.896; p= 0.042) were found to be statistically significant with utilization of institutional delivery during COVID-19 pandemic.

**Table 5. Association between Utilization of Institutional Delivery Services during COVID-19 pandemic with COVID 19 Awareness Related Factors.**

Variable	Category	Utilization of Institutional Service		UOR (95% CI)	p-value	AOR (95% CI)	p-value
		Yes	No				
Awareness towards COVID-19	Excellent	22(75.90)	7(24.10)	1		-	
	Good	35(89.70)	4(10.30)	4.375(1.323-14.467)		-	
	Poor	32(66.70)	16(33.30)	1.571(0.555-4.45)	0.04*	-	
Pregnant women are at more risk of COVID-19 than others	Yes	81(84.40)	15(15.60)	0.123(0.043-0.353)	<0.001*	0.13(0.035-0.48)	0.002**
	No	8(40)	12(60)	1		1	
A safe place for delivery of pregnant women with suspected or confirmed COVID-19	Hospital	26(63.4)	15(36.60)	3.029(1.249-7.346)	0.012*	1.796(0.564-5.723)	0.322
	Home	63(84)	12(16)	1		1	
Before delivery, all pregnant women needed to test for COVID 19	Yes	44(86.30)	7(13.70)	1		1	
	No	45(69.20)	20(30.80)	2.794(1.074-7.265)	0.031*	0.301(0.092-0.985)	0.047**
Intrauterine transmission of COVID-19	Yes	48(67.60)	23(32.40)	1		1	
	No	41(91.10)	4(8.90)	4.911(1.57-15.367)	0.004*	5.472(1.35-22.175)	0.017**
Pregnant women with suspected or confirmed COVID-19 have the right to treat with dignity	Yes	64(83.10)	13(16.90)	0.363(0.15-0.879)	0.002**	0.303(0.084-1.085)	0.044**
	No	25(64.10)	14(35.90)	1		1	
Pregnant women with suspected or confirmed COVID-19 should treat in separately	Yes	32(88.90)	4(11.10)	1		1	
	No	57(71.30)	23(28.70)	0.31(0.098-0.975)	0.038*	0.402(0.098-1.65)	0.206
COVID-19 virus could transmit through breastfeeding	Yes	56(70.90)	23(29.10)	1		1	
	No	33(28.4)	4(10.80)	3.388(1.0781-9.654)	0.003*	1.592(0.254-9.972)	0.619

Table 5 shows respondents knowledge and perception towards COVID-19 ,where pregnant women are at more risk of covid-19 than others (AOR=0.13 ,95% CI =0.035-0.48;p=0.002,) ,before delivery all pregnant women needed to test for COVID-19 (AOR= 0.301,95% CI = 0.092-0.985; p=0.047 ) ,intrauterine transmission of COVID-19 (AOR= 19 5.472 ;95% CI 1.35-22.175;p= 0.017), pregnant women with suspected or confirmed COVID-19 have right to treat with dignity (AOR= 0.303,95% CI =0.084-1.085p= 0.044) were found to be statistically significant with utilization of

institutional delivery during COVID-19 pandemic.

## DISCUSSION

The data in this study revealed that the majority (76.6%) had utilized health facilities for delivery during pandemic while the rest (23.4%) had delivered at home. This is a low figure than the annual data of 2019, Chitwan district, which showed above estimated (123.3%) of the delivery occurred in health care facilities.<sup>10</sup> Similarly, the study conducted in a selected hospital in Nepal<sup>4</sup> also showed institutional childbirth reduced by more than half during the lockdown. After the COVID-19 outbreak, more women are choosing to give birth at home so an increase in the number of home births has been reported in New York Bangladesh India, and Pakistan.<sup>9,11-13</sup> This might be due to the movement restrictions, transport challenges, stay home order and fear over possibly being exposed to coronavirus are main barriers to women to visit the health facility for childbirth, and it could lead to unfavourable outcomes for the mother and newborn.

In this study, greater utilization of institutional delivery services during the pandemic was found among age >25 as compared to <25 age with a mean of 24.7 years this finding is in the line of study findings of KC et al<sup>4</sup>, where the mean age of women giving birth at health institution during lockdown was 24.3 years (SD). Furthermore, in this study, Brahmin/Chhetri/Thakuri was 16.493 times more likely to utilize institutional delivery service during the pandemic as compared to Janajati and Dalit. These findings are supported by the study findings of KC et al,<sup>4</sup> Karki and Morgan<sup>9</sup>, which showed an increase in the use of childbirth services by women of the relatively advantageous ethnic group Brahmin and Chhetri- during lockdown 33.9% compared with before lockdown 30.7% births. A possible explanation, greater utilization of institutional delivery services among Brahmin/Chhetri might be indicating a widening equity gap due to COVID-19 and also point to the higher societal value given to this particular ethnic group may have the greater accessibility to the services.

Higher the education level greater the utilization of institutional delivery services showed in various studies which further supports the finding of this study as well.<sup>14-16</sup> Furthermore, the findings of Nepal Demographic and Health Survey (NDHS) also stated that women with SLC and above education (85%) delivered in a health facility.<sup>17</sup> As education makes mothers be more concerned for their health and have more autonomy to make decisions about their health, which eventually enhances their health-seeking behaviour. NDHS revealed that women in the wealthiest households (90%) are more likely to deliver at a health facility.<sup>16</sup> Surprisingly, in this

study, the mother who was involved in paid occupation 89.933 times less utilize the institutional delivery services during the pandemic. This might be due to this study involving those mothers in paid categories who were from daily wages and service holder groups. Due to lockdown financial barriers to seeking work caused financial crisis, monthly salaries also being held by some institution, economic and financial insecurity resulting from COVID-19 might be the reason not to prefer for institutional delivery.

The mother who has been pregnant for the first time and having one child was found higher utilize the institutional delivery during the pandemic. This finding is supported by the study of Alemi et al<sup>15</sup> done before the COVID-19 outbreak revealed that women with parity 1 were more likely to give birth at health care facilities than multiparous women (OR =3.05). The possible explanation is due to women who are pregnant for their first child are usually more likely to fear complications during labour and delivery whereas multiparous women have less fear, experience, and knowledge from previous pregnancies and births. Antenatal clinic (ANC) visit, counselling on incentive and institutional delivery, has been the positive influencing factor for the utilization of institutional delivery services in various studies<sup>15,18</sup> which further supports the finding of this study as well. Antenatal care visits offer an opportunity to get counselling services on birth preparedness, incentive, danger signs, the benefit of institutional delivery over home delivery.

The finding of this study revealed that women who have fear visiting health facilities 4.923 less utilize the institutional delivery. Which is supported by the findings of studied where pregnant women are reported to have experienced increased fear and anxiety as a result of COVID-19 which led many women to change their plan of childbirth and they are planning to have home deliveries.<sup>7-9, 19</sup> A possible explanation, women preferred not to seek healthcare due to the fear of themselves being infected with the virus or transmitting it to their unborn babies. Another reason for fear is that the government delivered only one main message to the public: that the virus is dangerous and people should stay at home. Most importantly, need to deliver a separate message to the pregnant women that they should visit the hospital for a regular check-up and deliver a baby at the hospital. In this study, women from less distance to nearest health facility have 32.582 times more utilize institutional delivery service than far distance. Similar findings revealed by the studies conducted before the pandemic showed that women who had to travel long distances were less likely to give birth at the health facility. The Long-distance between

residence and health facilities was the most common reason for choosing a home for delivery<sup>2, 20</sup> After the COVID-19 outbreak lockdown, transport challenges are acting as barriers to far distance women who are trying to access maternal health care during the pandemic. Resolving transport challenges by establishing measures to enable women to access referral-level hospital care.

In this study, most of the women who perceived that pregnant women are at more risk of COVID-19 than others are less likely to visit the health facility for delivery. This is contradictory with findings of studies that concluded pregnant women do not appear more likely to contract the infection than the general population.<sup>21-24</sup> Pregnancy itself alters the body's immune system and response to viral infections in general, which can occasionally cause more severe symptoms. This may be the same for COVID-19 but there is currently no evidence that pregnant women are more likely to be severely unwell.<sup>21,22</sup>

In this study, most of the women who perceived that before delivery all pregnant women needed to test for COVID-19 were less likely to visit health facilities for delivery. However, World Health Organization (WHO) recommendations are that pregnant women with symptoms of COVID-19 should be prioritized for testing. If they have COVID-19, they may need specialized care.<sup>21,22</sup> In this study who perceived that COVID-19 does not transmit intrauterine life have 5.472 higher chance to visit health facilities than those who perceived it can be transmitted mother to fetus in intrauterine. Studies showed there is currently no evidence that a pregnant woman with COVID-19 can pass the virus to her fetus or baby during pregnancy or delivery also no evidence that the virus passes through breastmilk.<sup>21, 22,25</sup> However, it is suggested that while parents with coronavirus can continue to breastfeed, they might consider wearing a mask. Another option is to pump milk and have someone who is well feeding it to the baby.<sup>24,25</sup> In this study who perceived that pregnant women with suspected or confirmed COVID-19 have the right to treat with dignity have more utilize the institutional delivery. This is supported by the WHO recommendation which states that all pregnant women, including those with confirmed or suspected COVID-19 infections, have the right to high-quality, respectful care before, during, and after childbirth.<sup>23</sup>

There was a possibility of recall bias as the mothers were asked about the utilization of the institutional delivery service received at the time of lockdown within last 6 month prior to the data collection. The findings may not be generalizable in all places as the sample was restricted to four wards of the Kalika municipality

of Chitwan district.

## CONCLUSIONS

In this study, women preferred not to seek healthcare for several factors such as ethnicity, respondent's education status, distance to the nearest health facility, fear to visit a health facility, misperception about COVID-19 and pregnancy were found to be statistically significant with the utilization of institutional delivery during COVID-19 pandemic. Therefore, Proper dissemination of information regarding the availability of delivery services, awareness on COVID-19, and removal of misperceptions about COVID-19 and pregnancy can help to increase the utilization of delivery service. Likewise, concerned authorities should need to deliver a separate message to the pregnant women for regular check-ups and deliver a baby at the hospital.

## ACKNOWLEDGEMENTS

First of all, the researchers would like to express their gratitude to Mr. Deepak Tiwari, Sr. PHA Health office Chitwan for providing valuable information related to maternal health services of Chitwan district.

## CONFLICT OF INTEREST

None.

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