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Association between intimate partner violence and prenatal anxiety and depression in pregnant women: a cross-sectional survey during the COVID-19 epidemic in Shenzhen, China

Fei Wu,[1,2] Lin Zhou,[3] Caiyun Chen,[2] Wei Lin,[1] Peiyi Liu,[1] Weikang Huang,[1] Chuyan Zhong,[1] Minyi Zhang,[2] Qiushuang Li,[2] Qing Chen ![ORCID],[2] Yue-Yun Wang[1]

[1]Department of Healthcare, Affiliated Shenzhen Maternity and Child Healthcare Hospital, Southern Medical University, Shenzhen, Guangdong, China
[2]Department of Epidemiology, School of Public Health, Southern Medical University, Guangzhou, Guangdong, China
[3]Department of Information Technology, Shenzhen Centre for Disease Control and Prevention, Shenzhen, Guangdong, China

Correspondence to
Dr Qing Chen;
qch.2009@163.com and
Dr Yue-Yun Wang;
wangyueyun@126.com

ABSTRACT

Objectives Intimate partner violence (IPV) against women remains a major global public health problem with harmful consequences for individuals and society. People's lifestyles have been greatly affected by the COVID-19 pandemic. This study investigated the prevalence of and relationship between IPV and anxiety and depression in pregnant Chinese women during the pandemic.

Design Cross-sectional study.

Setting This investigation was conducted in Shenzhen City, Guangdong Province, China from 15 September to 15 December 2020.

Participants A total of 3434 pregnant women were screened with the Abuse Assessment Screen Questionnaire to evaluate IPV and General Anxiety Disorder and Patient Health Questionnaire to evaluate symptoms of anxiety and depression, respectively. Pregnant women with perinatal health records at Shenzhen District Maternity and Child Healthcare Hospitals who consented to participate were enrolled. Women with psychotic disorders such as schizophrenia, mania or substance dependence and pregnant women who refused to participate were excluded. Data were analysed with the χ^2 test and by logistic regression analysis.

Results The prevalence of IPV among pregnant women was 2.2%. Mental violence was the most common type of violence (2.2%), followed by physical (0.6%) and sexual (0.7%) violence. The prevalence of anxiety and depression symptoms was 9.8% and 6.9%, respectively. After adjusting for covariates, there was a statistically significant association between IPV and prenatal anxiety (OR=4.207, 95% CI: 2.469 to 7.166) and depression (OR=3.864, 95% CI: 2.095 to 7.125).

Conclusions IPV increased the risk of prenatal anxiety and depression in pregnant women in China during the COVID-19 pandemic. Efforts should be made by the government and civil society to promote long-lasting antenatal interventions to ensure the safety and protect the mental health of pregnant women.

INTRODUCTION

Intimate partner violence (IPV) against women including physical, mental and sexual

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STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ This is the first investigation of the relationship between intimate partner violence (IPV) and prenatal anxiety and depression in pregnant women during the COVID-19 pandemic in China.
⇒ Causality between these two outcomes was not established.
⇒ IPV was likely under-reported by the study participants.
⇒ Some results should be interpreted with caution because of the small sample size.

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abuse is an important clinical and public health issue.[1 2] In 2016, the WHO highlighted various forms of interpersonal violence, particularly those occurring in the home and inflicted by intimate partners and other family members and remaining hidden, stigmatised and largely unrecognised by health and other service providers.[3] A previous study showed that pregnant women were vulnerable to the initiation or exacerbation of IPV[4] and were 2.7–3.9 times more likely to be victims of physical violence and twice as likely to be subjected to sexual violence compared with non-pregnant women.[5] In China, IPV prevalence in pregnant women has been reported as 18.32% in Wuhan[6] and 11.3% in Changsha.[7] Prenatal depression and anxiety are common sequelae of IPV.[8 9]

The COVID-19 outbreak began in December 2019 in Wuhan City, Hubei Province, China[10] and suddenly and radically altered the population's habits and lifestyles, with a drastic reduction in any form of socialisation. Physical distancing and self-isolation strongly impacted people's lives,[11] including those of pregnant women and their partners. Protecting the physical and mental well-being

of pregnant women is important for a healthy society. However, only one study to date[12] has examined the prevalence of IPV among pregnant women since the start of the COVID-19 pandemic, and there have been no studies investigating the association between IPV and prenatal anxiety and depression in this group.

Shenzhen is one of the most economically developed and populous cities in mainland China whose activities have been severely impacted by the restrictions imposed in response to the pandemic. The present study aimed to establish the prevalence of IPV among pregnant women in Shenzhen during the COVID-19 pandemic and the association between IPV and prenatal anxiety and depression.

METHODS
Research design and study population
This cross-sectional survey was conducted from 15 September to 15 December 2020 and enrolled women at all stages of pregnancy in Shenzhen City, Guangdong Province, China. Shenzhen is an economic centre and the fourth largest city in mainland China in terms of economic aggregate; there are fewer migrant workers than other large cities and most of its population is urban. The study participants were recruited from 10 representative administrative areas of Shenzhen that can provide reference values for areas in other countries with similar characteristics. Pregnant women were recruited from maternity and child healthcare hospitals in each of the 10 administrative areas using a multi-stage random sampling method.[13] Briefly, women at all stages of pregnancy who came to the hospital for regular check-ups between 15 September and 15 December 2020 were enrolled. A full description of the objectives, contents, procedures, associated benefits and risks of the present study was provided at the beginning of the electronic questionnaire completed by participants when they registered for the check-up. Investigators including trained doctors, nurses and medical students provided guidance for filling out the questionnaire. Pregnant women with perinatal health records at Shenzhen District Maternity and Child Healthcare Hospitals who consented to participate were enrolled. Women with psychotic disorders such as schizophrenia, mania or substance dependence and pregnant women who could not complete the questionnaire within the allotted time were excluded. The sample size calculation formula for cross-sectional studies was used to determine the minimum theoretical sample size for this study. The admissible error was 0.15, α=0.05, and based on previous studies, the expected prevalence was 5%[14]; 3416 people were therefore required to represent the population of Shenzhen. A total of 3437 women who met the inclusion criteria were enrolled; those who completed the questionnaire in less than 100 s were excluded, leaving 3434 women in the study from all 10 administrative areas of Shenzhen. Thus, the response rate was 99.9% (3434/3437). There were about 160 000 live births in

the Maternal and Child Health Hospital system of Shenzhen in 2020, which represents our sample size of about 2% of the total number of newborns in Shenzhen.

Measurements
General characteristics of the study population
General information obtained on each participant included age, education level, partner's education level, work status after pregnancy, partner's work status, marital status, living situation, psychological counselling before pregnancy, vaginal bleeding and pregnancy complications, pregnancy intention, intimacy between partners since COVID-19 and household income since COVID-19.

Family care
The Family Adaptation Partnership Growth and Resolved (APGAR) index was used for family care assessment.[15] The APGAR has five items, each answered on a 3-point Likert scale from 'Often' (2 points) to 'Rarely' (0 points). The total score was 0–10 points. A high APGAR score (7–10 points) indicated good family functioning; a mid-range score (4–6 points) indicated moderate family dysfunction and a low score (0–3) indicated severe family dysfunction.

Lifestyle characteristics
Lifestyle characteristics including smoking and drinking by a pregnant woman and her partner, exercise and sitting time per day were recorded. Smoking was defined as an average of one cigarette a day in recent years. Drinking was defined as consuming alcohol once a week on average. Exercise was defined as having engaged in walking, yoga or other physical activities more than three times during the past week. The above definitions were in accordance with previous research.[16] Sitting time per day was categorised as ≤1, 1 to <3, 3 to <5, 5 to <10 and ≥10 hour.

Assessment of IPV
The Abuse Assessment Screen Questionnaire was used to assess IPV during pregnancy. This scale is widely used as a tool to screen IPV in pregnant women and has good validity and reliability.[17] The scale assesses three aspects of domestic violence—that is, mental, physical and sexual—and has eight items. The response to each item was 'Yes' or 'No'. If the respondent answered 'Yes' to one or more of questions 5–7, she was identified as a victim of domestic violence during pregnancy.[18]

Assessment tool for prenatal anxiety
The 7-Item Generalised Anxiety Disorder scale (GAD-7)[19] is used as a screening tool for GAD in primary care patients and is easily understood and can be completed quickly. The scale has seven items, each scored on a 4-point scale ranging from 0 to 3 for a total score between 0 and 21, with a higher score indicating more severe anxiety symptoms. A GAD-7 score ≥7 was the cut-off for prenatal anxiety.

Assessment tool for prenatal depression

Prenatal depression was assessed with the 9-Item Patient Health Questionnaire (PHQ-9), which consists of nine questions pertaining to depression symptoms over the prior 2 weeks, each with four possible responses: 'Not at all', 'Several days', 'More than half of the days' and 'Nearly every day', corresponding to 0, 1, 2 and 3 points, respectively. The total score ranges from 0 to 27.[20] Participants with a score ≥10 were considered to have prenatal depression.

Statistical analysis

Data were kept anonymous and non-identifiable and were analysed using SPSS V.25.0 (SPSS). Some continuous variables such as age and family care (APGAR), prenatal anxiety (GAD-7) and prenatal depression (PHQ-9) scores were treated as categorical variables. The χ^2 test, calibration χ^2 test or Fisher's exact test was used to compare baseline characteristics between women who had experienced IPV (IPV group) and those who had not (no-IPV group). Multivariate logistic regression with the enter method was used to estimate OR and 95% CI of associations between IPV and prenatal anxiety and depression. A two-tailed test with $p < 0.05$ was considered statistically significant.

Patient and public involvement

Neither the patients nor the public was involved in the design, conduct, reporting or dissemination of this work. However, women in the recruitment populations have expressed a high degree of interest in the issue of mental health.

RESULTS

Of 3437 pregnant women without psychotic disorders who completed the electronic questionnaire, three were excluded because their completion time was <100 s. Thus, 3434 participants were ultimately included in the analysis. The mean age of the participants was 28.97±4.57 years (table 1). There were significant differences in age, professional psychological counselling, family care, pregnancy complications, partner intimacy since COVID-19, household income since COVID-19, smoking habits, drinking habits of the participant and her partner, exercise and sitting time per day between the IPV and no-IPV groups, whereas no intergroup differences were observed in the participant and her partner's education level, work status and other characteristics. A total of 77 participants (2.2%) experienced at least one form of IPV during pregnancy; mental violence was the most common (n=57, 1.7%), followed by physical (n=19, 0.6%) and sexual (n=7, 0.7%) violence.

There were differences in the prevalence of anxiety and depression between IPV and no-IPV groups (tables 2 and 3). According to GAD-7 scale score, the incidence of mild anxiety symptoms was 15.2% (523/3434), while moderate and severe anxiety symptoms were observed in 2.5% (85/3434) and 1.0% (35/3434) of participants,

respectively. Using a cut-off value of 7, the incidence of anxiety symptoms was 9.8% (337/3434). According to PHQ-9 scale score, 22.0% of participants (757/3434) had mild depressive symptoms, 6.1% (210/3434) had moderate depressive symptoms and 0.8% (28/3434) had severe depressive symptoms. Using a cut-off value of 10, the incidence of depressive symptoms was 6.9% (238/3434). Participants who experienced mental, physical and sexual violence had higher rates of prenatal anxiety and depression than those who did not report IPV.

After adjusting for potential confounding factors, IPV was significantly associated with prenatal anxiety in the multivariate logistic regression analysis (table 4). Participants who had experienced IPV were 4.207 times more likely to have experienced prenatal anxiety (OR=4.207, 95% CI: 2.469 to 7.166). Mental violence (OR=4.471, 95% CI: 2.444 to 8.179) and physical violence (OR=9.174, 95% CI: 3.224 to 26.102) were significantly associated with prenatal anxiety; however, there was no association between sexual violence and anxiety.

In the logistic regression analysis, participants who reported IPV were more likely to develop prenatal depression after adjusting for confounding factors (OR=3.864, 95% CI: 2.095 to 7.125). Mental violence (OR=3.259, 95% CI: 1.590 to 6.678), physical violence (OR=10.176, 95% CI: 3.495 to 29.627) and sexual violence (OR=4.121, 95% CI: 1.457 to 11.659) were all associated with an increased risk of prenatal depression (table 5).

DISCUSSION

The prevalence of IPV during the COVID-19 pandemic among pregnant women in Shenzhen, China was 2.2%. This is comparable to the rate reported in a cross-sectional study conducted in London, UK (3%)[21] but much lower than that reported in Pakistan (35%).[22] The disparities in prevalence are likely attributable to cultural, economic and regional differences. The COVID-19 pandemic has radically changed the lives of individuals. In particular, COVID-19 quarantine made the home a very dangerous place for victims of domestic violence as they were forced to spend more time with their abusive partners and away from people who could validate their experiences and offer help. IPV was also exacerbated by the economic crisis linked to COVID-19 with some pregnant women unable to leave their partners for economic reasons,[23] which likely influenced the reported prevalence of IPV. However, there has not been consistent screening for IPV because of limited time and resources, a reluctance to potentially offend pregnant women, insufficient training and reimbursement and perceived lack of institutional support. It is therefore essential that healthcare professionals address safety and violence faced by their pregnant patients at home. Telehealth provides an opportunity for IPV screening and the provision of resources as well as contraceptive and mental health counselling.[24]

Mental violence (1.7%) was the most common form of IPV among the study participants, which is consistent with

Table 1 General characteristics of the study participants

Variable	No-IPV	IPV	χ^2	P value*
Age (years)			17.528	**0.002**
≤19	28 (0.8)	4 (5.2)		
20–24	507 (15.1)	13 (16.9)		
25–29	1341 (39.9)	30 (39.0)		
30–34	1096 (32.6)	19 (24.7)		
≥35	385 (11.5)	11 (14.3)		
Education level			4.895†	0.418
Master's degree or higher	140 (4.2)	7 (9.1)		
Undergraduate	919 (27.4)	18 (23.4)		
College degree	912 (27.2)	21 (27.3)		
High school degree	699 (20.8)	14 (18.2)		
Junior high school diploma	670 (20.0)	17 (22.1)		
Primary school or lower	17 (0.5)	0 (0.0)		
Partner's education level			6.761†	0.215
Master's degree or higher	202 (6.0)	6 (7.8)		
Undergraduate	998 (29.7)	22 (28.6)		
College degree	844 (25.1)	18 (23.4)		
High school degree	698 (20.8)	13 (16.9)		
Junior high school diploma	600 (17.9)	16 (20.8)		
Primary school or lower	15 (0.4)	2 (2.6)		
Work status after pregnancy			0.007	0.933
Employed	2065 (61.5)	47 (61.0)		
Unemployed	1292 (38.5)	30 (39.0)		
Partner's working status			0.024‡	0.876
Employed	3217 (95.8)	73 (94.8)		
Unemployed	140 (4.2)	4 (5.2)		
Marital status			0.440	0.507
Married	3118 (92.9)	70 (90.9)		
Unmarried/divorced/widowed	239 (7.1)	7 (9.1)		
Living situation			3.337	0.189
Couple alone	2263 (67.4)	54 (70.1)		
Living with in-laws	844 (25.1)	14 (18.2)		
Living with parents	250 (7.4)	9 (11.7)		
Professional psychological counselling			17.816	**<0.001**
Not received	3125 (93.1)	62 (80.5)		
Received	232 (6.9)	15 (19.5)		
Family care			45.788	**<0.001**
Good functioning	1992 (59.3)	18 (23.4)		
Moderately dysfunction	872 (26.0)	31 (40.3)		
Severe dysfunction	493 (14.7)	28 (36.4)		
Gestational age			0.944	0.624
First trimester	1122 (33.4)	22 (28.6)		
Second trimester	1122 (33.4)	29 (37.7)		
Third trimester	1113 (33.2)	26 (33.8)		
Vaginal bleeding			2.623	0.105

Continued

Table 1 Continued

Variable	No-IPV	IPV	χ^2	P value*
No	2537 (75.6)	52 (67.5)		
Yes	820 (24.4)	25 (32.5)		
Pregnancy complications			6.730	**0.009**
No	2601 (77.5)	50 (64.9)		
Yes	756 (22.5)	27 (35.1)		
Pregnancy intention			3.641†	0.144
Planned conception	1796 (53.5)	33 (42.9)		
Unplanned pregnancy	1452 (43.3)	41 (53.2)		
Artificial insemination	109 (3.2)	3 (3.9)		
Intimacy with partner since COVID-19			64.846	**<0.001**
Essentially unchanged	2554 (76.1)	47 (61.0)		
Strained	65 (1.9)	12 (15.6)		
More intimate	738 (22.0)	18 (23.4)		
Household income since COVID-19			12.921†	**0.004**
Essentially unchanged	1805 (53.8)	30 (39.0)		
Increased	60 (1.8)	5 (6.5)		
Decreased by 20%–50%	1165 (34.7)	30 (39.0)		
Decrease by ≥50%	327 (9.7)	12 (15.6)		
Smoking			19.565‡	**<0.001**
No	3302 (98.4)	70 (90.9)		
Yes	55 (1.6)	7 (9.1)		
Partner's smoking habits			1.217	0.270
No	2082 (62.0)	43 (55.8)		
Yes	1275 (38.0)	34 (44.2)		
Drinking			8.892‡	**0.003**
No	3195 (95.2)	67 (87.0)		
Yes	162 (4.8)	10 (13.0)		
Partner's drinking habits			7.672	**0.006**
No	2441 (72.7)	45 (58.4)		
Yes	916 (27.3)	32 (41.6)		
Exercise			4.327	**0.038**
No	2412 (71.8)	47 (61.0)		
Yes	945 (28.2)	30 (39.0)		
Sitting time per day, hour			14.533	**0.006**
≤1	454 (13.5)	19 (24.7)		
1–3	1069 (31.8)	21 (27.3)		
3–5	829 (24.7)	11 (14.3)		
5–10	831 (24.8)	18 (23.4)		
≥10	174 (5.2)	8 (10.4)		

Data are presented as n (%).
*Values in bold face are statistically significant at p<0.05.
†Fisher's exact test.
‡Calibration χ^2 test.
IPV, intimate partner violence.

Table 2 Prevalence of anxiety among study participants

IPV or IPV subtype	No prenatal anxiety	Prenatal anxiety	χ^2	P value*
Overall IPV			97.172	**<0.001**
No	3053 (98.6)	304 (90.2)		
Yes	44 (1.4)	33 (9.8)		
Mental violence			83.936	**<0.001**
No	3066 (99.0)	311 (92.3)		
Yes	31 (1.0)	26 (7.7)		
Physical violence			44.591†	**<0.001**
No	3089 (99.7)	326 (96.7)		
Yes	8 (0.3)	11 (3.3)		
Sexual violence			13.594†	**<0.001**
No	3082 (99.5)	329 (97.6)		
Yes	15 (0.5)	8 (2.4)		
Total	3097 (90.2)	337 (9.8)		

Data are presented as n (%).
*Values in bold face are statistically significant at p<0.05.
†Calibration χ^2 test.
IPV, intimate partner violence.

findings from other studies conducted in China,[7] Thailand[25] and Ethiopia.[26] We observed similar rates of physical (0.6%) and sexual (0.7%) violence, although these were lower than that reported in Ethiopia during the COVID-19 pandemic.[12] The difference may be explained by the Chinese cultural norm of avoiding discussions of unpleasant personal circumstances in order to 'save face',[16] with the result that violence during pregnancy is frequently underreported.[27] It is worth noting that our results may have been biased by the fact that outcomes were assessed by self-report.[28] Although we informed the subjects that the survey was for scientific research purposes only and that they were filling out the electronic questionnaire anonymously, it is possible that the subjects concealed or avoided fully reporting their experiences of violence. On the other hand, the survey results were based on participants' recall of past events; participants may have forgotten about or ignored their experiences of IPV, especially psychological violence such as belittling and ridiculing, which may have decreased the reported rate of IPV.

Table 3 Prevalence of depression among study participants

IPV or IPV subtype	No prenatal depression	Prenatal depression	χ^2	P value*
Overall IPV			64.257	**<0.001**
No	3142 (98.3)	215 (90.3)		
Yes	54 (1.7)	23 (9.7)		
Mental violence			36.892†	**<0.001**
No	3155 (98.7)	222 (93.3)		
Yes	41 (1.3)	16 (6.7)		
Physical violence			31.369†	**<0.001**
No	3185 (99.7)	230 (96.6)		
Yes	11 (0.3)	8 (3.4)		
Sexual violence			23.669†	**<0.001**
No	3181 (99.5)	230 (96.6)		
Yes	15 (0.5)	8 (3.4)		
Total	3196 (93.1)	238 (6.9)		

Data are presented as n (%).
*Values in bold face are statistically significant at p<0.05.
†Calibration χ^2 test.
IPV, intimate partner violence.

Table 4 Association between intimate partner violence and prenatal anxiety

Variable	OR (95% CI)	P value*
IPV†	4.207 (2.469 to 7.166)	**<0.001**
Mental violence†	4.471 (2.444 to 8.179)	**<0.001**
Physical violence†	9.174 (3.224 to 26.102)	**<0.001**
Sexual violence†	2.018 (0.733 to 5.556)	0.174

*Values in bold face are statistically significant at p<0.05.
†Adjusted for age, participant and her partner's education level, participant and her partner's work status, marital status, living situation, professional psychological counselling, family care, gestational age, vaginal bleeding, pregnancy complications, pregnancy intention, intimacy with partner since COVID-19, household income since COVID-19, participant and her partner's smoking habits, participant and her partner's drinking habits, exercise, sitting time per day and IPV subtype.
IPV, intimate partner violence.

We observed a significant and positive association between IPV and prenatal anxiety and depression during the COVID-19 pandemic. This is consistent with other reports[6 7 9 29] in which IPV was identified as a chronic stressful condition that increased the risk of depression and anxiety during pregnancy. We also found that IPV subtypes had different effects on prenatal anxiety and depression; for instance, mental violence was associated with an increased risk of both conditions. A higher rate of psychological (emotional and verbal) abuse was shown to be more closely associated with mental health outcomes than physical violence,[30] possibly because psychological violence directly attacks a person's self-perception and can cause post-traumatic stress disorder and anxiety through mechanisms such as guilt, self-hatred and regret.[31] The adverse consequences of physical violence such as fractures, lacerations and head trauma are amplified during pregnancy and increased the risk of prenatal anxiety and depression in our cohort. Sexual violence did not appear to be associated with prenatal anxiety in our

Table 5 Association between intimate partner violence and prenatal depression

Variable	OR (95% CI)	P value*
IPV†	3.864 (2.095 to 7.125)	**<0.001**
Mental violence†	3.259 (1.590 to 6.678)	**0.001**
Physical violence†	10.176 (3.495 to 29.627)	**<0.001**
Sexual violence†	4.121 (1.457 to 11.659)	**0.008**

*Values in bold face are statistically significant at p<0.05.
†Adjusted for age, participant and her partner's education level, participant and her partner's work status, marital status, living situation, professional psychological counselling, family care, gestational age, vaginal bleeding, pregnancy complications, pregnancy intention, intimacy with partner since COVID-19, household income since COVID-19, participant and her partner's smoking habits, participant and her partner's drinking habits, exercise, sitting time per day and IPV subtype.
IPV, intimate partner violence.

research, which contradicts earlier findings[32]; this may be due to participants' reluctance to report this form of IPV according to the norms of Chinese culture. It is also possible that the positive rate was too low to show an association between sexual violence and prenatal anxiety. This warrants closer investigation in future studies with a larger sample size.

Strengths and limitations
This study is the first investigation of the relationship between IPV and prenatal anxiety and depression in pregnant women during the COVID-19 pandemic in China. The participants were representative of the entire population of Shenzhen. However, there were several limitations to our study. First, we were unable to establish causality between the two outcomes because of the cross-sectional study design. Second, symptoms of depression and anxiety were evaluated only once and therefore, it was not possible to detect any trends over the course of pregnancy. Third, non-pregnant women should have been included as controls to obtain a more comprehensive view of the effects of IPV on pregnant women. Finally, we found a low prevalence of IPV, which may lead to false negative results when analysing correlations. Future investigations should expand the sample size to confirm the results of this study. These issues can be addressed in future studies with a prospective, longitudinal, meditational and mixed method designs that also examine the mental health consequences of IPV for pregnant women.

CONCLUSION
Violence against women is a key priority for achieving gender equality around the world. The prevalence of IPV in pregnant women in China cannot be underestimated. Our results suggest that IPV among pregnant women during the COVID-19 pandemic was associated with prenatal anxiety and depression. Prenatal care can identify pregnant women who experience IPV so that they can be connected with services that offer protection. Eliminating violence against pregnant women requires practical and long-term interventions by the government and civil society starting from education within the family.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval This study involves human participants and was approved by Institutional Review Board of Shenzhen Maternity and Child Healthcare Hospitals; SFYLS [2020] 032. Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available upon reasonable request. The datasets generated and analysed during the current study are not publicly available due to privacy restrictions but are available from the corresponding author on reasonable request.

ORCID iD
Qing Chen http://orcid.org/0000-0002-2474-6697

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