

LSETHE LONDON SCHOOL
OF ECONOMICS AND
POLITICAL SCIENCE ■

LSE Research Online

Jitendra Kumar Singh, [Sara Evans-Lacko](#),
Dilaram Acharya, [Rajendra Kadel](#), Salila Gautam
Intimate partner violence during pregnancy
and use of antenatal care among rural
women in southern Terai of Nepal

**Article (Accepted version)
(Refereed)**

Original citation:

Singh, Jitendra Kumar and Evans-Lacko, Sara and Acharya, Dilaram and Kadel, Rajendra and Gautam, Salila (2017) *Intimate partner violence during pregnancy and use of antenatal care among rural women in southern Terai of Nepal*. [Women and Birth](#). ISSN 1871-5192

DOI: [10.1016/j.wombi.2017.07.009](https://doi.org/10.1016/j.wombi.2017.07.009)

© 2017 [Australian College of Midwives](#)

This version available at: <http://eprints.lse.ac.uk/86640/>

Available in LSE Research Online: February 2018

LSE has developed LSE Research Online so that users may access research output of the School. Copyright © and Moral Rights for the papers on this site are retained by the individual authors and/or other copyright owners. Users may download and/or print one copy of any article(s) in LSE Research Online to facilitate their private study or for non-commercial research. You may not engage in further distribution of the material or use it for any profit-making activities or any commercial gain. You may freely distribute the URL (<http://eprints.lse.ac.uk>) of the LSE Research Online website.

This document is the author's final accepted version of the journal article. There may be differences between this version and the published version. You are advised to consult the publisher's version if you wish to cite from it.

Intimate Partner Violence during Pregnancy and Use of Antenatal Care among Rural Women in Southern Terai of Nepal

Abstract

Background: Underutilisation of antenatal care services due to intimate partner violence during pregnancy has been well documented elsewhere, but it is understudied in Nepal. Our study aimed at exploring the impact of intimate partner violence on antenatal care service utilisation in southern Terai of Nepal.

Method: A community-based cross-sectional study was performed in 6 village development committees in Dhanusha district, Nepal. A total of 426 pregnant women in their second trimester were selected using multistage cluster sampling method. Multivariable regression analyses were used to examine the association between exposure to intimate partner violence and selected antenatal care services, adjusting for covariates.

Results: Among 426 pregnant women, almost three out of ten women (28.9%) were exposed to intimate partner violence at some point during their pregnancy. Pregnant women exposed to intimate partner violence were less likely to: register for antenatal care (OR 0.31; 95% CI (0.08-0.50, P = 0.03)), take iron and folic acid (OR 0.55; 95% CI (0.12-0.90, P = 0.025)), report dietary diversity (middle vs low: OR 0.34; 95% CI (0.11-0.58, p = 0.001) and high vs low: OR 0.18; 95% CI (0.08-0.37, p = 0.004), have rest and sleep during day time (OR 0.47; 95% CI (0.61-0.58, P = 0.0032)), and attend mother's group meetings (OR 0.29; 95% CI (0.10-0.83, P = 0.003)).

Conclusions: Intimate partner violence during pregnancy is associated with low utilisation of antenatal care services. Therefore, effective strategies to prevent or reduce intimate partner violence during pregnancy are needed to improve antenatal care service utilisation in Nepal.

Key Words: Pregnancy, Antenatal Care, Intimate Partner Violence, Nepal

Statement of the significance

Problem or Issue: There is poor utilisation of Antenatal Care (ANC) services in Nepal.

What is already known: Intimate partner violence (IPV) during pregnancy is common in developing countries and it is one of the major factors associated with poor utilisation of ANC services.

What this paper adds: The study identified that about three of ten women in rural southern Terai of Nepal experiencing IPV during pregnancy, which warrants immediate actions.

INTRODUCTION

Maternal mortality remains high in the developing world, approximately 830 mothers die every day from preventable causes related to pregnancy and childbirth; the rate is higher among women living in rural areas, and among poorer communities (1). Despite substantial efforts in reducing maternal and child mortality, Nepal has a high maternal mortality ratio of 229 per 100,000 live births, contributing to 11% of all deaths among women of reproductive age (15–49 years), the majority of which are preventable (2, 3). The government of Nepal introduced a maternity incentive scheme in 2005 which provides women with four Antenatal Care (ANC) visits, free institutional delivery (of baby), maternity care and provision of transportation costs in an effort to reduce maternal mortality (4, 5). Still, the proportion of pregnant women utilizing ANC service is low in Nepal. About a half of all births are attended by a Skilled Birth Attendant (SBA) in Nepal. There are wide discrepancies in utilising ANC services from a skilled provider (nursing staff) between urban (88%) and rural (55%) areas in Nepal. In Terai region, only 63% of pregnant women are receiving ANC services from a skilled provider (6).

Utilisation of ANC service is the key strategy to improving maternal and child health outcomes (7, 8). The benefits of ANC service are numerous. It can help to detect, treat, and

prevent pregnancy-related problems; provide tetanus toxoid (TT) immunization, iron tablets, de-worming tablets, nutritional care, advice on appropriate nutrients intake, and proper rest (9-12). However, millions of women from low-income countries are not receiving the recommended standard and quality of ANC services (8).

A number of previous studies on utilisation of ANC services highlighted that maternal age, education, parity, wealth, decision making, and their husband's education and occupation were associated with poor ANC use in Nepal (13-15). Intimate partner violence (IPV) during pregnancy has been identified as an important factor associated with poor utilisation of ANC services (16). IPV in pregnancy in Nepal is more prevalent than many other low income countries (17), however, no previous study has explicitly examined the role of IPV on utilisation of ANC services.

IPV refers to any behaviour within an intimate relationship that causes physical, psychological or sexual harm (18). Several studies from other LMICs have demonstrated that IPV was associated with negative maternal and child health outcomes (19-23). For example, studies revealed that IPV during pregnancy was significantly associated with termination of pregnancy (24), premature rupture of membranes and increased risk of low birth weight (19), perinatal and neonatal mortality (25), and pre-term labour which increases in the number of caesarean section cases and hospitalization during pregnancy (26). Similarly, other studies showed that IPV during pregnancy is associated with increased risk of common mental disorders, postnatal depression, and poor health-related quality of life (27-29).

Secondary data analysis of national surveys from 19 different countries (17 LMICs and 2 high income countries) showed that IPV during pregnancy is a common experience, ranging from 2% (Australia, Cambodia, Denmark and Philippines) to 13.5% (Uganda) (17). Rates also vary within country: for example, the proportion of women experiencing violence during pregnancy is higher in rural areas (7 per cent) than in urban areas (4 per cent) in Nepal. Rates

of IPV during pregnancy are particularly high in the Terai region (9 per cent) compared with other regions in Nepal (4-5 per cent) (6).

In general, women who experienced IPV during pregnancy reported a lower utilisation of health services, have a lower prospect of decision making power, decreased freedom of movement and increased economic dependency (30, 31) compared to women who did not experience IPV. This also holds true for utilisation of ANC services. For example, a nationally representative survey in India reported that women who experienced physical violence during pregnancy were less likely to receive prenatal care, home-visits from a health worker for a prenatal check-up, receive at least three prenatal care visits, and less likely to initiate prenatal care early in the pregnancy (32). Similar evidence has been reported from studies in Ghana, Bangladesh, Kenya and Nigeria (33-36).

As mentioned previously, the prevalence of IPV during pregnancy is higher in the Terai region of Nepal, and it is also evident that IPV is associated with poor utilisation of ANC services. However, the evidence for the association of IPV on ANC service utilisation in the southern Terai of Nepal is not well documented. Therefore, we aim to explore the impact of IPV on ANC service utilisation in the southern Terai of Nepal.

Materials and Methods

Study design and setting

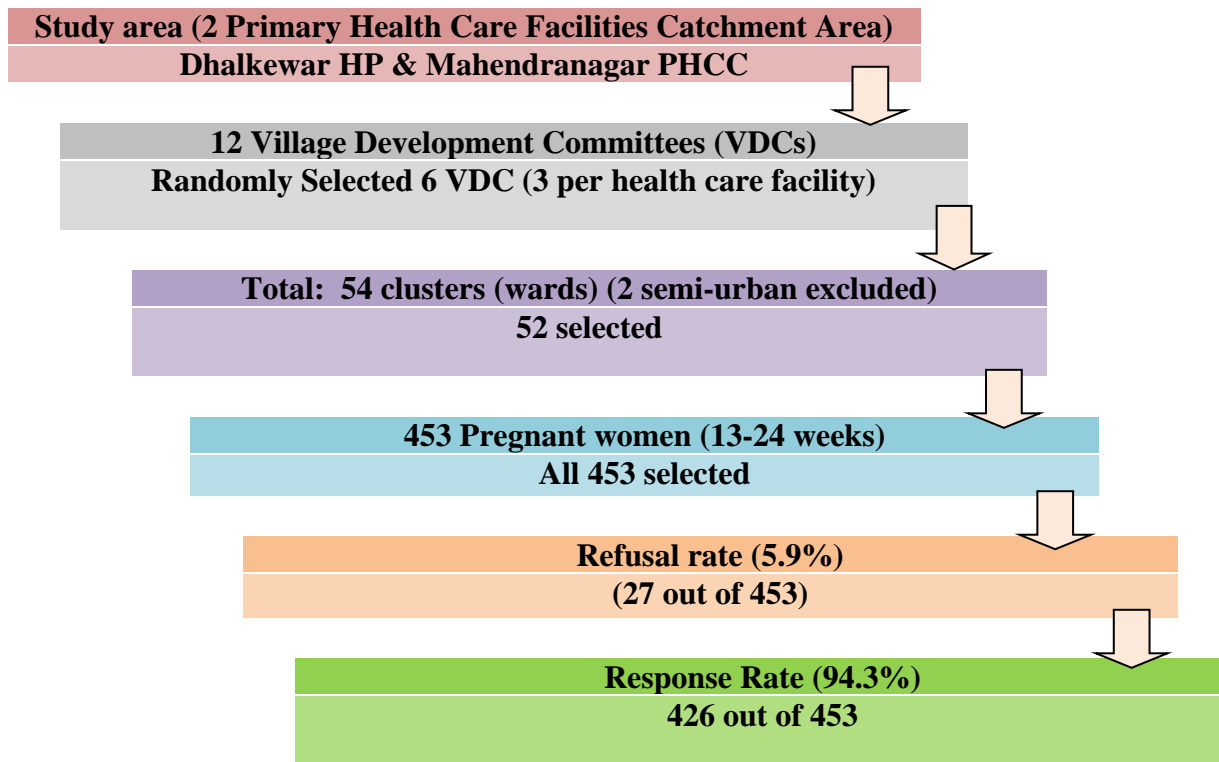
This study is based on a community-based cross-sectional design. The study was conducted across six Village Development Committees (VDCs) consisting of 52 wards in the Dhanusha district of Nepal. This study used the baseline data of 'MATRI-SUMAN' a capacity building and text messaging intervention to enhance maternal and child health service utilisation

among pregnant women from rural Nepal: study protocol for a cluster randomised controlled trial. Dhanusha is one of the 75 districts of Nepal situated in the southern Terai (plain area) region. VDCs are the basic political unit of the district, which is further divided into nine smaller units called wards (37). Each ward functions as a cluster in our study. The study area is predominantly inhabited by rural communities with agriculture as the main occupation (particularly vegetable farming) and the study population is relatively stable. The main residents of the district are from the Maithili ethnic group and the adult literacy rate is 69%. Administratively, the district comprises one municipality and 101 VDCs with an estimated population of 754,777 in 2011 (37, 38). Two health facilities (Dhalkewar health post & Mahendranagar primary health care centre) in the district, comprising 12 VDCs, were selected randomly and each health facility was divided into three strata. Then, one VDC was selected randomly from each stratum yielding 6 VDCs comprised of 54 wards that served as clusters. Of 54 clusters, 2 clusters were excluded from the study as they were semi-urban areas. Data were collected from January 2015 and March 2015.

Sampling

The sample size was calculated using Open Epi software (39). Our calculation was based on knowing that about 84% of pregnant women in Nepal made at least one ANC visit. We also know that pregnant women who were not a victim of IPV are two times as likely to utilise ANC services as those who were a victim of IPV (6). Under these assumptions and presuming 80% power at 95% confidence level, 398 pregnant women were required for a study. We assumed 12% non-response rate and invited a total of 453 participants in this study.

Figure 1. Sampling Strategy



Participants:

All pregnant women in their second trimester (n=453) from 52 wards of six VDCs were invited to participate in the study and 426 (94.3%) of them responded to the questionnaire. This was more than 10% of the target population (n=3730) of a study district. Participants were identified and invited with the help of Female Community Health Volunteers (FCHVs). The study population consisted of pregnant women aged between 15 and 49 years in their second trimester (gestation period between 13 and 24 weeks). Pregnancy status was confirmed by a validated pregnancy test report. Women were excluded if they had the following characteristics: (a) if they were in their first (gestation period below 12 weeks) and third trimester (gestation period above 24 weeks) of pregnancy, (b) aged above 45 years, (c) those not planning to stay at the study site during pregnancy (f) woman who are not willing (to give consent) to participate in the study.

Data collection

The study was based on primary data. The primary data were collected by a structured questionnaire during face-to-face interviews. We adopted a validated questionnaire which was used for National Demographic and Health Survey (NDHS) 2011 in Nepal (40). The study questionnaire included maternal and child health components of the NDHS 2011 questionnaire. The questionnaire was piloted in the neighbouring district and necessary changes were made as needed. It was also translated to Nepali and back translated into English to ensure that the meanings of the questions were not modified. The questionnaire consisted of two parts: i) Socio-demographic characteristics of the respondents, including their IPV exposure status and, ii) utilisation of selected antenatal care services. Five trained research assistants conducted the interviews with pregnant women and they were constantly supervised.

Definition of variables:

The main outcome variable of the study was the utilisation of selected ANC service components, including pregnancy registration at health facility, time of registration for ANC, place for ANC, type of ANC service provider, iron and folic acid (IFA) tablet use, de-worming, tetanus toxoid (TT) immunization, additional food intake, dietary diversity, rest and sleep during the day and attendance of the mother's group meeting.

The status of pregnancy registration was taken from self-report and validated by the presence of maternity cards of pregnant women who were registered for antenatal visits at the health facility (public or private) prior to the survey. Place of ANC check-up was considered as private or government health care facility. ANC providers were categorised either as skilled (medically qualified doctor, nurse/ midwife/paramedic) or unskilled (non-medically trained provider) (35). Use of routine iron/folic acid and de-worming were self-reported. Similarly,

TT immunization was also based on self-report and validated by the presence of a maternity card. Additional food intake during pregnancy included one more meal apart from the regular diet/meal by pregnant women. Dietary diversity was coded into three categories: low, medium, and high on the basis of food items consumed by pregnant women from 16 food groups as recommended by Food and Agriculture Organisation (FAO) (41). We included only 14 food groups for this study. Two food group sweets and spices/condiments were excluded during analysis as these foods consumed in very small amount. The consumption of food from ≤ 3 food groups, 4-5 food groups, and ≥ 6 food groups was considered as low, medium and high dietary diversity, respectively (41, 42). Rest and/or sleep during the day was operationally defined as whether the pregnant women were taking a rest or not during day time for at least 2 hours after lunch for current pregnancy. At the ward level there is at least one mother's group consisting of married women of reproductive age group led by FCHV. The mother's group meet each month and discuss about maternal and child health issues including antenatal care. We asked the respondents whether they attended a monthly mother's group meeting regularly in their recent pregnancy.

Each of the ANC service components were analysed separately with IPV, the explanatory variable. IPV was defined on the basis of respondents' self-reported exposure to any form of physical, sexual and emotional abuse from their intimate partner (s) (43).

Other covariates included: age, caste/ethnicity, origin, religion, women's education, husband's education, women's occupation, husband's occupation, wealth index, and parity. Socio-demographic characteristics such as religion, geographic origin, maternal occupation, maternal education, husband's education, husband's occupation were adapted from NDHS 2011 (6). Maternal age was coded as <20 years, 20-34 years, 35-49 years. Caste/ethnicity was based on the caste system in Nepal, and was divided into three major groups based on

available literature and similarities between the caste/ethnic groups: disadvantaged/Dalit, disadvantaged/Aadibasi/Janajati, and advantaged/upper caste (Brahmin and Chhetri) (44, 45). The wealth index was categorized as lower, second, middle, fourth and highest adapted from Nepal demographic and population health survey 2011 (6). The parity of the respondents was categorised as primi (newly pregnant), 1 (already having given birth once), 2 (already having given birth twice) and 3+ (already having given birth for more than two times), whereas duration of pregnancy was categorised as 13-16 weeks, 17-20 weeks and 21-24 weeks of gestation

Statistical analysis

Exposure to IPV was categorised into two groups: exposed (yes, n=123); and non-exposed (no, n=303). Bivariate analyses for the association between covariate and use of selected antenatal care components were examined using the Chi-square test. Significant outcome variables based on Chi-square results with p-value less than 0.05 were then analysed using stepwise backward elimination in multivariable logistic regression. ANC service use components: registered for ANC care, use of iron and folic acid, reported dietary diversity, reported rest and sleep during day time and attendance to the mother's group meetings were treated as outcome variables and IPV as an explanatory variable. The association of IPV with each outcome variables was adjusted for covariates in the model. A p-value of <0.05 was considered statistically significant. All analyses were carried out using SPSS version 20 for windows.

Ethical consideration

Ethical approval for the study was obtained from the Nepal Health Research Council, Nepal (approval no: 101) as well as the ethics committee of the Institute of Medical Sciences, Banaras Hindu University, India (approval no: ECR/526/Inst/UP/2014 Dt.31.1.14) and District Public Health Office, Dhanusha, Nepal (Ref. 2245). The aims and objectives of the study were explained to all the respondents and written informed consent obtained before data collection. Personal identifiers were removed before data analysis.

RESULTS

Table 1 presents rate of exposure to IPV in relation to socio-demographic characteristics of the respondents. A total of 426 pregnant women in their second trimester participated in the study, of which 29% were exposed to IPV. Most respondents were between ages 20 and 34 years (68.1%), of the upper caste group (62.0%), residing in the Terai origin (71.8%), believed in Hinduism (91.8%), and endorsed agriculture as their main occupation (68.5%). Slightly more than two-fifth of the participants were illiterate (25.4%) and 29% were from the lower wealth index. Nearly two-fifth of the participants who reported IPV were pregnant for the first time.

In bivariate analyses, IPV was significantly associated with several antenatal care components such as ANC registration in the health facility, place for ANC visit, consumption of iron and folic acid, dietary diversity, rest and sleep during day time, and participation in the mother's group meeting (Table 2).

The results of the multivariable logistic regression analyses are presented in Table 3.

Pregnant women who were not exposed to IPV were more likely to: register for ANC visits (AOR 3.3, $p = 0.030$), take iron and folic acid (AOR 2.0, $p = 0.002$), report dietary diversity

(middle vs high: AOR 3.3, $p = 0.001$ and low vs. high: AOR 5.0, $p = 0.003$), have rest and sleep during day time (AOR 2.5, $p = 0.032$), and participate in the mother's group meetings (AOR 5.0, $p = 0.003$), compared to those who were exposed to IPV.

Discussion

This is the only study we are aware of from Nepal which explores the influence of IPV during pregnancy for the utilisation of antenatal care services among rural women of southern Terai of Nepal. Our findings suggest that IPV is associated with lower rates of ANC visits. Our study demonstrated that almost three out of ten pregnant women were exposed to IPV, which is higher than the average of 9% for Terai of Nepal (6). Such differences could be attributed to the inclusion of more rural areas in our study, which is associated with greater IPV. However, these findings were consistent with other Nepalese studies carried out among rural married women, which reported that about two-fifth of respondents experienced IPV (46, 47).

Our study showed that IPV is negatively associated with the use of ANC services such as registering for ANC check-up, taking iron and folic acid, dietary diversity, rest and sleep during the day and attending a mother's group meeting. These findings are supported by several studies performed in LMICs (33-36). Our study findings are also similar to the study from India, which demonstrated that the utilisation of ANC components in pregnant women were negatively associated with physical violence during pregnancy (32).

Potential explanations could be that the women who suffer from IPV are less likely to have decision making power, freedom of movement, autonomy or economic independency (31, 46, 48). These factors could delay help-seeking for antenatal care services. In this regard, collective measures to foster women's decision making, empowerment and access to

financial resources besides enforcement of existing laws and regulations on IPV to improve the ANC service utilisation among rural women.

Our study has explored an important area of research in the Nepalese context, but the study should be interpreted in the light of some limitations. This study does not allow us to assess causal relationship between IPV and antenatal service utilisation as the nature of study was cross-sectional. Second, the study may suffer from response bias as IPV is stigmatised which could limit the disclosure of IPV. Awareness and literacy activities about violence against women such as ‘zero tolerance of violence’ through mother’s group network could address these issues. Third, the study may suffer from recall bias as the pregnant women may forget previous services they received during their pregnancy at the time of interview. Fourth, the study itself was performed only in six VDCs of southern Terai and thus the findings cannot be generalized to the whole country. Nevertheless, the study has shown that IPV was inversely associated with ANC service utilisation for the participants in the region where we surveyed.

Conclusions

IPV during pregnancy is negatively associated with antenatal service utilisation among rural women in the southern Terai of Nepal. Pregnant women exposed to IPV were less likely to register for ANC services, take iron and folic acid, have dietary diversity, rest and sleep during the day and participate in the mother’s group meeting. These findings suggest that stopping or reducing IPV during pregnancy is vital to improving ANC service utilisation. This study indicates that the effective implementation and monitoring of the Domestic Violence Act 2009 (49) of Nepal with a greater emphasis to rural women is needed, in addition to increasing community awareness about the consequences of IPV during pregnancy on maternal and child health outcomes.

Competing interests

SEL received consulting fees from Lundbeck, not connected to this research. The other authors declare that they have no competing interests.

Authors' contributions

JKS, and DA drafted the manuscript with the contribution from SG and RK. RK and SEL subsequently revised this manuscript. All authors agreed on the final manuscript.

Acknowledgements

We would like to thank to our research assistants as well as all respondents for their kind cooperation during this study. We are grateful to all academicians of Institute of Medical Sciences, Banarus Hindu University, India for their academic guidance and support in this study.

References

1. World Health Organisation. Maternal mortality, fact sheet No 348. Geneva: WHO; 2015 [updated Nov 2015]; Available from: <http://www.who.int/mediacentre/factsheets/fs348/en/>.
2. Pokharel JC, Pradhan HK, Hada B, BC RK, Chaudhary RP. Nepal Millennium Development Goals: Progress Report 2013. Kathmandu: Nepal Planning Commission; 2013.
3. Suvedi BK, Pradhan A, Barnett S, Puri M, Chitrakar SR, Poudel P, et al. Nepal maternal mortality and morbidity study 2008/2009: summary of preliminary findings. Kathmandu: Department of Health Services; 2009.
4. Upreti SR, Baral S, Lamichhane P, Khanal MN, Tiwari S, Tandan M, et al. Rapid Assessment of the Demand Side Financing Schemes: Aama and 4ANC Programmes (The Seventh Rapid Assessment). Kathmandu: Ministry of Health and Population; Nepal Health Sector Support Programme and Health Research and Social Development Forum; 2013.
5. Paudel D, Shrestha IB, Siebeck M, Rehfuss EA. Neonatal health in Nepal: analysis of absolute and relative inequalities and impact of current efforts to reduce neonatal mortality. *BMC Public Health*. 2013;13(1):1239.
6. Ministry of Health and Population, New ERA, ICF International. Nepal Demographic and Health Survey 2011. Kathmandu: Ministry of Health and Population, New ERA and ICF International; 2012.
7. Onasoga OA, Afolayan JA, Oladimeji BD. Factors influencing utilization of antenatal care services among pregnant women in Ife Central Lga, Osun State Nigeria. *Advances in Applied Science Research*. 2012;3(3):1309-15.
8. Simkhada B, Teijlingen ERV, Porter M, Simkhada P. Factors affecting the utilization of antenatal care in developing countries: systematic review of the literature. *Journal of Advanced Nursing*. 2008;61(3):244-60.
9. AbouZahr C, Wardlaw T. Antenatal care in developing countries: Promises, achievements and missed opportunities-an analysis of trends, levels and differentials, 1990-2001. Geneva: World Health Organization; 2003.
10. Campbell OM, Graham WJ, Lancet Maternal Survival Series Steering Group. Strategies for reducing maternal mortality: getting on with what works. *The Lancet*. 2006; 368(9543):1284-99.
11. Carroli G, Rooney C, Villar J. How effective is antenatal care in preventing maternal mortality and serious morbidity? An overview of the evidence. *Paediatric and Perinatal Epidemiology*. 2001;15(s1):1-42.

12. Shahjahan M, Chowdhury HA, Akter J, Afroz A, Rahman MM, Hafez M. Factors associated with use of antenatal care services in a rural area of Bangladesh. *South East Asia Journal of Public Health*. 2013;2(2):61-6.
13. Neupane S, Doku DT. Determinants of time of start of prenatal care and number of prenatal care visits during pregnancy among Nepalese women. *Journal of Community Health*. 2012;37(4):865-73.
14. Joshi C, Torvaldsen S, Hodgson R, Hayen A. Factors associated with the use and quality of antenatal care in Nepal: a population-based study using the demographic and health survey data. *BMC Pregnancy and Childbirth*. 2014;14(1):94.
15. Deo KK, Paudel YR, Khatri RB, Bhaskar RK, Paudel R, Mehata S, et al. Barriers to utilization of antenatal care services in Eastern Nepal. *Frontiers in Public Health*. 2015;12(48):253-8.
16. Das S, Bapat U, Shah More N, Alcock G, Joshi W, Pantvaidya S, et al. Intimate partner violence against women during and after pregnancy: a cross-sectional study in Mumbai slums. *BMC Public Health*. 2013;13(1):817.
17. Devries KM, Kishor S, Johnson H, Stockl H, Bacchus LJ, Garcia-Moreno C, et al. Intimate partner violence during pregnancy: analysis of prevalence data from 19 countries. *Reproductive health matters*. 2010;18(36):158-70. Epub 2010/11/30.
18. World Health Organisation. *World report on violence and health*. Geneva: WHO; 2002.
19. Abdollahi F, Abhari FR, Delavar MA, Charati JY. Physical violence against pregnant women by an intimate partner, and adverse pregnancy outcomes in Mazandaran Province, Iran. *Journal of Family and Community Medicine*. 2015 Jan-Apr;22(1):13-8.
20. Alhusen JL, Bullock L, Sharps P, Schminkey D, Comstock E, Campbell J. Intimate partner violence during pregnancy and adverse neonatal outcomes in low-income women. *Journal of Womens Health*. 2014;23(11):920-6.
21. Audi CA, Segall-Correa AM, Santiago SM, Perez-Escamilla R. Adverse health events associated with domestic violence during pregnancy among Brazilian women. *Midwifery*. 2012;28(4):356-61.
22. Beydoun HA, Tamim H, Lincoln AM, Dooley SD, Beydoun MA. Association of physical violence by an intimate partner around the time of pregnancy with inadequate gestational weight gain. *Social Science Medicine*. 2011 Mar;72(6):867-73.
23. Johri M, Morales RE, Boivin JF, Samayoa BE, Hoch JS, Grazioso CF, et al. Increased risk of miscarriage among women experiencing physical or sexual intimate partner violence during pregnancy in Guatemala City, Guatemala: cross-sectional study. *BMC Pregnancy and Childbirth*. 2011;11:49.

24. Sikander S, Lazarus A, Bangash O, Fuhr DC, Weobong B, Krishna RN, et al. The effectiveness and cost-effectiveness of the peer-delivered Thinking Healthy Programme for perinatal depression in Pakistan and India: the SHARE study protocol for randomised controlled trials. *Trials*. 2015;16:534.
25. Pool MS, Otupiri E, Owusu-Dabo E, de Jonge A, Agyemang C. Physical violence during pregnancy and pregnancy outcomes in Ghana. *BMC Pregnancy and Childbirth*. 2014;14:71.
26. Hassan M, Kashanian M, Hassan M, Roohi M, Yousefi H. Maternal outcomes of intimate partner violence during pregnancy: study in Iran. *Public Health*. 2014 May;128(5):410-5.
27. Shamu S, Zarowsky C, Roelens K, Temmerman M, Abrahams N. High-frequency intimate partner violence during pregnancy, postnatal depression and suicidal tendencies in Harare, Zimbabwe. *General Hospital Psychiatry*. 2016;38:109-14.
28. Ludermir AB, Valongueiro S, Araujo TV. Common mental disorders and intimate partner violence in pregnancy. *Revista de Saude Publica*. 2014;48(1):29-35.
29. Gharacheh M, Azadi S, Mohammadi N, Montazeri S, Khalajinia Z. Domestic Violence During Pregnancy and Women's Health-Related Quality of Life. *Global Journal of Health Science*. 2015;8(2):27-34.
30. Ellsberg MC. Violence against women: a global public health crisis. *Scandinavian Journal of Public Health*. 2006;34(1):1-4.
31. Smith M, Martin F. Domestic violence: recognition, intervention, and prevention. *Medsurg Nursing: official journal of the Academy of Medical-Surgical Nurses*. 1995;4(1):21-5.
32. Koski AD, Stephenson R, Koenig MR. Physical violence by partner during pregnancy and use of prenatal care in rural India. *Journal of Health, Population, and Nutrition*. 2011;29(3):245-54.
33. Goo L, Harlow SD. Intimate partner violence affects skilled attendance at most recent delivery among women in Kenya. *Maternal and Child Health Journal*. 2012;16(5):1131-7.
34. Ononokpono DN, Azfredrick EC. Intimate partner violence and the utilization of maternal health care services in Nigeria. *Health care for women international*. 2014;35(7-9):973-89.
35. Rahman M, Nakamura K, Seino K, Kizuki M. Intimate partner violence and use of reproductive health services among married women: evidence from a national Bangladeshi sample. *BMC Public Health*. 2012;12(1):913.
36. Sipsma H, Ofori-Atta A, Canavan M, Udry C, Bradley E. Empowerment and use of antenatal care among women in Ghana: a cross-sectional study. *BMC Pregnancy and Childbirth*. 2014;14(1):364.

37. District Development Committee Dhanusha, Ministry of Local Development. District profile of Dhanusha District Development Committee. Janakpur, Nepal: District Development Committee; 2012.
38. Centre Bureau of Statistics. National population and housing census 2011: general and social characteristics tables [Volume 05, Part I, NPHC2011]. Kathmandu: National Planning Commission, Central Bureau of Statistics; 2014.
39. Dean A, Sullivan K, Soe M. Open source epidemiologic statistics for public health [version 3.01]. USA: Emory University; 2009 [updated 19/09/2009]. Available from: http://www.openepi.com/Menu/OE_Menu.htm.
40. Food and Agriculture Organisation. Dietary diversity questionnaire. FAO/Nutrition and Consumer Protection Division; 2007. Available from: http://www.fao.org/fileadmin/user_upload/eufao-fsi4dm/doc-training/hdd.pdf.
41. Savy M, Martin-Prével Y, Sawadogo P, Kameli Y, Delpeuch F. Use of variety/diversity scores for diet quality measurement: relation with nutritional status of women in a rural area in Burkina Faso. *European Journal of Clinical Nutrition*. 2005;59(5):703-16.
42. Garcia-Moreno C, Jansen HA, Ellsberg M, Heise L, Watts CH. Prevalence of intimate partner violence: findings from the WHO multi-country study on women's health and domestic violence. *The Lancet*. 2006;368(9543):1260-9.
43. Acharya D, Khanal V, Singh JK, Adhikari M, Gautam S. Impact of mass media on the utilization of antenatal care services among women of rural community in Nepal. *BMC Research Notes*. 2015;8(1):345.
44. Khanal V, Adhikari M, Sauer K, Zhao Y. Factors associated with the introduction of prelacteal feeds in Nepal: findings from the Nepal demographic and health survey 2011. *Int Breastfeed J*. 2013;8(1):9.
45. Lamichhane P, Puri M, Tamang J, Dulal B. Women's status and violence against young married women in rural Nepal. *BMC Women's Health*. 2011;11:19.
46. Oshiro A, Poudyal AK, Poudel KC, Jimba M, Hokama T. Intimate partner violence among general and urban poor populations in Kathmandu, Nepal. *Journal of Interpersonal Violence*. 2010;26(10):2073-92.
47. Ellsberg M, Peña R, Herrera A, Liljestrand J, Winkvist A. Candies in hell: women's experiences of violence in Nicaragua. *SocSci Med*. 2000;51(11):1595-610.
48. Domestic Violence (Offence and Punishment) Act, 2066 (2009). Kathmandu: Nepal Law Commission; 2009. Available from: <http://www.lawcommission.gov.np/en/documents/2015/08/domestic-violence-crime-and-punishment-act-2066-2009.pdf>.

Appendices

Table 1: Socio-demographic characteristics of the respondents exposed and not exposed to intimate partner violence within a week (n=426).

Variable	Intimate partner violence		p-value	
	yes, n (%)	no, n (%)		
Age (years)				
<20	102 (23.9)	25 (20.3)	77 (25.4)	0.515
20-34	290 (68.1)	87 (70.7)	203 (67.0)	
35-45	34 (8.0)	11 (8.9)	23 (7.6)	
Caste/ethnicity				
Dalit	71(16.7)	41 (33.3)	30 (9.9)	<0.001
Adibasi/ janajati	91 (21.3)	39 (31.7)	52 (17.2)	
Upper caste group	264 (62.0)	43 (35.0)	221 (72.9)	
Birth origin				
Hill (Tibeto-Burman)	120 (28.2)	43 (35.0)	77 (25.4)	0.343
Terai (Indo-Aryan)	306 (71.8)	80 (65.0)	226 (74.6)	
Religion				
Hindu	391 (91.8)	112 (91.1)	279 (92.1)	0.060
Muslim/others	35 (8.2)	11 (8.9)	24 (7.9)	
Education level				
No education	108 (25.4)	48 (39.0)	60 (19.8)	<0.001
Primary	149 (35.0)	44 (35.8)	105 (34.7)	
Secondary	79 (18.5)	21 (17.1)	58 (19.1)	
Higher	90 (21.1)	10 (8.1)	80 (26.4)	
Husband Education				
No education	64 (15.0)	43 (35.0)	21 (6.9)	<0.001
Primary	131 (30.8)	39 (31.7)	92 (30.4)	
Secondary	91 (21.36)	18 (14.6)	73 (24.1)	
Higher	140 (32.9)	23 (18.7)	117 (38.6)	
Women Occupation				
Non-Agriculture	292 (68.5)	50 (40.7)	242 (79.9)	<0.001
Agriculture	134 (31.5)	73 (59.3)	61 (20.1)	
Husband Occupation				
Non-Agriculture	280 (65.7)	48 (39.0)	232 (76.6)	<0.001
Agriculture	146 (34.2)	75 (61.0)	71 (23.4)	
Wealth Index				
Lower	124 (29.1)	44 (35.8)	80 (26.4)	0.006
Second	100 (23.5)	19 (15.4)	81 (26.7)	
Middle	84 (19.7)	36 (29.2)	48 (15.8)	
Fourth	61 (14.3)	13 (10.6)	48 (15.8)	
Highest	57 (13.4)	11 (8.9)	46 (15.2)	
Parity				

Primi	167 (39.2)	40 (32.5)	127 (41.9)	0.165
1	112 (26.3)	31 (25.2)	81 (26.7)	
2	58 (13.6)	21 (17.0)	37 (12.2)	
3+	89 (20.9)	31 (25.2)	58 (19.1)	
Total	426 (100)	123 (28.9)	303 (71.1)	

Table 2: Utilisation of selected antenatal care services among respondents who were exposed and unexposed to intimate partner violence within the past week (unadjusted odds ratio)

Services	Intimate partner violence		OR (95%CI)	p-value
	yes, n/ (%)	no, n/ (%)		
Registered at health facility for ANC (n=426)				
Yes	26 (21.1)	107 (35.3)	0.4 (0.3-0.8)	0.004
No	97 (78.9)	196 (64.7)	1.0 (Reference)	
Time of registration for ANC (n=133)				
1 st trimester	4 (15.4)	24 (22.4)	0.6 (0.2-11.0)	0.601
2 nd trimester	22 (84.6)	83 (77.6)	1.00	
Place for ANC (n=133)				
Private hospital/ clinic	5 (19.2)	46 (43.0)	0.3 (0.1-0.9)	0.040
Government hospital	21 (80.8)	61 (57.0)	1.0	
ANC provider (n=133)				
Skilled	15 (57.7)	82 (76.6)	0.4 (0.3-3.3)	0.080
Unskilled	11 (42.3)	25 (23.4)	1.0	
Iron and folic acid tablet (n=133)				
Taken	13 (50.0)	83 (77.6)	0.2 (0.1-0.7)	0.010
Not taken	13 (50.0)	24 (22.4)	1.0	
De-worming (n=133)				
Yes	12 (46.2)	57 (53.3)	0.7 (0.1-1.4)	0.660
No	14 (53.8)	50 (46.7)	1.0	
TT immunization (n=133)				
Immunized	16 (61.5)	70 (65.4)	0.8 (0.0-2.5)	0.886
Not immunized	10 (38.5)	37 (34.6)	1.0	
Additional food (n=426)				
Consumed	24 (27.6)	93 (27.4)	0.5 (0.1-0.7)	0.026
Not consumed	99 (72.4)	210 (72.6)	1.0	
Dietary diversity (n=426)				
High	20 (16.3)	57 (18.8)	0.2 (0.1-0.4)	<0.001
Medium	70 (56.9)	229 (75.6)	0.1 (0.1-0.3)	

Low	33 (26.8)	17 (5.6)	1.0	
Rest & sleep during day (n=426)				
Yes	13 (10.6)	73 (24.1)	0.3 (0.2-0.7)	0.002
No	110 (89.4)	230 (75.9)	1.0	
Mother's group meeting (n=426)				
Attended	21 (17.1)	85 (28.1)	0.5 (0.1-0.9)	0.002
Not attended	102 (82.9)	218 (71.9)	1.0	
Total	123 (28.8)	303 (71.1)		

Table 3: Multivariable logistic regression model for the use of antenatal care associated with intimate partner violence

Variables	Reference	Adjusted OR	95% CI	p-value
Registered for ANC	Yes	3.3	1.0-10.0	0.030
Iron and folic acid tablet	Taken	2.0	1.1-10.2	0.002
Dietary Diversity	Middle vs. High	3.3	2.0-10.0	0.001
	Low vs. High	5.0	2.5-10.3	0.003
Rest & Sleep during day time	Yes	2.5	2.0-10.5	0.032
Mothers group meeting	Attended	5.0	1.2-10.8	0.003

Adjusted for significant socio-demographic variables (age, caste, education level, occupation, wealth index)