Prevalence and associated factors of domestic violence among pregnant women attending routine antenatal care in Nepal

Poonam Rishal 1,4, Kunta Devi Pun 1,2, Elisabeth Darj 3, Sunil Kumar Joshi 4, Johan Håkon Bjørngaard 5 , Katarina Swahnberg 6, Berit Schei 7, Mirjam Lukasse 8

1 Norwegian University of Science and Technology (NTNU), Norway
2 Kathmandu University School of Medical Sciences, Kathmandu University
3 Norwegian University of Science and Technology (NTNU) Trondheim, Norway / Department of Women's and Children's Health, Uppsala University, Sweden
4 Kathmandu Medical College Teaching Hospital, Nepal
5 Norwegian University of Science and Technology (NTNU), Norway/ Forensic 2Department and Research Centre Bröset, St. Olav's University Hospital, Trondheim, Norway
6 Linnaeus University, Kalmar, Sweden
7 Norwegian University of Science and Technology (NTNU), Norway/Department of Obstetrics and Gynecology, St. Olav's Hospital Trondheim University Hospital, Norway
8 Oslo and Akershus University College, Norway/ University College of Southeast Norway

Scandinavian Journal of Caring Sciences. 2017,0(0).
This article has been accepted for publication and undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the Version of Record. Please cite this article as doi: 10.1177/1403494817723195.

Prevalence and associated factors of domestic violence among pregnant women attending routine antenatal care in Nepal.

Poonam Rishal[a,d,*], Kunta Devi Pun[a,b], Elisabeth Darj[c], Sunil Kumar Joshi[d], Johan Håkon Bjørngaard[e] , Katarina Swahnberg[f], Berit Schei[g], Mirjam Lukasse[h], on behalf of ADVANCE study group[1].

[a] Department of Public Health and Nursing, Faculty of Medicine and Health Sciences, Norwegian University of Science and Technology (NTNU), Norway

[b] Kathmandu University School of Medical Sciences, Kathmandu University, Dhulikhel, Kavre, Nepal

[c] Department of Public Health and Nursing, Faculty of Medicine and Health Sciences, Norwegian University of Science and Technology (NTNU)/Department of Obstetrics and Gynecology, St. Olav's Hospital, Trondheim, Norway/Department of Women's and Children's Health, Uppsala University, Sweden

[d] Department of Community Medicine, Kathmandu Medical College Teaching Hospital, Nepal

[e] Department of Public Health and Nursing, Faculty of Medicine and Health Sciences, Norwegian University of Science and Technology (NTNU), Norway/Forensic

Department and Research Centre Bröset, St. Olav's University Hospital, Trondheim, Norway

[f] Department of Health and Caring Sciences, Faculty of Health and Life Science, Linnaeus University, Kalmar, Sweden

[g] Department of Public Health and Nursing, Faculty of Medicine and Health Sciences, Norwegian University of Science and Technology (NTNU), Norway/Department of Obstetrics and Gynecology, St. Olav's Hospital Trondheim University Hospital, Norway

[h] Faculty of Health Sciences, Oslo and Akershus University College, Norway/Department of Health and Social Sciences, University College of Southeast Norway

*Corresponding author: Poonam Rishal, Department of Public Health and Nursing, Faculty of Medicine and Health Sciences, Norwegian University of Science and Technology (NTNU), Postbox 8905, NO-7491, Email: poonam.rishal@ntnu.no or poonam.rishal1@gmail.com

[1] Addressing Domestic Violence in Antenatal Care Environments (ADVANCE) is a collaborative research study funded by the Research Council of Norway from 2013–2017. The coordinating institution is the Norwegian University of Science and Technology. Website: http://ww.ntnu.edu/web/advance/home

Description	**Number of Words**
Title	16
Abstract	252
Keywords	9
Text	3022
Number of tables/figures	• Tables: 4 • Figures:1 Supplemental file • Tables: S1 • Figures: S2

Abstract

Aims:

The primary aim of this study was to assess the prevalence of domestic violence (DV) and its associated factors among pregnant women in Nepal. The secondary aims were to investigate disclosure of DV by women to healthcare personnel and to assess whether healthcare personnel had asked women about their experience of DV.

Method:

This cross-sectional study included 2004 pregnant women between 12 and 28 weeks gestation, attending routine antenatal care at two hospitals in Nepal from August 2014 to November 2015. In our study, DV was defined as fear of a family member and/or an experience of physical, emotional, or sexual violence. Associated risk factors were analyzed using logistic regression analyses.

Results:

Twenty-one percent of the women had experienced DV; 12.5% experienced fear only, 3.6% violence only, and 4.9% experienced both violence and fear. Less than 2% percent reported physical violence during pregnancy. This study found that just 17.7% had ever been asked by healthcare personnel about DV, and of the women who had reported DV, only 9.5% had disclosed their experience to healthcare personnel. Women of young age and low socioeconomic status were more likely to have experienced DV. Women who

reported having their own income and the autonomy to use it were at significantly lower risk of DV compared to women with no income.

Conclusion:

A substantial proportion of women reported having experienced DV. Victims had rarely disclosed their experience of DV to healthcare personnel. Our study underlines the importance of integrating systematic assessment of DV in antenatal care.

Keywords

Domestic violence, prevalence, risk factors, pregnancy, Nepal, antenatal care, disclosure, enquiry

Introduction

Between 1990 and 2013, the maternal mortality rate decreased 45% globally, with the highest reduction in Eastern Asia (65%) and Southern Asia (64%). During the same time period, Nepal substantially reduced its maternal mortality rate, from 539 to 190 deaths per 100,000 live births, but failed to achieve its target for 2015, which was 134/100,000 live births [1, 2]. Apart from remaining constraints such as poverty, low education, disparities in access to healthcare services, domestic violence (DV) is an indirect cause of death and disability among pregnant women [3].

According to a World Health Organization study conducted across 10 countries, the percentage of women who are subject to physical violence during pregnancy ranges from 1% in Japan to 28% in Peru [4]. DV affects women's and children's health as it has been associated with intentional self-harm, delayed prenatal care, bleeding during pregnancy, miscarriage, premature labor, low birth weight, and fetal trauma [5].

The Nepal Ministry of Law and Justice has defined DV as: *"Any physical, mental, sexual, or economic harm perpetrated by one person on another with whom he or she has a family relationship, including acts of reprimand or emotional harm"* [6]. The Nepal Demographic Health Survey (NDHS) of 2011 reported that out of 2982 women who had ever been pregnant, 6% of women had experienced DV during pregnancy [7]. The Nepal Maternal Mortality Study of 2008/2009 identified family issues as one of the reasons women commit suicide during pregnancy [8].

In developing countries like Nepal, being young, being multiparous, having no or little education, having a husband with no or little education, having an unemployed husband, having a familial preference for a male child, living in an extended family, and having a minority ethnic background increases a woman's risk of DV during pregnancy [9, 10]. In such countries, antenatal care (ANC) may provide an opportunity to identify survivors of DV [11]. If healthcare personnel are able to identify women who are exposed to DV, they will be able to provide immediate and ongoing care, address associated health problems, and offer suggestions that might prevent the reoccurrence of violence [12, 13]. Although the current public policies in Nepal have addressed DV as a public health issue, systematic assessment of DV has not been integrated into ANC [14].

Aims

The primary aim of this study was to assess the prevalence of DV among pregnant women and to determine which factors were associated with an increased risk of DV. The secondary aims were to investigate disclosure of DV by women to healthcare personnel and to assess whether healthcare personnel had asked women about their experience of DV.

Method

The baseline data from a cohort study was used for this cross-sectional study. Pregnant women were recruited from two private hospitals in Nepal: Dhulikhel Hospital (DH)

and Kathmandu Medical College (KMC). DH is a community tertiary center situated in Dhulikhel, east of Kathmandu, while KMC is located in central Kathmandu. At DH, routine ANC for low-risk women is provided by midwives, while high-risk and complicated pregnancies are referred to obstetricians. At KMC, all ANC is provided by obstetricians and general physicians.

Pregnant women were consecutively recruited when their pregnancies were between 12 and 28 weeks of gestational age. Pregnant women who attended ANC with an emergency condition, had insufficient Nepali to answer the questionnaire, or had a hearing impairment were excluded from the study. The study period in both hospitals was from August 2014 to November 2015 (Figure S1). Data collection was stopped temporarily due to the earthquake in Nepal on 25 April 2015. The study was resumed at both sites in the first week of June 2015.

A Color-Coded Audio Computer-Assisted Self-Interview (C-ACASI) was used to interview the women. C-ACASI is a data collecting tool used in research involving potentially sensitive or stigmatizing issues such as sexually transmitted diseases, sexual behavior, and intimate partner relationships [15]. The five-item Abuse Assessment Screen (AAS) was translated and modified to assess DV [16]. Questions about frequency of DV were added to all five items, and a question about whom the women were afraid of was included (Table S1). Before the final data collection, an informal pilot was conducted among 10 women. Their comments prompted us to change the order of two questions

and to adjust the response options regarding the perpetrator. Data from the pilot was not included in the final dataset.

Domestic violence variables

Women who responded positively to the question that asked whether they feared anyone in their family were categorized as having fear. Women who reported having experienced physical, emotional, or sexual violence were classified as having been exposed to violence. Women reporting fear, but no violence, were classified as having experienced fear only. Finally, women reporting violence, but no fear, were classified as having been exposed to violence only. Women who reported having experienced fear, violence, or both were considered to have experienced any forms of domestic violence (Figure 1). The comparison category was women not reporting any DV; women in this category had a negative response to all five items on the AAS.

The women could report violence as having happened during their lifetime, within the last year, and/or during their current pregnancy. They could indicate that the perpetrator or perpetrators were their husband, ex-husband, mother-in-law, father-in-law, or other in-laws (brother-in-law, sister-in-law) according to their family structure (Table 1).

All women were asked whether any healthcare personnel had ever asked them about DV. In addition, women who reported DV were asked whether they had, at any time, spontaneously disclosed their experience to any healthcare personnel.

Socio-demographic variables

Data on socio-demographic characteristics (women, husband, and family/community) were collected. Income for both the woman and her husband was categorized according to a study from India [17]; low income (< USD 73.70 per month), middle income (USD 73.70 to USD 146.50 per month) and high income (> USD 146.50 per month). Women who reported having their own income were asked if they could decide how to use it. The women were then sorted into three groups: "no income"; "income, no autonomy"; or "income and autonomy." Women who were pregnant for the first time and did not have a history of stillbirth or abortion were defined as "Nulliparous," while those who had children and/or a history of stillbirth, abortion, or both were defined as "Multiparous." The women were also categorized based on caste/ethnicity: Dalits and religious minorities; disadvantaged Janajati and the disadvantaged group from Terai; advantaged Janajati; and Upper Caste.

Ethics

This study was approved by the Regional Ethical Committee (REK) (2014/146/REK sør-øst C) in Norway and the Nepal Health Research Council (NHRC) (Reg.no.08/2014). Due to low literacy in the area, verbal instead of written informed

consent was obtained from the participating women. To ensure safety, the study was introduced our study as research on "women's reproductive health." Two well-qualified research assistants, along with the first and second authors, recruited participants and supervised the interviews. All women were provided with a visiting card with information about safe shelter and one-stop crisis management centers irrespective of whether they had experienced DV.

Statistical analyses

Complete case analysis was performed to check for entry errors, repeat measures, outliers, and missing information.

Descriptive analysis was performed to assess the prevalence of DV in the two hospitals (DH and KMC), the individual and family socio-demographic characteristics, whether healthcare personnel had enquired about DV, and whether women who had experienced DV had disclosed it to healthcare personnel. A chi-squared test was performed to investigate the difference in the proportion of reported forms of DV and the two study sites. Similarly, the difference between fear only and violence and socio-demographic characteristics, and pre- and post-earthquake was also investigated. Multiple logistic regression analysis was performed, including a priori selected covariates based on the literature. Only women with complete information were included in the three models. Precision was measured using 95% confidence intervals

(CI) in the regression models. A p-value < 0.05 was considered statistically significant. SPSS version 22 was used for analysis.

Results

Sample

The flowchart gives an overview of the recruitment process (Figure S1). Of the eligible women invited (n = 2132), 76 women declined to participate, 6 were excluded because they had insufficient Nepali to complete the questionnaire, and 24 withdrew from the study after completing only a few questions. Of the 2026 women who completed the questionnaire, 22 women were excluded due to missing data: 7 were missing information on age, 4 were missing information on all five items of the AAS, and 11 were less than 12 weeks or more than 28 weeks pregnant. The final sample consisted of 2004 women (Figure S1).

Prevalence of domestic violence

Four hundred and twenty-one women (21%) reported having experienced DV (Table 1). Two hundred and fifty-one women (12.5%) reported fear only. Seventy-two women (3.6%) reported violence only. Ninety-eight women (4.9%) reported both violence and fear (Figure 1). Few women (1.6%) reported physical violence during pregnancy (Table 1). Women were more likely to report fear than violence after the earthquake compared to before (Table 2).

Many women who had experienced DV in the previous year continued to be subject to it during their current pregnancy. Of the 63 women who reported physical violence during the previous year, 20 (31.7%) reported physical violence continuing during their current pregnancy. Of the 23 women reporting sexual violence in the previous year, 9 (39.1%) women reported that sexual violence continued during pregnancy.

Perpetrators

Less than half the women, 178 out of 421 (42.2%) reported the perpetrator of the violence they experienced. The majority of the women 92 out of 94 (97.9%) living in a nuclear family identified their current husband as the perpetrator. However, most of those who lived in an extended family 64 out of 84 (76.2%) identified their in-laws as the perpetrators.

Enquiry and disclosure of domestic violence (data not shown)

A minority of the women in this study (17.7%) had ever been asked about DV by healthcare personnel. Of the 421 women who reported having experienced DV, 40 (9.5%) reported that they had disclosed their experience to healthcare personnel.

Associated factors for domestic violence

Women with a low socioeconomic position (i.e., no education, no income, little autonomy to use their income, a member of a disadvantaged ethnic group) were

significantly more likely to report DV compared to women with a higher socioeconomic position (Table 2).

Table 3, shows the crudes and adjusted odds logistic regression on any forms of DV and risk factors (CI). The risk for DV for women with their own income, but no autonomy, remained associated with DV in all three models: Model 1 (aOR 3.52, 95% CI 2.12-5.82), Model 2 (aOR 3.38, 95% CI 2.03-5.60), and Model 3 (aOR 3.55, 95% CI 2.15- 5.88) (Table 3). However, youth (15–19 years old) remained statistically significant when adjusted for covariates in Model 1 (aOR 2.03, 95% CI 1.05- 3.92) and Model 3 (aOR 2.15, 95% CI 1.20-3.82). When adjusted for husband's age and education in Model 2, the association fell below the level of significance (aOR 1.93, 95% 1.00-3.73).

In Table 4, the analysis was restricted to women reporting violence (n = 170). In this analysis, being multiparous remained statistically significant after adjustment in all three models: Model 1 (aOR 1.66, 95% CI 1.13-2.44), Model 2 (aOR 1.66, 95% CI 1.15-2.40), and Model 3 (aOR 1.73, 95% CI 1.20- 2.49). Women whose husbands had no education were at higher risk of violence, and the association remained significant after adjusting for covariates in Model 2 (aOR 2.16, 95% CI 1.18- 3.96).

Discussion

Twenty one percent of the pregnant women attending routine antenatal care reported having experienced DV. Few had been asked by healthcare personnel whether they had experienced DV. Husbands were the most commonly reported perpetrators. Being young, holding a low socioeconomic position increased the risk of DV.

In Nepal, as has been the custom throughout generations, women leave their home when they marry and move to their husband's house and in most of the cases they live in an extended family. Thus, women usually have little power in the new household, and as a result, they may be more vulnerable to various forms of DV [18]. Having to live with their new husband's family may create fear, irrespective of violence, because daughters-in-law are expected to be submissive. Therefore, "being afraid of someone in the family" in a Nepali context may either reflect the power imbalance between women and their husbands or their husbands' families, or it might

be due to having experienced DV [19]. The majority of women who reported any forms of DV in this study reported fear of someone in their family. To avoid misclassification because of fear, it was considered as a form of DV. Our classification agrees with a study done in Lebanon, which defined a woman's fear of her husband as emotional abuse [20]. Further research is needed to understand what it is women in Nepal mean when they report fear of someone in the family.

In Nepal, DV is considered a normal sociocultural phenomenon. Women might be less inclined to report it, which may be why a lower prevalence was found in our study of physical violence during pregnancy (1.6%) than was found by the NDHS (6%) [7]. Cultural factors may also be an important determinant, particularly concerning DV carried out by an intimate partner. Devries et al. reported that in countries with high levels of severe DV, women do not necessarily report high levels of DV during pregnancy [21]. Another possible explanation for the low prevalence during pregnancy is that abused women may be less likely to attend ANC [22]. It is assumed that identification of DV increases with repeated interviews [11]; in our study, women were interviewed only once in their pregnancy. Finally, women may have believed "no" to be the socially desirable response when asked whether they had experienced domestic violence, leading to lower reported numbers

Both spontaneous disclosure of DV to healthcare personnel and healthcare personnel enquiries regarding DV were low in our study. This is in agreement with

other studies conducted in industrialized settings [23, 24]. A qualitative study done in Kathmandu among women who experienced DV during pregnancy and utilized ANC reported that women concealed DV because of the negative attitude of healthcare personnel and the lack of support they had expected to receive through ANC [25]. The same study revealed that women preferred healthcare personnel to ask them about DV.

Abramsky et al. found that employed women with an unemployed partner were at higher risk of intimate partner violence [26]. While our study found that women who had income but did not have the autonomy to use it were significantly more likely to report DV, our analysis did not include the husband's income due to the large amount of missing information. Further research is needed to assess how increased employment and status among women in Nepal may influence their risk of DV.

Our study found an association between DV and young women. Devries et al. suggested that such an association could be because younger women are less prone to recall bias than older women [21]. In addition, our study also found an association between women with little or no education with DV.

In contrast to our study, having a husband with lower education have been associated with DV in one study in India [11] and one recently conducted among pregnant women in an urban area in Nepal [27]. The lack of this association in our study could be because most of the women reported their husbands to have higher education.

Furthermore, greater parity remained statistically significant when adjusted for the outcome category "violence" while it was not significantly associated with the category "any forms of DV". This could be because of the small sample size in the outcome category (n=170) which may have overestimated the odds ratio which is acknowledge as a statistical phenomenon in a logistic regression analyses [28]. As a result, interpretation of greater parity as a risk factor observed in this study limited. A study done among

Strengths and limitations

A larger sample size, inclusion of women from all sociodemographic and cultural groups, attending routine ANC from two different hospitals in Nepal are the strengths of this study.

A standardized tool (AAS) was used for this study to measure the prevalence of DV. It was translated from English to Nepali and back-translated into Nepali, and piloted in a Nepali setting. Although AAS does not have a broad spectrum of questions related to emotional violence, it has a broad conceptualization of physical violence during pregnancy, and so potentially represents an important tool for the obstetric population [16].

This was the first study to employ C-ACASI for data collection. The use of such technology ensured participant privacy and confidentiality, facilitating disclosure of

DV. However, one of the limitation of this study that must be acknowledged is that there is no estimates of the formal validation for C-ACASI in a Nepali context.

As with all self-reported studies on DV, we have relied on subjective reported events, not on objective observed measures. Information on associated factors, like family structure and spousal income, was also based on the women's reports. Other methods, such as using registries, may have yielded a different pattern. The cross-sectional design of our study limits the potential to draw any conclusion of causality of our findings [29]. Further, sociodemographic characteristics are only proxies of potential underlying causal factors.

As pregnant women in Nepal commonly experience DV, there is a need to develop and assess interventions that reduce its prevalence and consequences. There is also a need to provide training to healthcare personnel who are providing antenatal care, in order to identify and assist women who have experienced DV.

Conclusion

This study from Nepal has found that 21% of women reported having experienced domestic violence. Few women reported physical violence during pregnancy. Our findings suggest that enquiry by healthcare personnel could increase disclosure. Only few women disclosed about their experience of DV. Furthermore, our study emphasizes

the importance of routine screening, which may provide an opportunity for providers of antenatal care in Nepal to assist survivors of DV.

Acknowledgements

The authors are grateful to the funders of this study, the participants, the director of Dhulikhel Hospital, the principal of Kathmandu Medical College, the gynecology and obstetrics departments at DH and KMC, and our research assistants, particularly Buna Bhandari and Shrinkhala Shrestha, for making this work possible. In addition, the authors would like to acknowledge the other members of the ADVANCE study team for their input on the original project proposal. At Linneaus University, Kalmar (Sweden): Katarina Swahnberg; at John Hopkins University (USA): Jacquelyn C. Campbell; and at University of Jayewardenepura (Sri Lanka): Kumudu Wijewardene, Dinusha Chamanie Perera, and Mohamed Munas Mohamed Muzrif.

Declaration of conflict of interest

None declared.

Funding

This project was funded by the Research Council of Norway under its Global Health and Vaccination Research (GLOBVAC) program, project number 220893: “Evaluating

interventions in antenatal care to identify and assist victims of gender-based violence in Nepal and Sri Lanka."

Supplemental material

Supplemental file 1. Table S1. Interview Guide for Color-Coded Audio Computer-Assisted Self-Interview (C-ACASI).

Supplemental file 2. Figure S2. Recruitment process of participants at two settings.

References

1. World Health Organization (WHO) and UNICEF;. Trends in maternal mortality: 1990 to 2013: estimates by WHO, UNICEF, UNFPA, The World Bank and the United Nations Population Division: executive summary. 2014.
2. Government of Nepal, National Planning Commision of Nepal and United Nations Country Team of Nepal. Nepal Millenium Development Goals: Progress Report 2013. Nepal 2013.
3. Lester F, Benfield N and Fathalla MM. Global Women's Health in 2010: Facing the Challenges. *Journal of Women's Health (15409996)*. 2010; 19: 2081-9 9p.
4. García-Moreno C, Jansen H, Ellsberg M, Heise L and Watts C. *WHO multi-country study on women's health and domestic violence against women*. World Health Organization Geneva, 2005.
5. Jasinski JL. Pregnancy and domestic violence A review of the literature. *Trauma, Violence, & Abuse*. 2004; 5: 47-64.
6. Ministry of Law and Justice. Domestic Violence (Offence and Punishment) Act, 2066 (2009). In: Justice MoLa, (ed.). Kathmandu, Nepal 2009.
7. Ministry of Health and Population (MOHP). Nepal demographic and health survey 2011, New Era & ICF International Inc. 2012.
8. Pradhan A, Suvedi B, Barnett S, et al. Nepal maternal mortality and morbidity study 2008/2009. *Family Health Division, Department of Health Services, Ministry of Health and Population, Government of Nepal, Kathmandu, Nepal*. 2010.

9. Deuba K, Mainali A, Alvesson HM and Karki DK. Experience of intimate partner violence among young pregnant women in urban slums of Kathmandu Valley, Nepal: a qualitative study. *BMC Womens Health*. 2016; 16: 11.
10. Nasir K and Hyder AA. Violence against pregnant women in developing countries Review of evidence. *The European Journal of Public Health*. 2003; 13: 105-7.
11. Purwar MB, Jeyaseelan L, Varhadpande U, Motghare V and Pimplakute S. Survey of Physical Abuse during Pregnancy GMCH, Nagpur, India. *Journal of Obstetrics and Gynaecology Research*. 1999; 25: 165-71.
12. García-Moreno C, Hegarty K, d'Oliveira AFL, Koziol-McLain J, Colombini M and Feder G. The health-systems response to violence against women. *The Lancet*. 2015; 385: 1567-79.
13. Hegarty K, O'Doherty L, Taft A, et al. Screening and counselling in the primary care setting for women who have experienced intimate partner violence (WEAVE): a cluster randomised controlled trial. *The Lancet*. 2013.
14. Colombini M, Mayhew SH, Hawkins B, et al. Agenda setting and framing of gender-based violence in Nepal: how it became a health issue. *Health Policy and Planning*. 2015.
15. Bhatnagar T, Brown J, Saravanamurthy PS, Kumar R and Detels R. Color-Coded Audio Computer-Assisted Self-Interviews (C-ACASI) for Poorly Educated Men and Women in a Semi-rural Area of South India: "Good, Scary and Thrilling". *AIDS and behavior*. 2013; 17: 2260-8.
16. Basile K, Hertz M and Back S. Intimate partner violence and sexual violence victimization assessment instruments for use in healthcare settings. Version 1.0. 2007.
17. Hegde S, Latha K, Bhat S, Sharma P, Kamath A and Shetty A. Postpartum depression: prevalence and associated factors among women in India. *J Womens Health, Issues Care*. 2012; 1: 1-7.
18. Pun KD, Infanti JJ, Koju R, Schei B, Darj E and Group AS. Community perceptions on domestic violence against pregnant women in Nepal: a qualitative study. *Glob Health Action*. 2016; 9: 1-13.
19. Emery CR, Thapa S and Wu S. Power and Control in Kathmandu A Comparison of Attempted Power, Actual Power, and Achieved Power. *Violence against women*. 2016: 1077801216644993.
20. Hammoury N and Khawaja M. Screening for domestic violence during pregnancy in an antenatal clinic in Lebanon. *Eur J Public Health*. 2007; 17: 605-6.
21. Devries KM, Kishor S, Johnson H, et al. Intimate partner violence during pregnancy: analysis of prevalence data from 19 countries. *Reproductive health matters*. 2010; 18: 158-70.
22. McFarlane J, Parker B, Soeken K and Bullock L. Assessing for abuse during pregnancy. *JAMA: the journal of the American Medical Association*. 1992; 267: 3176-8.

23. Roelens K, Verstraelen H, Van Egmond K and Temmerman M. Disclosure and health-seeking behaviour following intimate partner violence before and during pregnancy in Flanders, Belgium: A survey surveillance study. *European Journal of Obstetrics & Gynecology and Reproductive Biology*. 2008; 137: 37-42.
24. Swahnberg K, Wijma B, Schei B, Hilden M, Irminger K and Wingren GB. Are sociodemographic and regional and sample factors associated with prevalence of abuse? *Acta Obstet Gynecol Scand*. 2004; 83: 276-88.
25. Rishal P, Joshi SK, Lukasse M, Schei B, Swahnberg K and on behalf of ASG. 'They just walk away' – women's perception of being silenced by antenatal health workers: a qualitative study on women survivors of domestic violence in Nepal. *Glob Health Action*. 2016; 9: 1-10.
26. Abramsky T, Watts CH, Garcia-Moreno C, et al. What factors are associated with recent intimate partner violence? findings from the WHO multi-country study on women's health and domestic violence. *BMC public health*. 2011; 11: 109.
27. Shrestha M, Shrestha S and Shrestha B. Domestic violence among antenatal attendees in a Kathmandu hospital and its associated factors: a cross-sectional study. *BMC Pregnancy Childbirth*. 2016; 16: 360.
28. Nemes S, Jonasson JM, Genell A and Steineck G. Bias in odds ratios by logistic regression modelling and sample size. *BMC medical research methodology*. 2009; 9: 56.
29. Rothman KJ. *Epidemiology: an introduction*. Oxford University Press, 2012.

Table 1. Prevalence of domestic violence

Types of domestic violence	Total (N=2004) n (%)	Dhulikhel Hospital (n=1011) n (%)	Kathmandu Medical College (n=993) n (%)	p-value
[a]Any forms of domestic violence	421 (21.0)	240 (23.7)	181 (18.2)	0.002
[b]Fear only	251 (12.5)	142 (14.0)	109 (11.0)	0.043
[c]Violence	170 (8.5)	98 (9.7)	72 (7.3)	0.054
[d]Fear	349 (17.4)	203 (20.1)	146 (14.7)	0.002
Types of domestic violence				
Physical violence (current pregnancy)	32 (1.6)	23 (2.3)	9 (0.9)	0.015
Physical violence (previous year)	63 (3.1)	40 (3.9)	23 (2.3)	0.035
Sexual violence (previous year)	23 (1.1)	16 (1.6)	7 (0.7)	0.065
Emotional and physical violence (lifetime)	116 (5.8)	62 (6.1)	54 (5.4)	0.506

[a]all positive responses to question on fear of someone in the family
[b]excluded those with positive response to violence questions
[c]all positive responses to questions on both violence and fear
[d]fear and /or violence or both

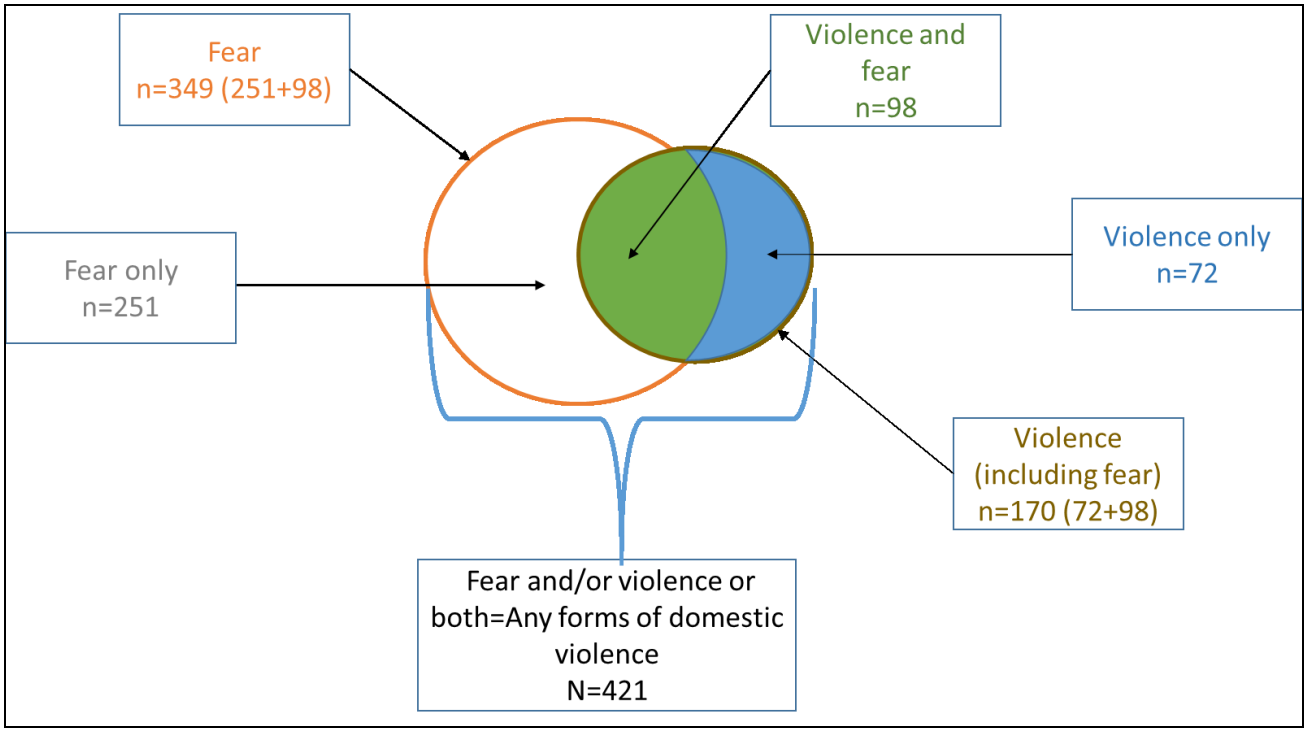

Figure 1. Venn diagram illustrating the co-occurrence of domestic violence and fear of someone in the family among women attending routine antenatal clinic in two hospitals in Nepal.

Table 2. Distribution of socio-demographic characteristics by category of any forms of DV

		No violence	Fear only	Violence	Total	
		n=1583	n=251	n=170	N=2004	
		n (%)	n (%)	n (%)	n (%)	p-value
Study site	Dhulikhel Hospital	771 (48.7)	142 (56.6)	98 (57.6)	1011 (50.4)	0.010
	Kathmandu Medical College	812 (51.3)	109 (43.4)	72 (42.4)	993 (49.6)	
Women's age, (n=2004)	mean (SD)	25.13 (4.10)	24.14 (3.81)	23.88 (4.02)	24.90 (4.10)	
Women's education (n=1999)	None	143 (9.1)	35 (14.0)	39 (23.1)	217 (10.9)	<0.001
	Primary	203 (12.8)	51 (20.4)	34 (20.1)	288 (14.4)	
	Secondary	345 (21.8)	65 (26.0)	37 (21.9)	447 (22.4)	
	Higher	889 (56.3)	99 (39.6)	59 (34.9)	1047 (52.4)	
Women’s income (n=2004)	No income	1162 (73.4)	192 (76.5)	135 (79.4)	1489 (74.3)	<0.001
	Income no autonomy	74 (4.7)	24 (9.6)	19 (11.2)	117 (5.8)	
	Income and autonomy	347 (21.9)	35 (13.9)	16 (9.4)	398 (19.9)	
Age at marriage, years (n=1651)	[mean (SD)]	21.54 (3.87)	20.62 (3.57)	20.13 (3.39)	21.31 (3.81)	
Parity	Nullipara	798 (50.4)	129 (51.4)	68 (40.0)	995 (49.7)	0.030

	Multipara	785 (49.6)	122 (48.6)	102 (60.0)	1009 (50.3)	
Husband's age, years (n=1970)	mean (SD)	28.78 (4.63)	27.59 (5.11)	27.73 (5.25)	28.55 (4.76)	
Husband's education (n=1979)	None	91 (5.8)	13 (5.4)	27 (16.1)	131 (6.6)	<0.001
	Primary	203 (12.9)	54 (22.5)	38 (22.6)	295 (14.9)	
	Secondary	370 (23.6)	72 (30.0)	36 (21.4)	478 (24.2)	
	Higher	907 (57.7)	101 (42.1)	67 (39.9)	1075 (54.3)	
Family structure (n=1942)	Nuclear	756 (49.1)	104 (44.1)	80 (47.9)	940 (48.4)	0.348
	Extended	783 (50.9)	132 (55.9)	87 (52.1)	1002 (51.6)	
Geographical setting (n=2004)	Rural	470 (29.7)	96 (38.2)	61 (35.9)	627 (31.3)	0.010
	Urban	1113 (70.3)	155 (61.8)	109 (64.1)	1377 (68.7)	
Caste/ Ethnicity (n=1996)	Dalit	40 (2.5)	10 (4.0)	7 (4.1)	57 (2.9)	0.020
	Disadvantaged janajati	334 (21.2)	66 (26.3)	50 (29.6)	450 (22.5)	
	Advantaged janajati	329 (20.9)	55 (21.9)	38 (22.5)	422 (21.1)	
	Upper caste	873 (55.4)	120 (47.8)	74 (43.8)	1067 (53.5)	
Earthquake (n=2004)	Pre-earthquake	664 (41.9)	121 (48.2)	91 (53.5)	876 (43.7)	0.005
	Post-earthquake	919 (58.1)	130 (51.8)	79 (46.5)	1128 (56.3)	

Table 3. Associated factors for any forms of domestic violence*

		Any forms of domestic violence			
			Model 1	Model 2	Model 3
		cOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)
Study Site	Dhulikhel	1.43 (1.14, 1.79)	1.22 (0.97, 1.55)	1.17 (0.92, 1.49)	1.12 (0.85, 1.48)
	Kathmandu Medical College	1	1	1	1
Woman's age	15-19	2.25 (1.31, 3.85)	2.03 (1.05, 3.92)	1.93 (1.00, 3.73)	2.14 (1.20, 3.82)
	20-24	1.99 (1.36, 2.91)	2.27 (1.42, 3.64)	2.24 (1.37, 3.65)	2.26 (1.50, 3.42)
	25-29	1.29 (0.86, 1.92)	1.49 (0.96, 2.31)	1.59 (1.01, 2.51)	1.49 (0.98, 2.25)
	≥30	1	1	1	1
Woman's education	None	2.79 (1.98, 3.94)	2.66 (1.84, 3.83)	2.01 (1.34, 3.03)	2.64 (1.81, 3.87)
	Primary	2.38 (1.73, 3.26)	2.06 (1.46, 2.90)	1.65 (1.13, 2.40)	2.02 (1.43, 2.86)
	Secondary	1.71 (1.29, 2.27)	1.65 (1.22, 2.22)	1.43 (1.04, 1.96)	1.62 (1.20, 2.19)
	Higher	1	1	1	1
Women's income	No income	1.97 (1.41, 2.75)	1.46 (1.04, 2.07)	1.41 (1.00, 2.00)	1.45 (1.02, 2.06)
	Income no autonomy	4.21 (2.58, 6.87)	3.52 (2.12, 5.82)	3.38 (2.03, 5.60)	3.55 (2.15, 5.88)
	Income and autonomy	1	1	1	1
Woman's age at marriage	≤19	2.38 (0.91, 6.21)	1.09 (0.37, 3.19)		
	20-24	1.54 (0.59, 3.99)	0.97 (0.34, 2.77)		
	25-29	1.14 (0.42, 3.08)	1.11 (0.38, 3.23)		
	≥30	1	1		
Parity	Multipara	1.12 (0.90, 1.40)	1.14 (0.87, 1.49)	1.15 (0.89, 1.48)	1.18 (0.91, 1.51)
	Nullipara	1	1	1	1
Husband's age (years)	15-19	1.77 (1.18, 2.65)		1.02 (0.61, 1.71)	
	20-24	1.11 (0.76, 1.62)		0.84 (0.53, 1.34)	
	25-29	0.81 (0.54, 1.22)		0.75 (0.48, 1.17)	
	≥30	1		1	
Husband's education	None	2.35 (1.54, 3.57)		1.53 (0.95, 2.48)	
	Primary	2.53 (1.87, 3.42)		1.61 (1.13, 2.31)	

	Secondary	1.64 (1.24, 2.16)	1.26 (0.93, 1.71)	
	Higher	1	1	
Family structure	Extended	1.19 (0.95, 1.49)		1.24 (0.97, 1.58)
	Nuclear	1		1
Geographical setting	Rural	1.33 (1.09, 1.74)		1.05 (0.78, 1.40)
	Urban	1		1
Caste/ Ethnicity	Dalit	1.79 (0.97, 3.31)		1.28 (0.67, 2.43)
	Disadvantaged janajati	1.57 (1.20. 2.06)		1.21 (0.90, 1.63)
	Advantaged janajati	1.28 (1.96, 1.70)		1.24 (0.91, 1.68)
	Upper caste	1		1
Earthquake	Before	1.38 (1.11, 1.73)		
	After	1		

Abbreviations: OR, Odds ratio; aOR, Adjusted odds ratio

Model 1: adjusted for individual characteristics of women and study site; Model 2: adjusted for study site, women's age, women's education, having income of their own and the autonomy to use it, parity and husband's age and education; Model 3: study site, women's characteristics in model 2 and family structure, geographical settings and caste/ethnicity

*among pregnant women with complete case information (n=1906)

Table 4. Regression analysis of potential factors for violence*

		Violence			
			Model 1	Model 2	Model 3
		cOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)
Study site	Dhulikhel	1.37 (0.99, 1.90)	1.16 (0.83, 1.63)	1.21 (0.85, 1.71)	1.16 (0.78, 1.72)
	Kathmandu Medical College	1	1	1	1
Woman's age	15-19	1.92 (0.87, 4.25)	2.32 (0.90, 5.97)	2.73 (1.05, 7.09)	2.41 (1.04, 5.62)
	20-24	1.96 (1.11, 3.45)	2.69 (1.37, 5.31)	3.27 (1.62, 6.61)	2.68 (1.47, 4.88)
	25-29	1.19 (0.66, 2.97)	1.54 (0.80, 2.95)	1.79 (0.93, 3.47)	1.51 (0.82, 2.81)
	≥30	1	1	1	1
Woman's education	None	3.62 (2.30, 5.70)	3.17 (1.96, 5.12)	2.25 (1.29, 3.92)	3.05 (1.84, 5.04)
	Primary	2.39 (1.52, 3.77)	1.85 (1.13, 3.02)	1.52 (0.89, 2.60)	1.79 (1.10, 2.93)
	Secondary	1.59 (1.03, 2.44)	1.42 (0.91, 2.22)	1.29 (0.80, 2.08)	1.38 (0.88, 2.17)
	Higher	1	1	1	1
Women's income	No income	2.21 (1.30, 3.77)	1.59 (0.92, 2.75)	1.52 (0.88, 2.64)	1.64 (0.94, 2.85)
	Income no autonomy	4.52 (2.24, 9.13)	3.55 (1.72, 7.31)	3.42 (1.65, 7.07)	3.57 (1.73, 7.37)
	Income and autonomy	1	1	1	1
Woman's age at marriage	≤19	2.44 (0.58, 10.35)	1.02 (0.21, 4.97)		
	20-24	1.45 (0.34, 6.14)	0.90 (0.19, 4.33)		
	25-29	0.97 (0.21, 4.40)	1.05 (0.21, 5.24)		
	≥30	1	1		
Parity	Multipara	1.57 (1.13, 2.18)	1.66 (1.13, 2.44)	1.66 (1.15, 2.40)	1.73 (1.20, 2.49)
	Nullipara	1	1	1	1
Husband's age	15-19	1.63 (0.92, 2.89)		0.89 (0.43, 1.83)	
	20-24	0.87 (0.50, 1.51)		0.63 (0.32, 1.22)	
	25-29	0.99 (0.56, 1.77)		0.93 (0.50, 1.74)	
	≥30	1		1	

Husband's education	None	3.71 (2.22, 6.19)	2.16 (1.18, 3.96)	
	Primary	2.40 (1.56, 3.67)	1.42 (0.85, 2.35)	
	Secondary	1.30 (0.85, 1.99)	0.98 (0.62, 1.56)	
	Higher	1	1	
Family structure	Extended	1.06 (0.77, 1.47)		1.18 (0.83, 1.67)
	Nuclear	1		1
Geographical setting	Rural	1.19 (0.85, 1.67)		0.88 (0.58, 1.33)
	Urban	1		1
Caste/ Ethnicity	Dalit	2.05 (0.89, 4.70)		1.32 (0.56, 3.14)
	Disadvantaged janajati	1.74 (1.18, 2.56)		1.31 (0.86, 1.99)
	Advantaged janajati	1.37 (0.90, 2.08)		1.34 (0.86, 2.08)
	Upper caste	1		1
Earthquake	Before	1.57 (1.14, 2.17)		
	After	1		

Abbreviations: OR, Odds ratio; aOR, Adjusted odds ratio

Model 1: adjusted for individual characteristics of women and study site; Model 2: adjusted for study site, women's age, women's education, having income of their own and the autonomy to use it, parity and husband's age and education; Model 3: study site, women's characteristics in model 2 and family structure, geographical settings and caste/ethnicity

*among pregnant women with complete case information (n=1906)