Does intimate partner violence influence the utilization of maternal health services?

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Abstract

Background Intimate partner violence [IPV] is public health problem globally and most common in developing countries that affects more than one fourth of women of reproductive age [WRA]. It is more critical during pregnancy. IPV not only affects physical and mental well-being but also leads in birth outcomes with negative consequences. **Methods** We use secondary data from Nepal Demographic and Health Survey 2016 to assess the association between IPV, and maternal service utilization: ANC visits and institutional delivery. Altogether 1374 WRA were randomly selected. Background characteristics of WRA and IPV were the independent variables, and ANC visits and institutional delivery were the dependent variables. **Results** Data show that 26 percent of WRA had faced at least one form of IPV, 68 percent had visited health facilities at least four times for ANC check-up during pregnancy, and the rate of institutional delivery was 61 percent. There were association among IPV with ANC visits and institutional delivery ($p < 0.001$). Age group, educational level, ethnicity, number of child, residence setting, and wealth status of WRA were significantly associated with ANC visits and institutional delivery ($p < 0.001$). **Conclusion** IPV, educational level, and wealth status of WRA were significant predictors for maternal health service utilization. Policy maker should incorporate these significant predictors during planning and intervention as well.

Background

Violence whether from intimate partner or from others plays significant impact in public health. But intimate partner violence [IPV] is more critical, that is most common and affecting women disproportionately in Nepal. It is in different forms: physical, mental, psychological or mixed (1). IPV during pregnancy is global health issue and most common in low and middle income countries which creates serious forms of consequences for woman's and child health. IPV not only creates physical problems or injuries but also leads to mental disorder, homicide and even suicide too (2). Various evidence show that IPV is strongly associated with mental disorder in women (3).

Women are at more risk of being exposed to IPV during pregnancy (4). Physical consequences such as a low birth weight, premature birth, birth with disabilities, miscarriage, perinatal mortality are some examples of IPV. Some studies claim that IPV is the predisposing factor for delinquent, hyperactivity, aggressiveness, anti-social behaviours, anxiety, depression as well as somatic symptoms to the children if their mother faced any form of violence during pregnancy (2). IPV also leads to unintended pregnancy. Nearly 15 percent of the total pregnancy is reported as unintended due to IPV(5). Another study shows that more than one third (37%) of the participants reported that they had faced any type of IPV during their lifetime (6,7). It is not only the issue developing countries, but also persists in developed countries. Chisholm et al. (2017) state that suicide and homicide are still the major causes of pregnancy related mortality in many localities of USA. A study from Uganda shows that women having disabilities were more vulnerable to IPV compared to the women without disabilities (8). IPV not only persists in the community but also in the university's students too (9).

Various evidences show the miraculous fact that nearly one third of the women aged more than 15 years have had experience of IPV during their lifetime globally but nearly two third in East Asia (10). IPV during pregnancy leads negative consequences not only the mother but also affects the offspring women's health, and economy (11). It is claimed that the cost of IPV is five percent of the total gross domestic product [GDP] (12).

WHO defines IPV as "any behaviour within an intimate relationship that causes physical damage, psychological or sexual abuse to a woman in the relationship, including physical assault, psychological abuse, forced intercourse and other forms of sexual coercion and of controlling behaviours" (10). Similarly, IPV is defined as "physical, psychological and/or sexual violence that occurs between intimate partners (including cohabiting or divorced intimate partners, independent of gender)" (13). It is universal phenomenon and an intentional manifestation of physical force, sexual and emotional abuse, use of any power to harm against the women form intimate partner (14).

Sustainable development goal number five incorporates achieve gender equality and empower all women and girls and goal number 5.1 and 5.2 have mentioned to end and eliminate all kind of violence and discrimination against women and girls (15), in the same way the Constitution of Nepal has also declared to eliminate all kind of discrimination and violence against women and child (16).

IPV significantly influences the public health. IPV destroys the life in some instances though it can be preventable (1). IPV not only affects the mother but also the child and family as well. Some major component to be healthy, such as breast feeding, good parenting and or family harmony are affected by IPV. Studies show that there was association between IPV and breast feeding that ultimately affected the child health (14). Furthermore, IPV against pregnant women were more likely to be depressive symptoms, anxiety, a low level of attachment with infant and chances of poor breast feeding compared to non-expose to IPV (4). It leads to adverse pregnancy as well as birth outcomes that ultimately affects the gross domestic product and national economy as well (17).

Very few researches are conducted on the field of IPV and its consequences for women's health as well as utilization of maternal health services which are provided at free of cost from government health facilities. So there is a lack of evidence based information whether IPV influences maternal health services utilization or not. This paper aims to find out the association among background characteristics of participants, IPV; and utilization of maternal services specially ANC visits and institutional delivery.

Methods

We extracted secondary data from the Nepal Demographic and Health Survey [NDHS] 2016 to assess the association among background characteristics of women who have had live birth within five-year of the NDHS, 2016; intimate partner violence; and utilization of maternal services. So the participants were the mother who had live birth within the five-year preceding the survey. It was a national representative household based survey conducted on 19th June 2016 to 31st January 2017. NDHS 2016 was the fifth

survey of this type and the main objective of the NDHS was 'to provide up-to-date estimates of basic demographic and health indicators'(18).

We analysed 'four or more visits for antenatal care [ANC]', and 'delivery at health facility' as dependent variables with socio-demographic, and IPV with background characteristics as independent variables such as age group, educational status, ethnicity, number of children, religion, women's autonomy for household decision, residence setting, employment status, and wealth status. The dependent variables were categorized into two attributes for each i.e. (i) less than four ANC visits; and equal or more than four ANC visits; and (ii) delivery at home; and health facilities for the variables: ANC visits and place of delivery respectively. We merged or manipulated some attributes of the variables due to poor responses to make meaningful the bivariate and multivariate analyses. We extracted raw data from NDHS and systematically filtered the data as per the nature of objective.

The study protocol was reviewed and ethical approval was approved from Nepal Health Research Council and the ICF Institutional Review Board. The consent was taken prior to interview from the participants. The questionnaire was the tool for data collection which was translated into Nepali, Maithili and Bhojpuri from English as it required. Data were collected by using tablet computers to facilitate the computer assisted personal interviewing.

Since the survey was designed to represent the national population of 15-49 years. Altogether 12862 sample from the reproductive age group of women were selected based on national household census 2011. Among them only 1374 mothers were included who had most recent live birth in the five-year preceding the NDHS 2016. Univariate [frequency and percentage], bivariate [chi-square test], and multivariate [binary logistic regression] were performed to assess the results. We used statistical package for social science [IBM SPSS Statistics 20] for statistical analysis.

Results

Background characteristics of the participants

Of the participants, nine out of ten were from the age less than 35 years. Among the participants, 49 percent from the age of 25 to 34 years, 41 percent from less than 25 years and rest of them were from more than 34 years. Data show that more than two third (68%) were literate which was just over the literacy rate than the population and housing census 2011 which was recorded as 57 percent of female (19). More than one third (34%) were from Adibasis/Janajatis, 28 percent were from Brahmin/Chhetri and rest of them were from Dalit and others.

Nearly one third of the participants had none/one child, 32 percent of the participants had two children and 15 and 17 percent had three and four or more children respectively. Of the participants, 86 percent were Hindu, whereas six, five, and three percent were from Islam, Buddhist and Kirat/Christian respectively which was as similar as the population and housing census 2011 (19). One third of the

participants expressed that they had no role in household’s decision-making process whereas one third expressed moderate autonomy in household decision. Most of the participants (54%) were from urban areas and 53 percent were engaged in any kind of employment.

Forty-three percent of the participants were from poor economic background; 21 percent were from middle wealth status whereas 37 percent were from rich wealth status. Nearly 22 percent of the participants experienced of physical violence; 13 percent faced emotional violence; eight percent faced sexual violence; and more than one fourth had faced any kind of violence by husband/partner. More than two third (68%) of the participants had visited health facilities for antenatal check-up (ANC) at least four times and 39 percent of the participants expressed that their latest deliveries were performed at their home.

Table 1: Background characteristics of participants (married women)

Experiences of violence and utilization of maternal health service

Data show that experience of violence plays significant role in maternal service utilization. There was negative association between experience of violence and utilization of maternal health services. Seventy-one percent of the participants who did not faced physical violence during pregnancy had visited health facilities for ANC check-up more than four times whereas just 57 percent of the participants, who had faced physical violence, visited for ANC check-up equal or more than four times during pregnancy which was statistically significant ($p<0.001$). Similarly, only 57 percent of mothers who faced emotional violence had equal or more than four time ANC visits compared to 70 percent who did not have faced emotional violence ($p<0.001$). In the same way, only 55 percent of the participant, who had faced sexual violence, had four or more ANC visits compared to 69 percent did visited four or more ANC visits during pregnancy. Majority of the participants (72%), who did not have any kind of violence from husband, had visited health facilities four or more time for ANC compared to 58 percent who had faced at least one violence from husband ($p<0.001$).

Data show that institutional delivery was influenced by any type of violence. Less than half (49%) of the participant, who faced physical violence, utilized delivery services from health facilities compared to 65 percent who did not faced physical violence ($p<0.001$). Nearly the same result observed from any type of violence and delivery at health facilities. Sixty-four and 52 percent of deliveries were conducted in health facilities who did not have any kind of violence and who had at least one violence from intimate partner respectively ($p<0.001$).

Socio-demographic or background characteristics also influenced the number of ANC visits and institutional delivery. Data show that lower the age, higher the ANC visits, and higher the institutional delivery. Seventy-three percent of the participants, having the age less than 25 years, visited health

facilities equal or more than four times for ANC compared to 67 and 54 percent by age group of 25 to 34 years, and more than 34 years respectively ($p<0.001$). Data show the education and ANC visits were positively and significantly associated that higher the education and higher the utilization of maternal health services ($p<0.001$). Eighty-three percent of the respondents, who had secondary education, visited health facilities for ANC more than four times. But less than half (49%) of the respondents, who had no formal education, visited to health facilities for ANC more than four times ($p<0.001$). Brahmin and Chhetri had utilized the maternal health services [four or more ANC visits] than the other ethnicity/caste ($p<0.001$).

The negative relationship was observed between number of child and more than four ANC visits. Higher the number of child and lower the maternal service utilization ($p<0.001$). Eighty-two percent of the respondents who had none/one child visited the health facilities for antenatal services compared to 37 percent of those who had four or more children. Three fourth of the participants, who followed the Buddhist religion, received more the four ANC services compared to 67 and 54 percent of Hindus and Islam respectively ($p<0.05$). Data show that higher women's autonomy in household decision and higher the ANC visits.

Three fourth of the participants who resided in urban areas had visited more than three times of ANC visits compared to rural areas which accounts for 61 percent ($p<0.001$). Employment status of the women also associated with the utilization of ANC services. Seventy-one percent of the participants, who engaged in any kind of occupation, visited health facilities more than three times for maternal health services ($p<0.05$) compared to the participants (65%) who had no job. Wealth index was also associated factor for maternal health service utilization. Eighty percent of the participants who were rich visited health facilities for ANC equal or more than four times compared to middle (65% of the participants) and poor (59% of the participants) ($p<0.001$).

Nearly the same result was observed in institutional delivery. Data show that 68 percent of the participants less than 25 years conducted their last delivery at health facilities compare to 57 and 53 percent of age group of 25 to 34 years and more than 34 years ($p<0.001$). Education plays the positive role in institutional delivery. Seventy-eight percent of participants who had secondary or higher level education gave their last birth at health facilities. But only 56 and 40 percent of the participants who had primary and no education performed their last birth at health facilities ($p<0.001$). Seventy percent of participants who belonged to Brahmin/Chhetri received delivery services from health facilities whereas 63 and 56 percent of Janajatis and Dalit received delivery services from health facilities respectively ($p<0.001$).

Table 2: Experience of violence and maternal health service utilization

Number of child was negatively associated with the institutional delivery. Higher the number of child lower the rate of institutional delivery was observed. Eighty percent of the participants who had none/one child received natal services from health facilities whereas 63 and 46 percent of participants who had two and three children received delivery services from health facilities respectively ($p<0.001$). Sixty-two

percent of the participants who belonged to Hindu received delivery services from health facilities whereas just 59 and 52 percent of Buddhist and Islam received natal services from health institutions.

Participants' residence plays key role in utilization of maternal services. Data show that 70 percent of the participants residing urban areas received natal services at health facilities compared to 51 percent of participants from rural residence ($p < 0.001$). Two-third of the participants who did not currently working received delivery services from health facilities and 57 percent of participants who were currently working received the delivery services from health facilities ($p < 0.01$). Wealth status of the participants seemed positive association with delivery services utilization. Eighty percent of participants, who were rich, received deliver services from health facilities followed by middle (64%) and poor (44 %) respectively ($p < 0.001$).

Adjusted odds ratios for utilization of maternal health services

Data show that participants who faced at least one form of violence from husband were less likely to receive four or more ANC visits compared to no experience of violence from husband (aOR = 0.74, CI [0.56 – 0.98], $p < 0.05$) similarly participants who had experiences of at least one form of violence were less likely to received delivery services at health facilities (aOR = 0.80, CI [0.60 – 0.90], $p < 0.05$). Participants having age more than 34 years were less likely to have four or more ANC visits (aOR = 0.58, CI [0.37 – 0.91], $p < 0.05$) compared to age less than 25 years. Similarly, participants having age between 25 to 34 years tended less likely to receive natal service during delivery form health facilities compared to the age less than 25 years (aOR = 0.86, CI [0.52 – 0.89], $p < 0.01$). Educational status seemed significant predictor for both ANC visits and institutional delivery. Participants having primary; and secondary or higher education were more likely to receive ANC visits four or more time (aOR = 1.62, CI [1.16 – 2.26], $p < 0.01$; aOR = 3.03, CI [2.17 – 4.22], $p < 0.001$) and more likely to receive delivery services form health facilities respectively compared to those who had no education respectively (aOR = 1.68, CI [1.20 – 2.35], $p < 0.01$; aOR = 3.10, CI [2.24 – 4.29], $p < 0.001$).

Table 3: Adjusted odds ratios (aOR) for maternal health services (4th ANC visit and delivered at health facility) for the last birth within the past five-year by selected predictors

Participants belonged to Janajatis were less likely to receive ANC four or more times compared to Brahmin and Chhetri (aOR = 0.59, CI [0.42 – 0.85], $p < 0.01$) in the same way Janajatis were less likely to receive delivery services from health facilities compared to Brahmin and Chhetri (aOR = 0.64, CI [0.45 – 0.90], $p < 0.05$). In case of religion, other religions than Hindu were more likely to receive four or more ANC services and delivery services from health facilities.

The participants who had high autonomy (involved in all three issues) tended to have four or more ANC visits and receive delivery services from health facilities. But the participants residing from rural areas

were less likely to have four or more ANC visits compared to participants from urban areas (aOR = 0.72, CI [0.56 – 0.93], $p < 0.05$). Similarly, participants from rural areas were less likely to receive delivery services from health facilities compared to those who were from urban areas (aOR = 0.68, CI [0.53 – 0.88], $p < 0.01$). Participants who were currently working (job) tended to have four or more ANC visits compared to those who had not (aOR = 1.46, CI [1.11 – 1.91], $p < 0.01$) but less likely to have institutional delivery. Wealth status seemed a key predictor for maternal health service utilization. Participants having middle and rich wealth status tended to have four or more ANC visits compared to those who were poor respectively (aOR = 1.77, CI [1.25 – 2.51], $p < 0.01$; aOR = 2.53, CI [1.82 – 3.52], $p < 0.001$). Similarly, participants having middle and rich wealth were more likely to have delivery at health facilities compared to those who were poor respectively (aOR = 3.06, CI [2.16 – 4.33], $p < 0.001$; aOR = 4.41, CI [3.18 – 6.11], $p < 0.001$).

Discussion

Main findings

Results show that more than one fourth of the women, who had last birth within the past five-year preceding the NDHS 2016, had faced at least one violence from their husband. Nearly one third of them did not have at least four ANC visits and more than one third had experience of delivery at home. Data show that higher the violence leads lower the rate of maternal health service utilization. Similarly, higher the age of women leads lower utilization of maternal health services. Whereas higher education status leads higher utilization of ANC and natal care. Data show that women having more child have lower utilization of maternal health services. Urban women have more utilization rate of maternal health services compared to those who live in rural areas. Interestingly, employed women have more utilization of ANC services but lower utilization of delivery services from health facilities. Economically rich women have more utilization of maternal health services than middle class and poor women. Multivariate analyses show that young than elder, educated than illiterate, Brahmin and Chhetri than other caste, women from urban than rural areas, rich than poor were more likely to utilize the maternal health services available at free of cost at government and other health facilities.

Various studies support the results. One fourth of the participants had faced at least one violence from husband in Nepal but nearly three fourth of the pregnant women had faced at least one form of IPV during their current pregnancy in Iran (4) which is three folds compared to Nepal but more than one third from US have had an experience of IPV which is similar to Nepal in terms of IPV rate (17). Interestingly, not only women but also the gay, bisexual and other men having sex with men [GBMSM] also violated by intimate partner. A study at London shows that GBMSM also victimized by IPV (20). Besides these, child also influenced by IPV. Eighteen percent of children had faced IPV in United States that leads homelessness, involvement in criminal activities, unemployed and chronic health conditions (21).

A study from Dhanusha shows that 29 percent of the pregnant mother had faced at least one types of IPV during their pregnancy (22). Similarly, another study by Laelago, Belachew, and Tamrat (2017)

observed that about 23 percent of the women had faced IPV during their pregnancy at Ethiopia. So it can be concluded that nearly one fourth of the mother are facing IPV during their pregnancy. In the same ways the study also supports the results that IPV during pregnancy was associated with the low utilization of maternal health services (22). A study from Wuhan, China shows that IPV was associated with prenatal depression that leads to adverse birth outcomes (24).

Some controversial statements were observed that elder women were more vulnerable for IPV and their later life can be complex (25) but the study shows that younger women were more vulnerable than elder. So, type and magnitude IPV and its effects may be different in socio-geographical context. A study from Ethiopia shows that low birth weight and pre-term birth were associated with IPV (23,26). So, IPV not only influences the mother but also affects birth outcomes too. Exposure to any form of violence leads to a barrier of maternal health service utilization (27).

Employment is a predictor for IPV during pregnancy. A study conducted at New York City shows that 79 percent of the respondents were victimized by IPV. In the same way, higher education leads to lower IPV which supports the study (28). The study also supports that younger age and poor financial status were associated with IPV during pregnancy as observed by Doi et al. (2019). Another study shows that poverty, lack of education and food security lead to IPV during and after pregnancy (29,30). Appropriate interventions can minimize and control the IPV as various experiments became successful in many countries (31).

A systematic review and meta-analysis [SRMA] shows that IPV reduces utilization of maternal health services by 25 and 20 percent in ANC visits and delivery services by skilled health worker respectively (32). Similarly, another SRMA from Ethiopia shows that women's and partners' educational status, partners' alcohol use were significant predictor for IPV (33). A study conducted at Nawalparasi, Chitwan and Kapilvastu shows nearly the same results that so called 'low caste', women's employment, income, inadequate marital discussion were associated with IPV (34) but another study shows that IPV was not associated with modern contraceptive uses (35). All these studies support the study and can be concluded that IPV is significantly associated with maternal health services utilization.

Conclusions

Data and evidences show that IPV was the significant predictor for the utilization of health services during pregnancy. Therefore, clinical, educational, legal as well as motivational interventions should be planned and implemented to overcome the violence by intimate partner. Intervention programmes should focus the women who belonging in facing violence from their intimate partner, women having age more than 25 years, no education, Janajatis, Dalit and other caste, rural and poor women since they are more vulnerable compared to others.

List Of Abbreviations

ANC: Ante-natal care; GDP: Gross domestic product; IPV: Intimate partner violence; NDHS: Nepal Demographic and Health Survey; WHO: World Health Organization; WRA: Women of reproductive age

Declarations

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Authors' contributions

DA is the principle author of this article. DA and RA designed the study. RA analysed the data. DA, RA, CR, RP and PBT all involved in draft preparation, read/approved the final manuscript, and agreed to submit for publication.

Consent for publication

Not applicable. No personal data have been included.

Conflict of interest

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Tables

Table 1: Background characteristics of participants (married women)

Variables	Category	%	N
Age group	Less than 25 years	40.7	559
	25-34	48.6	668
	35 or above	10.7	147
Education	No education	31.8	437
	Primary	19.7	270
	Secondary or above	48.5	667
Ethnicity	Brahmin/Chhetri	28.2	388
	Janajatis	34.0	467
	Dalit	14.6	201
	Other	23.2	318
Total Children	None/one	35.8	492
	Two	32.3	443
	Three	15.0	206
	Four or more	16.9	233
Religion	Hindu	85.9	1180
	Buddhist	4.8	65
	Islam	6.1	84
	Kirat/Christian	3.2	44
Women's autonomy in household decision	No autonomy	33.4	458
	Moderate autonomy (involved in 1-2 issues)	34.2	470
	High autonomy (involved in all 3 issues)	32.4	445
Place of residence	Urban	53.6	736
	Rural	46.4	637
Currently working	No	46.8	643
	Yes	53.2	731
Wealth index	Poor	42.7	587
	Middle	20.6	283
	Rich	36.7	504
Physical violence by husband/partner	No	78.2	1074
	Yes	21.8	300
Emotional violence by husband/partner	No	87.4	1201
	Yes	12.6	173
Sexual violence by husband/partner	No	92.2	1266
	Yes	7.8	108
At least one violence from husband	No	74.4	1022
	Yes	25.6	352
Number of ANC visits for the most recent live birth in the five-year preceding the survey	Less than 4 visit	31.7	436
	4 or more visits	68.3	938
Place of delivery for the most recent live birth in the five- year preceding the survey	Home	38.8	533
	Health facilities	61.2	841
Total		100.0	1374

Table 2: Experience of violence and maternal health service utilization

Variables	ANC visits #		Place of delivery ##		Total	
	<4 visits	≥4 visits	Home	Health facilities	%	N
Experience of violence						
Physical violence	***			***		
No	28.6	71.4	35.3	64.7	100.0	1074
Yes	42.9	57.1	51.5	48.5	100.0	300
Emotional violence	***			*		
No	30.1	69.9	37.6	62.4	100.0	1201
Yes	43.3	56.7	47.5	52.5	100.0	173
Sexual violence	**			*		
No	30.6	69.4	38.6	61.4	100.0	1266
Yes	45.2	54.8	40.9	59.1	100.0	108
At least one violence from husband	***			***		
No	28.4	71.6	35.7	64.3	100.0	1022
Yes	41.6	58.4	47.9	52.1	100.0	352
Socio-demographic characteristics						
Age group	***			***		
Less than 25 years	26.9	73.1	32.1	67.9	100.0	559
25-34	32.7	67.3	42.7	57.3	100.0	668
35 or above	45.9	54.1	46.7	53.3	100.0	147
Education	***			***		
No education	51.3	48.7	60.3	39.7	100.0	437
Primary	35.4	64.6	44.5	55.5	100.0	270
Secondary or above	17.5	82.5	22.4	77.6	100.0	667
Ethnicity/Caste	***			***		
Brahmin/Chhetri	21.2	78.8	29.8	70.2	100.0	388
Janajatis	30.1	69.9	37.1	62.9	100.0	467
Dalit	35.4	64.6	44.2	55.8	100.0	201
Other	44.7	55.3	48.9	51.1	100.0	318
Number of children	***			***		
None/one	17.8	82.2	20.3	79.7	100.0	492
Two	28.1	71.9	37.4	62.6	100.0	443
Three	37.8	62.2	54.5	45.5	100.0	206
Four or more	62.8	37.2	66.7	33.3	100.0	233
Religion	*			NS		
Hindu	31.2	68.8	38.4	61.6	100.0	1180
Buddhist	25.2	74.8	40.9	59.1	100.0	65
Islam	45.6	54.4	48.4	51.6	100.0	84
Kirat/Christian	29.1	70.9	27.4	72.6	100.0	44
Women's autonomy in household decision	NS		NS			
No autonomy	34.7	65.3	42.2	57.8	100.0	458
Moderate autonomy (involved in 1-2 issues)	32.1	67.9	36.4	63.6	100.0	470
High autonomy (involved in all 3 issues)	28.3	71.7	37.8	62.2	100.0	445
Place of residence	***			***		
Urban	25.2	74.8	30.3	69.7	100.0	736
Rural	39.3	60.7	48.7	51.3	100.0	637
Currently working	*			**		

No	34.7	65.3	34.5	65.5	100.0	643
Yes	29.2	70.8	42.6	57.4	100.0	731
Wealth index	***		***			
Poor	40.6	59.4	56.1	43.9	100.0	587
Middle	34.7	65.3	35.8	64.2	100.0	283
Rich	19.8	80.2	20.4	79.6	100.0	504
Total	31.7	68.3	38.8	61.2	100.0	1374

Note: # = number of ANC visits for the most recent live birth in the five-year preceding the survey; ## = place of delivery for the most recent live birth in the five-year preceding the survey; NS = not significant; *** = significant at $p < 0.001$; ** = $p < 0.01$; and * = $p < 0.05$

Table 3: *Adjusted odds ratios (aOR) for maternal health services (4th ANC visit and delivered at health facility) for the last birth within the past five-year by selected predictors*

Selected predictors	≥ 4 ANC visits			Delivered at health facility		
	aOR	95% CI		aOR	95% CI	
		Lower	Upper		Lower	Upper
Experience of violence						
Violence from husband (at least one form)						
No (ref)	1.00			1.00		
Yes	0.74*	0.56	0.98	0.80*	0.60	0.90
Socio-demographic characteristics						
Age group						
Less than 25 years (ref)	1.00			1.00		
25-34	0.82	0.62	1.09	0.68**	0.52	0.89
35 or above	0.58*	0.37	0.91	0.89	0.57	1.39
Education						
No education (ref)	1.00			1.00		
Primary	1.62**	1.16	2.26	1.68**	1.20	2.35
Secondary or above	3.03***	2.17	4.22	3.10***	2.24	4.29
Ethnicity						
Brahmin/Chhetri (ref)	1.00			1.00		
Janajatis	0.59**	0.42	0.85	.64*	0.45	0.90
Dalit	0.75	0.49	1.15	.76	0.50	1.14
Other	0.46***	0.29	0.71	.38***	0.24	0.59
Religion						
Hindu (ref)	1.00			1.00		
Buddhist	1.86	0.97	3.56	1.08	0.58	2.01
Islam	1.07	0.62	1.83	1.16	0.68	2.04
Kirat/Christian	1.27	0.62	2.60	1.97	0.94	4.15
Women's autonomy in household decision						
No autonomy (ref)	1.00			1.00		
Moderate autonomy (involved in 1-2 issues)	0.88	0.64	1.19	1.08	0.79	1.46
High autonomy (involved in all 3 issues)	1.14	0.83	1.56	1.07	0.78	1.46
Place of residence						
Urban (ref)	1.00			1.00		
Rural	0.72*	0.56	0.93	.68**	0.53	0.88
Currently working						
No (ref)	1.00			1.00		
Yes	1.46**	1.11	1.91	.78	0.60	1.03
Wealth index						
Poor (ref)	1.00			1.00		
Middle	1.77**	1.25	2.51	3.06***	2.16	4.33
Rich	2.53***	1.82	3.52	4.41***	3.18	6.11
Constant	1.437			1.06		
Cox & Snell R Square	.146			.204		
-2 Log likelihood	1500.5			1521.3		

Note: *** = significant at $p < 0.001$; ** = $p < 0.01$; and * = $p < 0.05$