



## Factors associated with the utilization of maternal health care services among Lodha women in West Bengal, India

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### KEYWORDS

Maternal health care services, socio-demographic factors, supply side factors, Lodha women, West Bengal

### ABSTRACT

*The objective of the present study was to find out the trends in utilization of maternal health care services by the Lodha women. Furthermore, attempt has also been made to identify the factors contributing to the utilization of maternal health services. The study has been conducted among the Lodha women residing in the district of Jhargram, West Bengal, India. Participants were married, aged between 15 and 44 years, have experienced at least one pregnancy during the last five year period, prior to the date of study. Pretested structured questionnaires were used to obtain the socio-demographic characteristics and utilization of maternal health care services. Three components of utilization of maternal healthcare services were measured: antenatal care (ANC), skilled birth attendants and post-natal care (PNC). Result shows that 88.7% of the participants received ANC service, 62.7% used SBA and 32.0% received PNC service. Bivariate analyses found significant association between utilization of maternal health care services and socio-demographic factors. Multivariate analysis revealed that apart from individual level factors (such as, age, education, parity, total number of pregnancy and women autonomy), supply-side/ contextual level factors [such as availability of health care providers (ASHA worker), availability of transport facility and distance to sub centre] have a significant bearing on the utilization of maternal health care services.*

### Introduction

Although India recorded significant improvements in maternal health care outcomes at the national level, yet the country accounts for 15% of global maternal deaths (WHO 2015). For example, the maternal mortality ratio (MMR) of India was 174 per 100,000 live births in 2015, while the annual rate of MMR reduction between 1990 and 2015 is 4.6%. Literature shows that the progress in Maternal and Child Health (MCH) has been uneven and inequitable, and many women and children still lack access to adequate health care (Sanneving et al. 2015). Apart from the supply-side factors, micro-level studies have recognized five demand-side structural factors such as economic status, gender, education, social group status (caste or tribe), and age (adolescents) that are associated with inequity in MCH in India. Among the supply-side factors, 'quality' and 'continuum' of availability of MCH services are found to be important among marginalised populations, even if they reach the facilities to obtain such services (Ghosh et al. 2015). Owing to such 'quality' issues, out-of-pocket expenditure (OOP) has been increasing as demand for services shifted from public to private (Issac et al. 2016, Sharma and Bothra 2016).

The utilization antenatal care (ANC) is not only important in order to sustain a better maternal health, but it can largely help mitigate the risk of maternal mortality and morbidity (Bloom et al. 1999).

Skilled attendance at birth (SBA) remains another important intervention in reducing maternal mortality and complications. Yet, utilization of SBA depends on several factors, such as adequate antenatal care (ANC) (Mishra and Retherford 2008), obstetric complications, quality of care, and proximity to a health facility (Gabrysch and Campbell 2009), educational attainment (WHO 2008), age at parity (IIPS 2007), and economic accessibility (Addai 2000).

Provision of postnatal care (PNC) to women and children would reduce the chance of maternal and child mortality (WHO 2014). Studies revealed that factors, like age (Dhakal et al. 2007) and educational attainment of women (Titaley et al. 2009, Babalola and Fatusi 2009, and Tarekegn et al. 2014), decision making ability (Sipsma et al. 2013), and financial and geographical barrier to health care (Babalola and Fatusi 2009) are significantly associated with the utilization of PNC.

In India, health of tribal women is a grossly neglected concept (Narain 2019). Generally, the tribal women follow traditional maternal health care practices. The habit of consuming alcohol during pregnancy has been found to be a practice among tribal women and almost all of them are observed to continue their regular activities including hard labour during advanced pregnancy. As per as child care is concerned, both rural and tribal non-illiterate mothers are observed to breastfeed their babies. Most of them adopt practices like discarding of colostrum, giving prelacteal feeds, delayed initiation of breastfeeding and introduction of complementary feeds. In addition, extremes of magic-religious beliefs and taboos tend to aggravate the problems (Naidu 2015, Contractor et al. 2018 and Narain 2019).

Under this circumstance, we aimed to investigate the trends in three aspects of maternal health care services such as, anti natal care (ANC), use of skilled birth attendants (SBA) during delivery and post natal care (PNC) among the Lodha women. Moreover, the factors contributing to the utilization of ANC, use of skilled birth attendants (SBA) and PNC services among the Lodha women were also identified.

## **Materials and Methods**

We conducted this cross sectional study among a group of indigenous ethnic group known as the “Lodha” of West Bengal, a state located in eastern India. Lodha population have been declared one of the “Particularly Vulnerable Tribal Groups” of this country on the basis of certain characteristics like a low level of literacy, pre-agricultural level of technology, and declining or stagnant population (Ministry of Tribal Affairs, Government of India 2019). In West Bengal, they are mainly concentrated in the districts of Paschim Medinipur and Jhargram. We selected the district of Jhargram for our study. We identified the Lodha population from six villages of this district. In the second stage, we chose two community development (CD) blocks, namely, Jhargram and Binpur from the district of Jhargram. Five villages, Peniabhanga, Dhatkidanga, Swabasa, Suknibasa and Ramchandrapur, were chosen from the CD block, Jhargram, and Dahijuri villages from the CD block Binpur.

We identified 150 participants on the basis of the criteria fixed for the study: married at the time of interview, aged between 15 and 44 years, and experience of pregnancy during last five years prior to the study. The objectives and benefits of the study were explained to and written consent was obtained from all the participants who volunteered to participate.

## Data collection

To assess the trend in utilization of maternal health care, three aspects such as antenatal care, skilled birth attendants at delivery and post-natal care within 48 hours of delivery from any sources have been considered. Structured questionnaires have been administered to collect data, developed in English and then translated into the local language (Bengali), and further retranslated into English to check their validity. Data on the socio-demographic characteristics and utilization of maternal care services were collected using pretested questionnaires. In order to maintain the quality of data to be collected, a pre-test was performed before the actual data collection and interviews were performed using the local language.

### *Socio-demographic characteristics*

It includes the age of the participants at the time of interview, type of family, number of family members, monthly household expenditure [Indian National Rupees (INR)], years of education and occupational types of the participants, duration of marriage, mean age at pregnancy, parity, total number of pregnancy and women autonomy based on indicators of women's mobility (decision making ability on ANC and freedom to avail health facility). Data types also included place of residence, physical quality of the road from the place of residence to the public health centers, availability of transport facility in the locality, distance of health sub-centre from the place of residence, availability of auxiliary nurse midwifery (ANM) and accredited social health activist (ASHA) in the village.

### *Utilization of maternal health care services*

A well tested questionnaire was designed to assess the information on ANC service utilization, delivery using skilled birth attendants and utilization of PNC.

To assess the information on ANC service utilization, participants were asked five questions; e.g., "Did you register your pregnancy at any health facility?", "Did you receive any antenatal care during last pregnancy?", "Have you used IFA tablets during pregnancy?", "Did you complete the full course of IFA tablets?" and "Were you given an injection during last pregnancy to prevent Tetanus?" The response options were 'yes' or 'no'. Other questions like "How many times did you avail health facility during ANC?" the response options were '1-4 times', '5-8 times', '9-12 times' and 'no visit' and "Where did you receive antenatal visit for most of time during pregnancy?" the response options were 'Public Facility' and 'others' were also used.

To assess the information on delivery using skilled birth attendants, participants were asked seven questions pertaining to their last child delivery. For example, "Where did your last delivery take place?"- the response options were 'public facility', 'private facility' and 'home'; "Who conducted the delivery?"- the response options were 'skilled birth attendant' and 'unskilled birth attendant'; "Who motivated you to go to any Facility for delivery?"- the response options were 'ANM' and 'ASHA'; "Where did the motivator advice you to go for delivery?" -the response options were 'public facility' and 'private facility'; "What type of transport facility was provided to you for reaching the health institution?"-the response options were 'arranged by family' and 'arranged by ASHA workers'; "What type of transport facility was provided to you to return from the health institution?" -the response options were 'arranged by family', 'arranged by ASHA workers' and 'provided by panchayet /other government resource'; "Was your health check-up done by health personnel in the institution?" -the

response options were 'yes' or 'no'.

To assess the information on utilization of PNC, participants were asked two questions- (a) "Did you have any health check-up within 48 hours of delivery?" and (b) "During the two months after your delivery, have any health check-up done by health personnel?" The response options were 'yes' or 'no'.

### ***Operational definitions***

Skilled attendants: Professionals who have midwifery skills including doctors, ANM and nurses.

ANC: Pregnancy care provided by skilled health professionals (doctor, ANM or nurse) during last pregnancy period of the participant.

Use of skilled birth attendants: Delivery care provided by skilled health providers (doctor, ANM or nurse) during last pregnancy period of the participant.

PNC: Care provided to women within 48 days after delivery.

Woman's autonomy: An autonomous woman is a woman who can decide on health care spending alone or with her husband.

### **Ethical issue**

The present study was approved by Institutional Ethical Committee, University of Calcutta (approval number: Table Item No. 02, dated 26.12.2018).

### **Data analysis**

Descriptive statistics were used to calculate the frequency of socio-demographic characteristics and utilization of maternal health care services among the participants. Bivariate statistics like a chi square test was used to assess the association between different socio-demographic characteristics and utilization of maternal health care services (ANC, SBA at delivery and PNC within 48 hours of delivery from any sources). A minimum cut off point of  $p < 0.05$  was used to determine the significance level.

Binary logistic regression (using enter method) analyses were done to find out the factors that significantly associated with utilization of maternal health care services. In these analyses, utilization of maternal health care services such as receipt of ANC, place of delivery, use of SBA and receipt of PNC were considered dependent variables. All the socio demographic characteristics were entered in the analyses as independent variables. The following were the reference categories (in parenthesis) for each of the categorical variables: working status (non working), monthly household expenditure in INR (above 5000), availability of ASHA (absent), transport availability (no), distance to sub centre (near) and women autonomy (yes). The rest of the variables, such as age of the participants at the time of interview, years of education, duration of marriage, age at pregnancy, number of pregnancy, parity were treated as continuous variables.

A 'p' value of  $\leq 0.05$  was considered statistically significant and only significant values were presented with odds ratio and 95% confidence interval. The software Statistical Package for Social Science (SPSS) version 16.0 (SPSS Inc, Chicago) was used for analysis of the entire data.

## Results

Table 1 shows that the mean age of the participants was 24.67 years at the time of interview and most of them live in nuclear family with monthly house hold expenditure less than 5,000 (INR). More than half of the participants and of their husbands has not received any formal education and majority of them were engaged in the collection of wood from the forest and manual labour. The physical quality of the roads and availability of the transports was very poor within all the villages. Each of the villages was supported by an appreciable number of ANM and ASHA workers. Most participants got married within the last ten year period prior to the time of study, and the mean age at pregnancy was well below the statutory age at marriage of India with parity between 2 and 4.

An overwhelming majority of the participants (88.7%) received at least one ANC during their last pregnancy. More than half of the participants regularly availed themselves of a public health facility (1-4 times) at the time of pregnancy. The majority of the participants received a tetanus toxoid (TT) injection (above 88.0%) and the frequency was twice during pregnancy. Most of the participants received iron tablets, but very few of them completed the course of this drug. About 62.7% of the participants availed themselves of a public health facility for their deliveries with the help of skilled birth attendants, whereas data shows that home deliveries were done by un-skilled birth attendants. Only 32.0% of the participants received PNC services and very few of them received health check-ups after two months of discharge from any health institution. ANC related decision was taken by both participants and their husbands. They preferred to visit health institution by their own choice (44.0%) (Table2). The use of ANC services depended on total number of pregnancy and number of parity of the participants ( $p \leq 0.05$ ). In addition, there was significant association between use of ANC services and availability of transport and ASHA worker in the respective villages and distance of health sub centre from those villages ( $p \leq 0.05$ ) (Table 3).

Table 4 reveals that socio-demographic variables like age, education and occupation were significantly associated with the institutional delivery ( $p \leq 0.05$ ). The other variables like 'total number of pregnancy', 'parity' and 'freedom to avail oneself of a health facility' was also significantly associated with institutional delivery ( $p \leq 0.05$ ). Table 5 shows similar trend as described in table 4. Moreover, there were significant associations between utilization of PNC services with participant's age, education, total number of pregnancy and women's autonomy (freedom to avail oneself of a health facility) ( $p \leq 0.05$ ) (Table 6). Table 7 shows that year of education, parity, availability of ASHA worker and transport facility, and distance to sub centres from respective villages were significant determinants of receiving ANC course. More particularly, the chance of receiving of ANC services, institutional delivery and use of skilled birth attendants during delivery increased sharply with increased levels of education of the participants. The likelihood of receiving ANC course was found to be higher among villages that were near to the sub centres. The availability of health care providers (ASHA) and transport facility were positively associated with the receiving of ANC course. Parity was found to be significant determinant of receiving ANC course among the participants.

Age was found to be another significant factor associated with place of delivery and receiving PNC service. Additionally, women's autonomy (freedom to avail oneself of a health facility) was positively associated with the utilization of maternal healthcare services such as, place of delivery, availing of SBA and of PNC services. This table also reveals that the likelihood of using of SBA and receiving of PNC service decreased with increased number of pregnancy of the participant.

## Discussion

With the advent of globalization, India's population including those belonging to scheduled tribes (ST) is undergoing demographic, socio-economic and health transformations. The tribal population primarily inhabits rural and remote areas and they are the most vulnerable and marginalized section of the society. Moreover, they lag behind all other social groups in various social, health and developmental indicators (Census 2011). Without addressing the concerns of vulnerable population, India's socio-economic transformation will remain incomplete and it will not be possible to achieve the UN Sustainable Development Goals for which India is committed itself along with other countries (NITI Aayog 2018).

The trends of maternal health of our study reveal that although the ANC and institutional delivery remains prevalent among the studied Lodha community, yet the trend in availing themselves of PNC by the Lodhas is not appreciable. The trend in this finding contradicts the results of NHSF (2015-2016) towards the availing themselves of PNC (IIPS 2017). However, such finding calls for qualitative investigation, which is beyond the scope of our study.

Dahiru and Oche (2015) reveal in their study that older women are more likely to go for institutional delivery as well as use PNC services compared to those who are younger; our study corroborated this finding. The explanation may be that older women might have experienced some complications during their previous delivery and that thrust them to seek additional care of maternal health services.

In our study, a participant's education was positively associated with the utilization of maternal health care services, corroborating studies conducted in other developing countries (Shariff and Singh 2002, Gubhaju et al. 2003, Mrisho et al. 2007, Thind et al. 2008). An explanation for this might be that educated women are expected to have knowledge and awareness about their pregnancy related complications. Moreover, education is likely to improve the general status of women and help them build up confidence to make decisions about their own health.

Parity was found to be a significant determinant of receiving ANC course among the participants of our study, which corroborates some previous studies (Mekonnen and Mekonnen 2002 and Singh et al. 2012). The reason might be that women with lower parity might look for delivery assistance more frequently than those with high parity due to their lower experience in child birth that might develop fear about the difficulties during labor. This could motivate them to seek maternal health care. The other possible explanation for the low utilization of maternal health care services among women with higher parity could be resource and time constraints in maintaining household chores.

Women's autonomy is a very important factor which significantly influences the utilization of maternal health care services. Previous studies showed a significant association between women's autonomy and maternal health (Adhikari 2016, Adjiwanou and Le Grand 2014 and Tiruneh et al. 2017). One of the explanations has been given by Sen and Batliwala (2000), that is a woman's autonomy might increase self-confidence and an inner transformation of one's consciousness, which enables the woman to overcome external barriers and access resources or change traditional ideologies. Bloom et al. (2001) demonstrated that women with a greater freedom of movement obtained higher levels of antenatal care and were more likely to use safe delivery care. The study further concluded that the influence of women's autonomy on the use of health care appears to be as important as other known determinants such as education.

Our study also reveals that apart from individual level factors (such as, age, education, parity, total number of pregnancy and women autonomy), supply-side/ contextual level factors [such as availability of health care providers (ASHA worker), availability of transport facility and distance to sub centre] have a significant bearing on the utilization of such care. For example, the availability of ASHA worker in a village, transport facilities and distance from sub centre enhances the odds of utilization of ANC services among the study participants. A similar trend has been found in other studies also (Lodhiya et al. 2012 and Rashmi et al. 2013). Padda et al. (2013) found in his study that the utilization of ANC service during pregnancy and institutional delivery has been increased after the inception of ASHA workers in a rural community of North India.

Agarwal et al. (2019) reported that the service of ASHA workers is significantly associated with reduction in home deliveries, and births without a skilled attendant, yet the utilization of maternal health care services continues to be the lowest among scheduled tribes, even after accounting for the receipt of ASHA services. One has to keep in mind that we could not control the physical quality of the roads. It could be the case that the physical conditions of the roads are so poor inside the village that pregnant women do not take the chance to travel by road to the health centre for ANC. In such cases, the likelihood of utilization of ANC services also diminishes.

We are aware of the limitations of our study. First, cross-sectional data are not suitable for finding out cause-effect relationship. Second, participants were asked for events (using structured questionnaire) within the last five years, this could have introduced recall bias. Moreover, inclusion of qualitative data (using FGDs or case studies on participants) could have enriched the study.

## **Conclusion**

Although an appreciable number of our study participants were noticeably utilizing ANC, availing institutional delivery, yet the utilization of PNC services is still very low. Further studies need to be addressed to identify whether the demand for the utilization of PNC is lower because of cultural and/or other motivational factors or the health institutions are not prompt in providing PNC.

## **Recommendations**

Policy makers and health planners need to recognize the determinants of maternal health care service use. More efforts should be given to educate mothers, to improve husbands' involvement, to strengthen community participation, to increase political commitment and to boost accessibility to maternal health care services. Emphasis should also be given for capacity building for skilled birth attendants.

The provision of PHC services are a fundamental pillar in the reduction of maternal mortality. However, the quality of Health Extension Program (especially maternal health care) services being provided at the health posts requires urgent assessment.

Furthermore, future studies will need to explore the existing maternal health care services utilization and the current performance on Health Extension Program and its impact on the reduction of maternal mortality. In addition, qualitative studies need to be carried out to get women's perspectives on the provision of maternity care services and what interventions would be appropriate.

### ***Conflict of Interests***

The authors declare that there is no conflict of interests regarding the publication of this paper.

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Table: 1 Socio-demographic characteristics of the participants

Group		Participants (N=150)/ Mean± SD	
Mean age of participants at the time of interview (years)		24.67± 5.91	
Type of family			
Nuclear		108 (72.0)	
Joint		37 (24.7)	
Extended		5 (3.3)	
Members in a family			
≤ 5		122 (81.3)	
>5		28 (18.7)	
Monthly household expenditure (INR)			
Below 5,000		82 (54.7)	
Above 10,000		68(45.4)	
Years of education of participants	Participants(N=150)	Years of education of participants' husband	Husband (N=150)
0	87 (58.0)	0	99 (66.0)
1-4	31 (20.7)	1-4	31 (20.7)
5-8	26 (17.3)	5-8	17 (11.3)
9-10	5(3.3)	9-10	3 (2.0)
≥11	1(0.7)	≥11	-
Occupational types of participants	Participants(N=150)	Occupational types of participants' husband	Husband (N=150)
Wood collection from forest	85 (56.7)	Wood collection from forest	81 (54.0)
Agriculture labour work	6 (4.0)	Agriculture labour work	5 (3.0)
Other labour work	37 (24.7)	Other labour work	54 (36.0)
Home maker	22 (14.7)	Driver	5 (3.0)
		Dead	4 (2.7)
Duration of marriage (in years)		Participants (N=150)/ Mean± SD	
1-10		108 (72.0)	
11-20		36 (24.0)	
21-30		6 (4.0)	
Mean age at pregnancy		17.25± 1.96	
Parity			
1		55 (36.7)	
2-4		90 (60.0)	
≥5		5 (3.3)	
Total number of pregnancy			
1-2		92 (61.3)	
3-4		49 (32.7)	
>5		9 (6.0)	
Place of residence			
Remote village		22 (14.7)	
Forest		85 (56.7)	
Road side		43 (28.7)	
Physical quality of the roads			
Good		43 (28.7)	
Poor		107 (71.3)	
Transport availability			
Available		43 (28.7)	
Not available		107 (71.3)	
Distance of sub centre from residence			
Near to residence		48 (32.0)	
Far from residence		102 (68.0)	
Availability of first ANM in attached Sub Centre			
Yes		138 (92.0)	
No		12 (8.0)	
Availability of second ANM in attached Sub Centre			
Yes		150 (100.0)	
No		-	
Availability of ASHA in attached Sub Centre			
Yes		124 (82.7)	
No		26 (17.3)	

Figures in the parenthesis indicate percentages

Table: 2 The trend in utilization of maternal health care among the participants

Utilization of maternal health care	Participants (N=150)
Registration for antenatal check-ups at any Health Facility	
Yes	135 (90.0)
No	15 (10.0)
Women received antenatal check-ups	
Yes	133 (88.7)
No	17 (11.3)
Number of visiting at any Health Facility for antenatal check-ups	
1-4 times	104 (69.3)
5-8 times	24 (16.0)
9-12 times	5 (3.3)
No visit	17 (11.3)
Place of antenatal check-ups (n=133)	
Public facility	133 (100.0)
Others	-
Use of IFA tablet	
Yes	127 (84.7)
No	23 (15.3)
Complete course of IFA tablet	
Yes	37 (24.7)
No	90 (60.0)
Receive of TT Injection during pregnancy	
Yes	132 (88.0)
No	18 (12.0)
Place of delivery	
Public facility	94 (62.7)
Private facility	-
Home	56 (37.3)
Delivery was conducted by	
Skilled birth attendant	94 (62.7)
Unskilled birth attendant	56 (37.3)
Motivation to go for delivery (n=94)	
ANM	91 (60.7)
ASHA	3 (2.0)
Place of delivery where motivator advice participant to go (n=94)	
Public	93 (62.0)
Private	1 (0.7)
Transport provided to reach the Institute	
Arranged by family	76 (50.7)
Arranged by ASHA	18 (12.0)
Transport provided to back home from Institute	
Arranged by family	14 (9.3)
Arranged by ASHA	6 (4.0)
Arranged by panchayet/other government sources	74 (49.3)
Health check up done by health personnel in the Institute where delivery was done	
Yes	94 (100.0)
No	-
Receive of post natal check-up	
Yes	48 (32.0)
No	102 (68.0)
Receive of health check-up after two months of discharge from Institute	
Yes	13 (8.70)
No	137 (91.30)
ANC related decision	
Participant's husband	4 (2.7)
Participant and participant's husband both	59 (39.3)
With other members	28 (18.7)
No discussion	59 (39.3)
Freedom to availed health facility	
Alone	66 (44.0)
With someone	37 (24.7)
Not all to go	47 (31.4)

Figures in the parenthesis indicate percentages

Table: 3 Percentage distributions of the participants who received antenatal care (ANC) by socio-demographic characteristics

Background characteristics	Participants who received ANC		
	Yes	No	$\chi^2$ p
Age group (in years)			
15-22	58 (100.0)	-	NA
23-30	62 (82.7)	13 (17.3)	
>30	13 (76.5)	4 (23.5)	
Family type			$\chi^2=1.95$ , p=0.37
Nuclear	94 (87.0)	14 (13.0)	
Joint	35 (94.6)	2 (5.40)	
Extended	4 (80.0)	1 (20.0)	
Education level			NA
Non literate	71 (81.6)	16 (18.4)	
Up to upper primary	56 (98.2)	1 (1.8)	
Above upper primary	6 (100.0)	-	
Occupational type			NA
Working	111 (86.7)	17 (13.3)	
Non working	22 (100.0)	-	
Monthly household expenditure			$\chi^2=0.59$ p=0.44
Below 5,000/-	73 (86.9)	11 (13.1)	
5,000/- and above	60 (90.9)	6 (9.1)	
Total no of pregnancy			$\chi^2=12.81$ p=0.002*
1-2	88 (95.7)	4 (4.3)	
3-4	39 (79.6)	10 (20.4)	
Above 5	6 (66.7)	3 (33.3)	
Parity			$\chi^2=7.87$ p=0.01*
1	54 (98.2)	1 (1.8)	
2-4	75 (83.3)	15 (16.7)	
Equal and above 5	4 (80.0)	1 (20.0)	
Place of residence			NA
Forest/remote village	90 (84.1)	17 (15.9)	
Road side	43 (100.0)	-	
Transport availability			$\chi^2=7.70$ p=0.005*
Yes	42 (97.67)	1 (2.33)	
No	91 (85.04)	16 (14.95)	
Distance from sub centre			$\chi^2=9.02$ p=0.003*
Near	47 (97.91)	1 (2.08)	
Far	86 (84.31)	16 (15.68)	
Availability of ANM			NA
Yes	121 (87.7)	17 (12.3)	
No	12 (100.0)	-	
Availability of ASHA			$\chi^2=7.60$ p=0.005*
Yes	114 (91.9)	10 (8.1)	
No	19 (73.1)	7 (26.9)	
Freedom to availed health facility			NA
Alone	66 (100.0)	-	
With someone	32 (86.5)	5 (13.5)	
Not at all	35 (74.5)	12 (25.5)	

Figures in the parenthesis indicate percentages, \*p≤0.05

Table: 4 Percentage distributions of the participants who went for Institutional delivery by socio-demographic characteristics

Background characteristics	Participants who went for Institutional delivery		
	Yes	No	$\chi^2$ p
Age group (years)			
15-22	48 (51.1)	10 (17.9)	$\chi^2= 18.24$ p =0.001*
23-30	40 (42.6)	35 (62.5)	
>30	6 (6.4)	75 (50.0)	
Family type			
Nuclear	66 (70.2)	42 (75.0)	$\chi^2= 2.12$ p =0.34
Joint	26 (27.7)	11 (19.6)	
Extended	2 (2.1)	3 (5.4)	
Education level			
Non literate	42 (44.7)	45 (80.4)	$\chi^2= 18.33$ p =0.001*
Up to upper primary	47 (50.0)	10 (17.9)	
Above upper primary	5 (5.3)	1 (1.8)	
Occupational type			
Working	74 (78.7)	54 (96.4)	$\chi^2= 8.79$ p =0.003*
Non working	20 (21.3)	2 (3.6)	
Monthly household expenditure			
Below 5,000/-	53 (56.4)	41 (43.6)	$\chi^2= 0.015$ p =0.90
5,000/- and above	41 (43.6)	25 (44.6)	
Total no of pregnancy			
1-2	71 (75.5)	21 (37.5)	$\chi^2= 22.78$ p =0.001*
3-4	21 (22.3)	28 (50.0)	
Above 5	2 (2.1)	7 (12.5)	
Place of residence			
Forest/remote village	63 (67.0)	44 (78.6)	$\chi^2= 2.28$ p =0.13
Road side	31 (33.0)	12 (21.4)	
Transport availability			
Yes	31 (33.0)	12 (21.4)	$\chi^2= 2.28$ p =0.13
No	63 (67.0)	44 (78.6)	
Distance from sub centre			
Near	36 (38.3)	12 (21.4)	$\chi^2= 4.58$ p =0.03*
Far	58 (61.7)	44 (78.6)	
Availability of ANM			
Yes	86 (91.5)	52 (92.9)	$\chi^2= 0.08$ p =0.76
No	8 (8.5)	4 (7.1)	
Availability of ASHA			
Yes	80 (85.1)	44 (78.6)	$\chi^2= 1.04$ p =0.30
No	14 (14.9)	12 (21.4)	
Parity			
1	42 (44.7)	13 (23.2)	$\chi^2= 7.45$ p =0.02*
2-4	50 (53.2)	40 (71.4)	
Equal and above 5	2 (2.1)	3 (5.4)	
Road condition			
Good	31 (33.0)	12 (21.4)	$\chi^2= 2.28$ p =0.13
Poor	63 (67.0)	44 (78.6)	
Freedom to availed health facility			
Alone	51 (54.3)	15 (26.8)	$\chi^2= 16.03$ p =0.001*
With someone	24 (25.5)	13 (23.2)	
Not at all	19 (20.2)	28 (50.0)	

Figures in the parenthesis indicate percentages, \*p≤0.05

Table: 5 Percentage distribution of the participants who used skilled birth attendants during delivery by socio-demographic characteristics

Background characteristics	Participants who used skilled birth attendants during delivery		
	Yes	No	$\chi^2$ , p
Age group (years)			
15-22	48 (82.8)	10 (17.2)	$\chi^2= 18.24$ p =0.001*
23-30	40 (53.3)	35 (46.7)	
>30	6 (35.3)	11 (64.7)	
Family type			
Nuclear	66 (61.1)	42 (38.9)	$\chi^2=2.12$ p =0.34
Joint	26 (70.3)	11 (29.7)	
Extended	2 (40.0)	3 (60.0)	
Education level			
Non literate	42 (48.3)	45 (51.7)	$\chi^2=18.33$ p =0.001*
Up to upper primary	47 (82.5)	10 (17.5)	
Above upper primary	5 (83.3)	1 (16.7)	
Occupational type			
Working	74 (57.8)	54 (42.2)	$\chi^2=8.79$ p =0.003*
Non working	20 (90.9)	2 (9.1)	
Monthly household expenditure			
Below 5,000/-	53 (63.1)	31 (36.9)	$\chi^2=0.015$ p =0.90
5,000/- and above	41 (62.1)	25 (37.9)	
Total no of pregnancy			
1-2	71 (77.2)	21 (22.8)	$\chi^2=22.78$ p =0.001*
3-4	21 (42.9)	28 (57.1)	
Above 5	2 (22.2)	7 (77.8)	
Place of residence			
Forest/remote village	63 (58.9)	44 (41.1)	$\chi^2=2.28$ p =0.13
Road side	31 (72.1)	12 (27.9)	
Transport availability			
Yes	31 (72.1)	12 (27.9)	$\chi^2=2.28$ p =0.13
No	63 (58.9)	44 (41.1)	
Distance from sub centre			
Near	36 (75.0)	12 (25.0)	$\chi^2=4.58$ p =0.03*
Far	58 (56.9)	44 (43.1)	
Availability of ANM			
Yes	86 (62.3)	52 (37.7)	$\chi^2=0.08$ p =0.76
No	8 (66.7)	4 (33.3)	
Availability of ASHA			
Yes	80 (64.5)	44 (35.5)	$\chi^2=1.04$ p =0.30
No	14 (53.8)	12 (46.2)	
Parity			
1	42 (76.4)	13 (23.6)	$\chi^2=7.45$ p =0.02*
2-4	50 (55.6)	40 (44.4)	
Equal and above 5	2 (40.0)	3 (60.0)	
Road condition			
Good	31 (72.1)	12 (27.9)	$\chi^2=2.28$ p =0.13
Poor	63 (58.9)	44 (41.1)	
Freedom to availed health facility			
Alone	51 (77.3)	15 (22.7)	$\chi^2=16.03$ p =0.001*
With someone	24 (64.9)	13 (35.1)	
Not at all	19 (40.4)	28 (59.6)	

Figures in the parenthesis indicate percentages, \*p≤0.05

Table: 6 Percentage distributions of the participants who received post natal check-up by socio-demographic characteristics

Background characteristics	Participants who received post natal check up		
	Yes	No	$\chi^2$ , p
Age group (years)			
15-22	28 (48.3)	30 (51.7)	$\chi^2= 11.67$ p =0.003*
23-30	17 (22.7)	58 (77.3)	
>30	3 (17.6)	14 (82.4)	
Family type			
Nuclear	36 (33.3)	72 (66.7)	$\chi^2= 0.50$ p =0.77
Joint	11 (29.7)	26 (70.3)	
Extended	1 (20.0)	4 (80.0)	
Education level			
Non literate	21 (24.1)	66 (75.9)	$\chi^2= 6.16$ p =0.04*
Up to upper primary	25 (43.9)	32 (56.1)	
Above upper primary	2 (33.3)	4 (66.7)	
Occupational type			
Working	38 (29.7)	90 (70.3)	$\chi^2= 2.14$ p =0.14
Non working	10 (45.5)	12 (54.5)	
Monthly household expenditure			
Below 5,000/-	34 (40.5)	50 (55.5)	$\chi^2= 6.30$ p =0.01
5,000/- and above	14 (21.2)	52 (78.8)	
Total no of pregnancy			
1-2	38 (41.3)	54 (58.7)	$\chi^2= 10.92$ p =0.004*
3-4	10 (20.4)	39 (79.6)	
Above 5	-	9 (100.0)	
Place of residence			
Forest/remote village	34 (31.8)	73 (68.2)	$\chi^2= 0.009$ p =0.92
Road side	14 (32.6)	29 (67.4)	
Transport availability			
Yes	14 (32.6)	29 (67.4)	$\chi^2= 0.009$ p =0.92
No	34 (31.8)	73 (68.2)	
Distance from sub centre			
Near	19 (39.6)	29 (60.4)	$\chi^2= 1.86$ p =0.17
Far	29 (28.4)	73 (71.6)	
Availability of ANM			
Yes	47 (34.1)	91 (65.9)	$\chi^2= 3.35$ p =0.06
No	1 (8.3)	11 (91.7)	
Availability of ASHA			
Yes	41 (33.1)	83 (66.9)	$\chi^2= 0.37$ p =0.54
No	7 (26.9)	19 (73.1)	
Parity			
1	22 (40.0)	33 (60.0)	$\chi^2= 4.37$ p =0.11
2-4	26 (28.9)	64 (71.1)	
Equal and above 5	-	5 (100.0)	
Road condition			
Good	14 (32.6)	29 (67.4)	$\chi^2= 0.009$ p =0.92
Poor	34 (31.8)	73 (68.2)	
Freedom to availed health facility			
Alone	43 (65.2)	23 (34.8)	$\chi^2= 11.28$ p =0.004*
With someone	19 (51.4)	18 (48.6)	
Not at all	40 (85.1)	7 (14.9)	

Figures in the parenthesis indicate percentages, \*p≤0.05

Table: 7 Odds ratio of participant who, received antenatal check-ups (ANC), used skilled birth attendants (SBA), and received post natal check-ups (PNC) as well as place of delivery according to participant's characteristics

Dependant variable (s)	Independent variables (s)	Likelihood of receiving ANC and PNC, using skilled birth attendant and Institutional delivery, 95% CI		
		Odds Ratio (Significance)	Lower	Upper
Receive of ANC	Year of education of participant(continuous)	1.38	1.05	6.15
	Availability of ASHA (absent) <sup>R</sup>	6.34	1.12	35.9
	Parity (continuous)	0.55	0.30	0.62
	Transport availability (no) <sup>R</sup>	1.04	1.64	3.28
	Distance from Sub Centre (near) <sup>R</sup>	0.34	0.10	0.90
Place of delivery	Age of the participant (inyears) (continuous)	1.02	1.02	1.25
	Year of education of participant (continuous)	0.77	0.60	0.98
	Freedom to availed health facility (yes) <sup>R</sup>	0.24	0.09	0.67
Use of SBA	Year of education of participant(continuous)	1.02	1.01	1.03
	Freedom to availed health facility (yes) <sup>R</sup>	0.34	0.12	0.95
	Number of pregnancy of the participant (continuous)	0.50	0.25	0.66
	Distance from sub centre (near) <sup>R</sup>	0.56	0.32	0.90
Receive of PNC	Number of pregnancy of the participant (continuous)	0.68	0.32	0.98
	Age of the participant (inyears) (continuous)	9.85	1.78	20.2
	Freedom to availed health facility (yes) <sup>R</sup>	0.33	0.12	0.99

Only significant values have been presented in the table,  $p \leq 0.05$