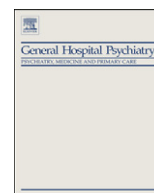


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## High-frequency intimate partner violence during pregnancy, postnatal depression and suicidal tendencies in Harare, Zimbabwe

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## ABSTRACT

**Introduction:** Intimate partner violence (IPV) is a common form of violence experienced by pregnant women and is believed to have adverse mental health effects postnatally. This study investigated the association of postnatal depression (PND) and suicidal ideation with emotional, physical and sexual IPV experienced by women during pregnancy.

**Methods:** Data were collected from 842 women interviewed postnatally in six postnatal clinics in Harare, Zimbabwe. We used the World Health Organization versions of IPV and Centre for Epidemiological Studies – Depression Scale measures to assess IPV and PND respectively. We derived a violence severity variable and combined forms of IPV variables from IPV questions. Logistic regression was used to analyse data whilst controlling for past mental health and IPV experiences.

**Results:** One in five women [21.4% (95% CI 18.6–24.2)] met the diagnostic criteria for PND symptomatology whilst 21.6% (95% CI 18.8–24.4) reported postpartum suicide thoughts and 4% (95% CI 2.7–5.4) reported suicide attempts. Two thirds (65.4%) reported any form of IPV. Although individual forms of severe IPV were associated with PND, stronger associations were found between PND and severe emotional IPV or severe combined forms of IPV. Suicidal ideation was associated with emotional IPV. Other forms of IPV, except when combined with emotional IPV, were not individually associated with suicidal ideation.

**Conclusion:** Emotional IPV during pregnancy negatively affects women's mental health in the postnatal period. Clinicians and researchers should include it in their conceptualisation of violence and health. Further research must look at possible indirect relationships between sexual and physical IPV on mental health.

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## 1. Introduction

Intimate partner violence (IPV) is a common form of violence amongst pregnant women and is a risk factor for postpartum mental health problems [1,2]. A global review of the prevalence of IPV found that African countries reported amongst the highest levels [3]. In a systematic review of IPV during pregnancy in Africa [4], as many as one in two pregnant women reported such violence. Studies have highlighted postnatal depression (PND) as a common maternal health problem globally and have shown that it is exacerbated in resource-limited settings such as many African countries [5,6] including Zimbabwe [7–9]. PND affects between 8% and 20% of women and impacts negatively on mother child bonding and care giving [10].

Biological explanations for PND include the rapid hormonal withdrawal within 4 weeks postpartum leading to vulnerability of women and activation of a biological system underlying mother–child attachment behaviour regulated by hormones [11]. It is crucial to understand the association of IPV during pregnancy and PND, including the serious dimensions of suicidal ideation, to develop prevention interventions. Prevention and early identification is important to plan treatment and further prevention [12].

There is increasing attention on the association between IPV and PND but few studies [1,13,14] focussed on IPV experienced during pregnancy, even though research shows that IPV during pregnancy is more likely to lead to PND compared to IPV outside of pregnancy [1]. Other current research limitations include recall bias when women are asked retrospectively about their pregnancies, whilst other studies did not adjust for confounding variables [10]. PND has been assessed at different times from a day after giving birth to as long as 2 years after giving birth with most studies using 6 weeks postpartum as the

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crucial time for measuring PND [10,15]. This study considers PND at 6 weeks postpartum.

In a systematic review of the associations between PND and violence in Africa, it was noted that data were only available from 8 countries with 58 PND prevalence estimates ranging between 3.2% and 48% with the majority lying between 10% and 19% and a weighted mean of 18% (95% CI 17.6–19.1%) [15]. The wide range (3.2–48%) reported is mostly due to the studies using various time periods after which PND was measured such as between 5 days and 18 months after delivery although prevalence is known to decrease after 6 months as reported in cohort studies [16,17]. In Zimbabwe, in particular, the prevalence of PND was reported at 16% in 1998 at 6–8 months postpartum using the Edinburgh PND scale [8]. Validation of PND measures in Zimbabwe has been done extensively with different tools such as the Edinburgh PND scale [18] offering adequate literature on PND with which to compare our results.

Suicide is a leading cause of perinatal maternal deaths in developed countries [19] but it has not been given adequate attention in developing countries. Suicidal ideation requires more attention in women in developing countries where it has traditionally been regarded as a male health problem [20]. The World Health Organization (WHO) Multi Country Study on women's health [3] reported that up to 12% women have attempted suicide and an even higher proportion have at one time thought about taking their lives [21]. Although measurement differences exist, a study that used the same WHO violence questions and the Centre for Epidemiological Studies – Depression Scale (CES-D) tool for measuring suicide found that 14% of women attempted suicide in their lifetime, and abused women were three times more likely to develop suicide thoughts [21]. These studies addressed the general population. Little evidence exists on suicide attempts and thoughts in the postpartum period and on IPV experienced during the time of pregnancy. Understanding the association between IPV and PND and suicidality is crucial as it affects not only the health of the mother but also that of the new born with both short and long health sequelae. A broader study on IPV during pregnancy provides an opportunity to explore PND and suicide. Women were interviewed at their sixth week after birth, minimising recall bias. This study also measured past IPV and past suicidal ideation and we were able to control for this in the analysis. The paper assesses the relationship between IPV during pregnancy and both PND and suicidal ideation.

## 2. Methods

### 2.1. Design and data collection

A cross-sectional survey was conducted amongst 2042 postnatal women who attended postpartum clinics in Harare, Zimbabwe. The study was conducted in six public postnatal clinics in low-income urban areas between May and September 2011. The study recruited 1156 women at the 10-day postnatal clinic (56.6%) and 886 women at the 6-week postnatal clinic (43.4%). This paper is based on an analysis of data from 886 women recruited at the 6-week postnatal clinic to ensure adequate measurement of PND symptomatology. We felt that measuring PND at the 10th postnatal day would not yield reliable data on PND that is normally measured from 6 weeks postpartum [8] and up to 2 years. Women aged 15–49 years were consecutively recruited from the postnatal clinic queues. Trained female interviewers invited women and conducted face-to-face interviews in a private space in vernacular.

IPV during the recent pregnancy was measured using an adapted version of the WHO questionnaire for measuring violence against women and girls [3]. In the questionnaire, partners were defined as current or past husbands, boyfriends or fiancés regardless of the legal status of the relationship. IPV was measured using four, three and six questions for emotional, sexual and physical violence respectively. For example, physical violence was measured by asking a woman if, during

the time she was pregnant, her partner ever slapped, kicked, hit, choked, shoved or threatened her with a weapon. Any positive response was coded yes for that type of violence. An additional question measuring violence frequency asked how many times each act happened during pregnancy with once, twice or thrice/more as the responses.

PND symptomatology was measured using the WHO [3] version of the CES-D that is also commonly used to measure PND. This scale has been validated and used extensively in many African settings [3] and has 20 questions that assess whether a woman experienced or felt a range of problems and emotions during the past 4 weeks including the following: sadness, bad sleep, loss of interest in things, poor appetite, often having headaches, excessive thinking, feelings of guilt, tiredness, movement/motion problems and thoughts of ending their life. For example, whilst referring to the past 4 weeks, respondents were asked, "Do you often have headaches?" Each question was dichotomously coded "yes" if the respondent reported having felt or experienced the problem and "no" if they did not.

Suicide thoughts were assessed by asking whether a participant ever had thoughts of killing themselves in their lifetime and this was dichotomised as No=0 and Yes=1. The same question was also asked with reference to the last 4 weeks. Respondents who reported "yes" to suicide thoughts were asked if they ever tried to end their lives and similarly coded as "yes" or "no". A participant was regarded as having had past suicidal ideation if they reported ever having suicidal thoughts or ever attempted to end own life.

We also collected participants' sociodemographic information in the interview such as woman's and partner's age and education, their age differences and marital status. Women's HIV status data were collected from clinic records after receiving women's written consent. Relationship quality was assessed by asking how often the couple quarrelled and this was coded on a Likert scale (often, sometimes or rarely). History of child abuse was measured by asking if a participant ever experienced physical or sexual violence before age 16 years. The questionnaire was tested with 60 postnatal women at one of the clinics in the study area and few adaptations were made. Detailed methodology and overall findings have been reported elsewhere [22].

The study followed the WHO [23] guidelines for researching violence against women and girls. Written informed assent and consent were provided before beginning each interview. Women who reported violence, depressive symptoms and suicide thoughts and attempts were given information about professional counsellors and were encouraged to consult services. Ethical clearance was received from the Medical Research Council of Zimbabwe and the University of the Western Cape research ethics committees.

## 3. Data analysis

Data were processed using Stata version 12. The depression cutoff point of 7 was used following studies conducted in Zimbabwe [6,8,9] and the WHO Multi Country Study [3] version of the questionnaire. We therefore classified women reporting at least 8 of the 20 items as having PND symptomatology. The WHO self-reporting questionnaire has been reported to classify depression the same way with higher degree of agreement with the local 14-item questionnaire that measures depression [6,24–26]. The reliability coefficient for the PND symptomatology scale used was 0.80, demonstrating a high degree of agreement amongst the individual items used.

A composite violence severity measure was derived from the violence frequency measures used in the study (once, twice, thrice/more). This frequency was then added to the number of types of each category of violence. The composite violence variable based on frequency and multiple types of violence were used to assess chi-square associations with mental health effects as follows: physical and/or sexual IPV and, physical, sexual and/or emotional IPV.

For each violence type or combination, we further constructed a three-level violence variable with no violence experienced during

**Table 1**Patterns of severity of violence types during pregnancy, *N*=842.

Violence type	No IPV, <i>n</i> (%)	1 + events, <i>n</i> (%)	1–2 events, <i>n</i> (%)	3 + events, <i>n</i> (%)	1–3 events	4 + events
Emotional	446 (53.0)	396 (47.0)	155 (18.4)	251 (28.6)		
Physical	690 (82.0)	152 (18.0)	89 (10.6)	63 (7.5)		
Sexual	507 (60.2)	335 (39.8)	88 (10.5)	247 (29.3)		
Physical and/or sexual	436 (51.8)	406 (48.2)	126 (15.0)	280 (33.3)		
Physical, sexual and/or emotional	291 (34.6)	551 (65.4)			281 (33.4)*	270 (32.1)**

pregnancy, low violence if a woman reported only one to two events of violence and high level of violence (defined as severe violence) if a woman experienced at least three events of violence. The same was repeated for physical and/or sexual violence. For physical, sexual and emotional IPV, the categorisation for low violence included one to three types or acts/events of violence and high levels of violence included at least four events of violence regardless of type of violence.

We conducted logistic regression to assess the association between each individual violence type and combined forms of violence with PND. Similar regression models were fitted for the association between violence and suicidal thoughts. The models controlled for variables that are reported in literature to be associated with PND as well as other variables that we added based on our univariate analyses and our understanding of mental health and violence. We controlled for marriage, age, education, past violence, relationship status (levels of quarrelling, controlling behaviours by a partner), pregnancy outcome, HIV status and woman's past suicidal ideation. We did not control for antenatal depression as it was not assessed in the study.

#### 4. Results

Amongst the 886 women interviewed at 6 weeks postpartum, 95% (842) completed the mental health survey. More than one in five women [21.4% (95% CI 18.6–24.2)] met the diagnostic criteria for PND symptomatology. A total of 27.6% (95% CI 25.5–29.4) reported lifetime suicide thoughts whilst 21.6% (95% CI 18.8–24.4%) reported suicide thoughts in the postpartum period. A total of 60% of those who reported postpartum suicide thoughts had experienced suicide thoughts in their lifetime. A total of 4% [4.1% (95% CI 2.7–5.4)] reported suicide attempts. Table 1 shows prevalence and frequencies of IPV during pregnancy amongst the 842 postnatal women. Generally high levels of violence were reported during pregnancy; slightly over two thirds (65.4%) reported experiencing any one type of violence. Almost half reported emotional violence (47.0%), almost a fifth (18%) reported physical violence and 40% reported sexual violence.

Table 2 shows statistical differences between depression, suicide thoughts and IPV during pregnancy and selected variables (including

social demographics, HIV status and relationship status). Statistical differences were found between mental health outcomes (PND or suicide) and the following variables: marital status, history of child abuse, HIV positivity, frequent quarrelling in relationships and past IPV. Significant differences were also found between PND and partner's educational status whilst those in polygamous marriages differed significantly from those in monogamous marriages in terms of reporting suicidal ideation. Statistical differences were observed between IPV during pregnancy and history child abuse, HIV positivity, quarrelling behaviour and past abuse.

Table 3 shows the prevalence of different types of IPV (three-level variables) by experiences of depression and suicidal thoughts amongst postnatal women. There were highly significant differences (<.0001) observed between any violence type and either depression or suicidal thought.

Table 4 shows results of the regression analysis between different types of violence and PND. Across violence types, the odds of reporting PND were significantly higher when women experienced severe violence than experiencing less severe violence. Although each type of severe violence was associated with PND, strong associations were found between depression and severe emotional violence and severe combined violence. Less severe physical violence was not associated with PND.

For suicidal ideation, we tested two models: the first is without controlling for past suicidal ideation, and in the second, we controlled for past suicidal ideation to see the significance of past mental health status of a woman. In the first model except for sexual violence, all severe violence measures were associated with suicidal ideation (data not shown) with stronger associations found between severe physical and emotional violence amongst the individual types and all combined types. In the second model after controlling for past suicidal ideation, the association only persisted for emotional violence and when it is combined with other types of violence in a severe derived variable (Table 4). Sexual violence was not associated with suicidal ideation, whether in less severe or severe cases of violence. As with depression, higher levels of combined forms of violence were strongly associated with suicidal ideation followed by emotional violence and physical violence.

**Table 2**

Sociodemographic characteristics of women by depression, suicide thoughts and violence.

Variable	Depression		Suicide thoughts		Physical, sexual and/or emotional violence	
	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)
Married	741/841 (88.1)	46/180 (25.6)***	36/155 (23.2)***	83/551 (15.1)***		
Primary education only	60/840 (7.1)	27/179 (15.1)***	15/154 (9.7)	43/550 (7.8)		
15–25 years old	369/839 (44.0)	81/180 (45.0)	74/155 (47.7)	253/549 (46.1)		
Partner has other wives	139/819 (17.0)	34/165 (20.6)	41/143 (28.7)***	111/529 (21.0)***		
Child abuse	160/836 (19.1)	59/177 (33.3)***	56/154 (36.4)***	139/546 (25.5)***		
Partner has no tertiary education	709/832 (85.2)	157/174 (90.2)*	130/150 (86.7)	461/543 (84.9)		
Partner aged 30 + years	463/839 (55.2)	95/178 (53.6)	76/154 (49.4)*	287/549 (52.3)		
HIV positive	123/815 (15.1)	35/174 (20.1)*	35/151 (23.2)***	91/535 (17.0)*		
Quarrels frequently with partner	220/832 (26.4)	74/178 (41.6)***	56/152 (36.8)**	168/547 (30.7)***		
Pregnancy/birth complications	41/818 (5.0)	9/173 (5.2)	7/152 (4.6)	22/533 (4.1)		
Past violence	528/842 (62.7)	134/180 (74.4)**	119/155 (76.8)***	439/551 (79.7)***		

\* *P*<.05.\*\* *P*<.001.\*\*\* *P*<.0001.

**Table 3**  
Prevalence of violence during pregnancy by PND and postnatal suicidal ideation.

Violence IPV types and experiences	PND		P value	Postpartum suicidal ideation (thoughts, attempts)		
	No depression, n=662 (78.6%)	Depression, n=180 (21.4%)		No suicide, n=595 (71.2%)	Suicide, n=241 (28.8%)	P value
Emotional violence: No	404 (61.0)	42 (23.3)		371 (83.6)	73 (16.4)	
Low	120 (18.1)	35 (19.4)		109 (71.2)	44 (28.9)	
High	138 (20.9)	103 (57.2)	<.0001	115 (48.1)	124 (51.9)	<.0001
Physical violence: No	571 (86.3)	119 (66.1)		532 (77.6)	154 (22.5)	
Low	65 (9.8)	24 (13.3)		44 (50.0)	44 (50.0)	
High	26 (3.9)	37 (20.6)	<.0001	19 (30.7)	43 (69.4)	<.0001
Sexual violence: No	427 (64.5)	80 (44.4)		380 (75.4)	124 (24.6)	
Low	65 (9.8)	23 (12.8)		55 (63.2)	32 (36.8)	
High	170 (25.7)	77 (42.8)	<.0001	160 (65.3)	85 (34.7)	<.0001
Physical and/or sexual: No	378 (57.1)	58 (32.2)		349 (80.6)	84 (19.4)	
Low	95 (14.4)	31 (17.2)		76 (60.8)	49 (39.2)	
High	189 (28.6)	91 (50.6)	<.0001	170 (61.2)	108 (38.9)	<.0001
Physical, sexual and/or emotional: No	237 (35.8)	18 (10.0)		220 (86.6)	34 (13.4)	
Low	93 (14.1)	16 (9.0)		188 (80.0)	47 (20.0)	
High	332 (50.2)	146 (81.1)	<.0001	187 (53.9)	160 (46.1)	<.0001

## 5. Discussion

We found a PND prevalence of 21% that is consistent with findings elsewhere [1]. Although our study reports a rate that is similar to rates reported in a systematic review in Africa (weighted mean of 18%) [15] and other studies conducted in Zimbabwe [8], a higher rate has been reported in a recent Zimbabwean study where a third (33%) of the postpartum women reported PND [18]. This may be adduced to methodological differences as the study conducted by Chibanda et al. [18] measured depression in 6–7 weeks postpartum in a small sample of women ( $n=210$ ) in only two clinics.

The high levels of PND found in this study highlight the need to assess PND early in the postpartum period and that it is important to ensure that there are support mechanisms for women in the first year of pregnancy. Ensuring that bonding with baby takes place is critical for child development. As Woolhouse et al. [27] found in their prospective study, 57.6% of the women who reported depressive symptoms in the first 3 months reported it again after 6 or 12 months. Although screening of women for PND adds more work to the heavily burdened nursing staff in developing countries, its benefits could be substantial [27]. Screening can be done during the 6th week postnatal care visit with appropriate referrals made.

Rates of emotional violence were higher than those of physical or sexual violence. The study also found that emotional violence was more strongly associated with PND and suicidal ideation than any other type of violence both in nonsevere and severe forms of violence. We found that when emotional violence is added to physical or sexual violence, the relationship between violence and PND strengthens showing the significance of emotional violence in predicting women's mental health. Our findings do not only add to the growing but still thin literature on the relationship between emotional IPV and mental health as reported in cohort studies [1,10,27,28] but also adds the aspect

of IPV severity to this relationship. As emotional violence is increasingly identified as an important risk factor for PND, it is crucial that clinicians and researchers include it in their conceptualisation of violence in order to develop and implement effective screening, prevention, treatment and support interventions. There is a link between PND and IPV and there is need to consider what health sector interventions have been tested. Research on the link between PND and IPV is fairly new and few randomised controlled trials have been done on this topic resulting in inconclusive evidence [29]. Interventions tested have not been conducted in developing country settings such as Zimbabwe.

We found IPV during pregnancy associated with PND. These findings contribute to the evidence of the association reported from studies across the globe [10,14,27,30,31]. However, the cross-sectional nature of the study prevents us from determining if this relationship is causal. The study found that the strength of the association between violence and PND increases with violence severity. Other studies also found that severity of IPV increases severity of depression [1,32]. Our results show that measuring violence dichotomously as having been experienced or not may not be useful as the association between PND and violence was more determined by the frequency and nature of violent acts than just being abused.

Overall there is limited research on suicidality amongst women in Africa [33] with researchers and clinicians tending to focus on suicide committed by men. The WHO (in Mars et al. [21,33]) estimated that the prevalence of suicide amongst females is half that of men in Zimbabwe. We found a prevalence of suicide thoughts of 4.1% that is consistent with rates of suicide thoughts (0.8–12%) found in a WHO Multi Country Study [21] and elsewhere [19]. Our results show that a significant fraction of women have tendencies towards suicidality. Since studies have shown that uncompleted suicides or suicide thoughts may result in complete suicide if no attention is given to the women's situations [34,35], our study highlights a need for preventive action

**Table 4**  
Adjusted odds ratios showing association between low and severe IPV during pregnancy and PND and suicide thoughts controlling for sociodemographic factors, past violence and past suicidal ideation.

Violence type	PND		Suicide thoughts	
	0 vs. 1–2 events, adjusted odds ratio (95% CI)	0 vs. 3+ events, adjusted severe violence measure	0 vs. 1–2 events, adjusted odds ratio (95% CI)	0 vs. 3+ events, adjusted severe violence measure
Emotional violence	2.87 (1.60–5.16)	5.08 (2.98–8.66)	2.03 (1.12–3.65)	2.46 (1.46–4.15)
Physical violence	1.05 (0.56–1.98)	3.76 (1.91–7.41)	1.60 (0.88–2.94)	1.68 (0.80–3.51)
Sexual violence	1.91 (1.00–3.66)	2.00 (1.26–3.18)	0.78 (0.38–1.60)	0.91 (0.56–1.49)
Physical and/or sexual violence	1.87 (1.03–3.42)	2.23 (1.38–3.60)	1.25 (0.68–2.31)	1.13 (0.68–1.86)
Physical, sexual and/or emotional violence	2.53 <sup>a</sup> (1.31–4.88)	7.04 <sup>b</sup> (3.68–13.44)	1.26 <sup>a</sup> (0.67–2.37)	2.21 <sup>b</sup> (1.18–4.12)

<sup>a</sup> 1–4 events.

<sup>b</sup> 5+ events.



amongst abused women with suicide tendencies. Durkheim's conceptualisation of suicide [36] as due to lack of coherence and integration may help us to understand the association between suicidality and partner violence. The high rates of partner controlling behaviours reported in Zimbabwe by Shamu et al. [22] may be useful in explaining the pathways to suicidality in the context of violence experiences. A number of studies reviewed by Mars et al. [33] in Africa reported that suicidality was related to experiences of violence, conflict and other relationship problems whilst others have reported suicide as related to chronic pain and suffering [37,38]. Whilst our findings reveal some trends in the adult population, Jewkes's analysis of data from a 2-year intervention in South Africa found that adolescent women were more likely to develop suicide tendencies 2 years after experiencing abuse [39]. This furthers our understanding that suicidal behaviours develop over time and may not be fully understood in cross-sectional studies such as ours.

The study did not find an association between sexual violence and either PND or suicidal ideation. This could be because sexual violence – which was widely reported in our study that asked questions on sexual behaviours – may have enabled women to view themselves as not being abused. Qualitative studies in Zimbabwe find women describing sexual violence in nonviolence terms and feelings of duty to provide their partners with sexual services. Additionally, sexual violence is seldom found on its own [40].

The study has some limitations that should be considered in interpreting the results. Since this was a cross-sectional study, causal explanations cannot be made as IPV and depression tend to develop at the same time [39]. We did not measure depression during pregnancy that could have helped us to understand PND as there is a possibility of a causal pathway from IPV during pregnancy resulting in depression during pregnancy that may finally lead to PND. PND could have been explained via depression during pregnancy. Further studies may also look at lack of perceived support and other mental health problems as possible predictors of PND and suicide. However, our analysis controlled for past suicidal ideation and past IPV helping us to understand the linkages between violence experienced during pregnancy and the mental health problems that we measured during the postpartum.

This paper shows that more episodes and particular types of violence are strongly associated with serious mental health problems that have negative effects on both women and their infants and families. It helps us to understand that it is continued exposure to violence, particularly emotional violence that is strongly associated with mental health problems, in contrast to studies that used only one episode of violence in their analysis. Robust analysis of data is another strength of the paper especially the way severity and combined forms of violence were measured and used in the study. The large study sample and a high response rate (97%) in the main study [22] also contribute to the strengths of the study. The study used nonjudgemental internationally recognised IPV and depression measurements and we were able to control for some possible confounders such as past suicidal ideation and past violence experiences.

## 6. Conclusion

The study provides strong evidence that emotional violence is far more associated with mental health measures than any other type of violence. Focusing on emotional violence is needed since most existing policies and interventions focus on physical and sexual violence yet these two were not shown to be independently associated with PND. Further research is needed to determine if the psychological consequences of physical or sexual IPV could be contributing to the PND.

## Competing Interests

The funders had no role in study design, data collection and analysis, decision to publish or preparation of the manuscript. The authors have declared that no competing interests exist.

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## References

- [1] Ludermer AB, Lewis G, Valongueiro SA, de Araújo TVB, Araya R. Violence against women by their intimate partner during pregnancy and postnatal depression: a prospective cohort study. *Lancet* 2010;376(9744):903–10.
- [2] Desmarais SL, LE Pritchard A, Janssen PA. Intimate partner abuse before and during pregnancy as risk factors for postpartum mental health problems. *BMC Pregnancy Childbirth* 2014;14(1):132.
- [3] WHO. WHO multi-county study on women's health and domestic violence against women: initial results on prevalence, health outcomes and women's responses. Geneva: WHO; 2005.
- [4] Shamu S, Abrahams N, Temmerman M, Musekiwa A, Zarowsky C. A systematic review of African studies on intimate partner violence against pregnant women: prevalence and risk factors. *PLoS One* 2011;6(3). <http://dx.doi.org/10.1371/journal.pone.0017591>.
- [5] Small MJ, Gupta J, Frederic R, Joseph G, Theodore M, Kershaw T. Intimate partner and nonpartner violence against pregnant women in rural Haiti. *Int J Gynecol Obstet* 2008;102(3):226–31.
- [6] Patel V, Abas M, Broadhead J, Todd C, Reeler A. Depression in developing countries: lessons from Zimbabwe. *BMJ* 2001;322(7284):482–4.
- [7] Abas MA, Broadhead JC. Depression and anxiety among women in an urban setting in Zimbabwe. *Psychol Med* 1997;27(01):59–71.
- [8] Nhwitiwa S, Patel V, Acuda W. Predicting postnatal mental disorder with a screening questionnaire: a prospective cohort study from Zimbabwe. *J Epidemiol Community Health* 1998;52(4):262–6.
- [9] Patel V. Cultural factors and international epidemiology depression and public health. *Br Med Bull* 2001;57(1):33–45.
- [10] Beydoun HA, Beydoun MA, Kaufman JS, Lo B, Zonderman AB. Intimate partner violence against adult women and its association with major depressive disorder, depressive symptoms and postpartum depression: a systematic review and meta-analysis. *Soc Sci Med* 2012;75(6):959–75.
- [11] Miller LJ. Postpartum depression. *JAMA* 2002;287(6):762–5.
- [12] Sharp LK, Lipsky MS. Screening for depression across the lifespan. *Am Fam Physician* 2002;66:1001–8.
- [13] Patel V, Rodrigues M, DeSouza N. Gender, poverty, and postnatal depression: a study of mothers in Goa, India. *Am J Psychiatry* 2002;159(1):43–7.
- [14] Leung W, Kung F, Lam J, Leung T, Ho P. Domestic violence and postnatal depression in a Chinese community. *Int J Gynecol Obstet* 2002;79(2):159–66.
- [15] Sawyer A, Ayers S, Smith H. Pre- and postnatal psychological wellbeing in Africa: a systematic review. *J Affect Disord* 2010;123(1):17–29.
- [16] Coleman R, Morison L, Paine K, Powell R, Walraven G. Women's reproductive health and depression. *Soc Psychiatry Psychiatr Epidemiol* 2006;41(9):720–7.
- [17] Tomlinson M, Cooper P, Stein A, Swartz L, Molteno C. Post-partum depression and infant growth in a South African peri-urban settlement. *Child Care Health Dev* 2006;32(1):81–6.
- [18] Chibanda D, Mangezi W, Tshimanga M, Woelk G, Rusakaniko P, Stranix-Chibanda L, et al. Validation of the Edinburgh Postnatal Depression Scale among women in a high HIV prevalence area in urban Zimbabwe. *Arch Womens Ment Health* 2010;13(3):201–6.
- [19] Howard L, Flach C, Mehay A, Sharp D, Tylee A. The prevalence of suicidal ideation identified by the Edinburgh Postnatal Depression Scale in postpartum women in primary care: findings from the RESPOND trial. *BMC Pregnancy Childbirth* 2011;11(1):57.
- [20] Devries K, Seguin M. Violence against women and suicidality: does violence cause suicidal behaviour? In: Riecher-Rössler A, García-Moreno C, editors. *Karger Medical and Scientific Publishers*; 2013.
- [21] Devries K, Watts C, Yoshihama M, Kiss L, Schraiber LB, Deyessa N, et al. Violence against women is strongly associated with suicide attempts: evidence from the WHO multi-country study on women's health and domestic violence against women. *Soc Sci Med* 2011;73(1):79–86.
- [22] Shamu S, Abrahams N, Zarowsky C, Shefer T, Temmerman M. Intimate partner violence during pregnancy in Zimbabwe: a cross-sectional study of prevalence, predictors and associations with HIV. *Tropical Med Int Health* 2013;18(6):696–711.
- [23] WHO. Putting women first: ethical and safety recommendations for research on domestic violence against women. Geneva: WHO; 2001.
- [24] Hall A, Williams H. Hidden psychiatric morbidity: a study of prevalence in an outpatient population at Bindura Provincial Hospital. *Cent Afr J Med* 1987;33(10):239–43.
- [25] Patel VAR, Lima MS, Ludermer A, Todd C. Women, poverty and common mental disorders in four restructuring societies. *Soc Sci Med* 1999;49:461–71.
- [26] Patel VSE, Gwanzura F, Lewis G, Mann A. The Shona symptom questionnaire: the development of an indigenous measure of nonpsychotic mental disorder in Harare. *Acta Psychiatr Scand* 1997;95(6):469–75.

- [27] Woolhouse H, Gartland D, Hegarty K, Donath S, Brown S. Depressive symptoms and intimate partner violence in the 12 months after childbirth: a prospective pregnancy cohort study. *BJOG* 2012;119(3):315–23.
- [28] Flach C, Leese M, Heron J, Evans J, Feder G, Sharp D, et al. Antenatal domestic violence, maternal mental health and subsequent child behaviour: a cohort study. *BJOG* 2011;118(11):1383–91.
- [29] MacMillan HL, Wathen CN, Jamieson E, Boyle MH, Shannon HS, Ford-Gilboe M, et al. Screening for intimate partner violence in health care settings: a randomized trial. *JAMA* 2009;302(5):493–501.
- [30] Bacchus L, Mezey G, Bewley S. Domestic violence: prevalence in pregnant women and associations with physical and psychological health. *Eur J Obstet Gynecol Reprod Biol* 2004;113(1):6–11.
- [31] Janssen PA, Heaman MI, Urquia ML, O'Campo PJ, Thiessen KR. Risk factors for postpartum depression among abused and nonabused women. *Am J Obstet Gynecol* 2012;207(6):489.e1–8.
- [32] Miszkurka M, Zunzunegui MV, Goulet L. Immigrant status, antenatal depressive symptoms, and frequency and source of violence: what's the relationship? *Arch Womens Ment Health* 2012;15(5):387–96.
- [33] Mars B, Burrows S, Hjelmeland H, Gunnell D. Suicidal behaviour across the African continent: a review of the literature. *BMC Public Health* 2014;14(1):606.
- [34] Suominen K, Isometsä E, Suokas J, Haukka J, Achte K, Lönnqvist J. Completed suicide after a suicide attempt: a 37-year follow-up study. *Am J Psychiatr* 2004;161(3):562–3.
- [35] Tidemalm D, Långström N, Lichtenstein P, Runeson B. Risk of suicide after suicide attempt according to coexisting psychiatric disorder: Swedish cohort study with long term follow-up. *BMJ* 2008;337:a2205.
- [36] Pescosolido BA, Georgianna S. Durkheim, suicide, and religion: toward a network theory of suicide. *Am Sociol Rev* 1989;54(1):33–48.
- [37] Ilgen MA, Zivin K, McCammon RJ, Valenstein M. Pain and suicidal thoughts, plans and attempts in the United States. *Gen Hosp Psychiatry* 2008;30(6):521–7.
- [38] Braden JB, Sullivan MD. Suicidal thoughts and behavior among adults with self-reported pain conditions in the national comorbidity survey replication. *J Pain* 2008;9(12):1106–15.
- [39] Jewkes R. Intimate partner violence as a risk factor for mental health problems in South Africa. In: Riecher-Rössler A, García-Moreno C, editors. *Karger Medical and Scientific Publishers*; 2013.
- [40] Shamu S, Abrahams N, Temmerman M, Shefer T, Zarowsky C. That pregnancy can bring noise into the family: exploring intimate partner sexual violence during pregnancy in the context of HIV in Zimbabwe. *PLoS One* 2012;7(8):e43148.