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# Influence of interpersonal violence on maternal anxiety, depression, stress and parenting morale in the early postpartum: a community based pregnancy cohort study

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## Abstract

**Background:** Research has shown that exposure to interpersonal violence is associated with poorer mental health outcomes. Understanding the impact of interpersonal violence on mental health in the early postpartum period has important implications for parenting, child development, and delivery of health services. The objective of the present study was to determine the impact of interpersonal violence on depression, anxiety, stress, and parenting morale in the early postpartum.

**Methods:** Women participating in a community-based prospective cohort study (n = 1319) completed questionnaires prior to 25 weeks gestation, between 34–36 weeks gestation, and at 4 months postpartum. Women were asked about current and past abuse at the late pregnancy data collection time point. Postpartum depression, anxiety, stress, and parenting morale were assessed at 4 months postpartum using the Edinburgh Postnatal Depression Scale, the Spielberger State Anxiety Index, the Cohen Perceived Stress Scale, and the Parenting Morale Index, respectively. The relationship between interpersonal violence and postpartum psychosocial health status was examined using Chi-square analysis ( $p < 0.05$ ) and multivariable logistic regression.

**Results:** Approximately 30% of women reported one or more experience of interpersonal violence. Sixteen percent of women reported exposure to child maltreatment, 12% reported intimate partner violence, and 12% reported other abuse. Multivariable logistic regression analysis found that a history of child maltreatment had an independent effect on depression in the postpartum, while both child maltreatment and intimate partner violence were associated with low parenting morale. Interpersonal violence did not have an independent effect on anxiety or stress in the postpartum.

**Conclusion:** The most robust relationships were seen for the influence of child maltreatment on postpartum depression and low parenting morale. By identifying women at risk for depression and low parenting morale, screening and treatment in the prenatal period could have far-reaching effects on postpartum mental health thus benefiting new mothers and their families in the long term.

**Keywords:** Interpersonal violence, Pregnancy cohort, Postpartum mental health, Parenting morale

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## Background

Interpersonal violence is a significant risk factor for poor health outcomes in women [1], and is recognized by the World Health Organization as an essential public health priority [2]. Interpersonal violence refers to intentional violence between individuals either in the family or community that is in the form of neglect, psychological or emotional, sexual, or physical violence [2,3]. Family violence often takes place in the home (e.g. child maltreatment or intimate partner violence), while community violence occurs between unrelated individuals (e.g. rape, sexual assault by an unknown person, random acts of violence) and includes violence in institutional settings such as workplaces or schools [2]. Recent Canadian data indicate that over half of Canadian women have survived at least one incident of sexual or physical violence at some point in their lives and 29% have been assaulted by a spouse [4]. True prevalence rates of interpersonal violence is remain elusive, given differences in definitions and types of violence, as well as variations across studies in design, timing of assessment, period versus point prevalence estimates, and under-reporting of incidences of violence [5].

The effects of family violence (child maltreatment or intimate partner violence) on women are extensive and have long-term consequences [1]. Child maltreatment is a risk for variety of psychological symptoms and psychiatric disorders in adulthood [6-19], as well as long term physical problems [11,14,19-22]. The effects of intimate partner violence includes mental health problems, substance abuse and chronic health problems [23-26]. During pregnancy and the perinatal period, both past and current interpersonal violence may present unique psychological and physical challenges such as fear of childbirth, preterm labour, having a low birth weight infant, neonatal death, and difficulties with breast feeding [27-31].

Given the positive impact of maternal well-being during the postpartum period on healthy parent-child interaction and child development, understanding the factors that influence mental health during the postpartum period is of paramount importance. To date, the majority of studies have focused on specific symptomatology, such as depression, for specific types and timing of abuse. Postpartum depression has been associated with lifetime physical and sexual abuse [32], recent intimate partner violence [33], and traumatic life events [34], although the literature remains inconclusive [35]. Among women with postpartum depression, a history of child maltreatment can exacerbate depressive symptoms which can lead to impaired mother-infant interactions [36], affecting the emotional development of the child [37]. Studies on the effect of interpersonal violence on postpartum anxiety and other emotional problems

during the postpartum period are lacking [38]. Maternal anxiety often occurs alongside depression [39,40] but has been less commonly described [41]. However, evidence suggests that maternal anxiety is associated with poorer coping and less confidence in parenting, and affects attachment and bonding [42,43], infant temperament [44,45], and child development [46]. Furthermore, studies to date that have examined interpersonal violence and postpartum psychosocial health have not adequately accounted for potential confounding variables and other risk factors for poor mental health in multivariable analyses. In particular, few studies address maternal physical energy levels when examining postpartum mental health, despite its confounding influence, and to our knowledge, none have taken intrinsic traits, like optimism, into consideration.

In summary, there is a need for further research regarding the effect of interpersonal violence on mental health indicators in the postpartum. While some studies have assessed the impact of abuse on postpartum depression, the numbers of studies are limited and results are inconclusive. The aim of this study is to examine the impact of interpersonal violence on women's mental health in the postpartum period, specifically symptoms of depression, anxiety, stress, and parenting morale, while controlling for potential confounding variables and important risk factors for poor mental health. Study findings may have clinical implications regarding prenatal screening and preventative measures that can be initiated in the prenatal period to support women and improve postpartum mental health.

## Methods

The All Our Babies (AOB) study is a community-based prospective study in Calgary, Alberta that began recruitment in 2008. The overall aims were to examine maternal well-being during the perinatal period and rates of infant outcomes such as preterm birth, and to identify the current barriers and facilitators to accessing prenatal care in Calgary. Women were recruited ( $n = 1654$ ) from health care offices, community posters, through the Alberta Health Services website, and through Calgary Lab Services. Women were eligible if they were: a) less than 25 weeks gestational age at the time of recruitment, b) receiving prenatal care in Calgary, and c) able to complete questionnaires in English. Of those who were eligible ( $n = 1649$ ), 91% completed at least 1 questionnaire. The most common reasons for discontinuation were pregnancy loss or lost to follow up.

Participation in the study involved the completion of three mailed questionnaires and linkage to prenatal and birth records. The first self-report questionnaire was completed before 25 weeks gestation (mean = 16.4 wks;  $sd = 4.2$  wks), the second between 34-36 weeks gestation

(mean = 34.5wks; sd = 1.5wks), and the third at 4 months (16wks) postpartum (mean = 17.8wks; sd = 3.3 wks). The questionnaires, which were composed of both standardized scales and investigator derived questions, asked about socio-demographics, lifestyle, health care utilization, mental health, social support, birth outcomes, postpartum experiences, and breastfeeding, among other variables.

For the purposes of the present study, we restricted the sample to women having complete information across all three data collection time points in the perinatal period ( $n = 1319$ ). There were no differences in sociodemographic or psychosocial characteristics between the study sample and the larger sample (results not shown). For the present analysis, the following validated instruments were used: the Edinburgh Postnatal Depression Scale (EPDS) [47], the Spielberger State Anxiety Index (SSAI) [48], the Cohen Perceived Stress Scale (PSS) [49], the Parenting Morale Index [50], the Life Orientation Test-Revised [51], and the Medical Outcomes Study Social Support Scale [52] to measure depression, anxiety, stress, parenting morale, optimism, and social support, respectively. To operationalize the postpartum maternal psychological health outcomes, we used established cut-offs as per the literature for symptoms of depression and anxiety (10 or above on the EPDS and 40 or above on the SSAI), and above the 80<sup>th</sup> percentile or below the 20<sup>th</sup> percentile or of the distribution for stress and parenting morale.

The main exposure for the present study was interpersonal violence, as assessed at the second data collection time point in late pregnancy (34–36 weeks), according to detailed questions on exposure, timing, and perpetrator to five different types of abuse: physical, sexual, emotional, financial, and neglect. Types of interpersonal violence used in the present study were derived as per national and international classifications and previous research [2,3,53,54], as well as through discussions with content experts in the field: child maltreatment, intimate partner violence, and ‘other’ abuse. Child maltreatment was classified as any abuse that occurred when individuals were younger than 18 years of age. Intimate partner violence was defined as any type of abuse committed by a current or former partner, spouse or ex-spouse, or a current or former dating partner. ‘Other’ abuse included women who noted an experience of abuse but did not provide sufficient details to be classified as either child maltreatment or intimate partner violence, as well as women who experienced abuse outside of an intimate partner relationship as adults (e.g., abuse by work colleagues, friends), and women who experienced sexual assault as adults. Other variables of interest for the present study included sociodemographic and socioeconomic factors, history of mental illness and drug

or alcohol abuse, and self-reported energy levels. These variables were assessed mainly using single item questions. See Additional file 1 for a description of select standardized tools as well as phrasing and coding for single item measures.

Descriptive statistics were used to assess the characteristics of study participants. Comparisons between those who reported any type of experience of abuse and those who did not were performed using Chi Square test/Fisher’s exact test for categorical variables. Bivariate analysis was performed to identify potential confounding variables and risk factors for inclusion in multivariable models. Due to multiple testing, an alpha level of 1% was adopted as the threshold for statistical significance. Separate multivariable logistic regression analyses were performed to examine the extent to which exposure to interpersonal violence was an independent predictor of maternal depression, stress, anxiety, and parenting morale at 4 months postpartum, controlling for known risk factors and potential confounding variables. All analyses were performed using SPSS version 19.0 (SPSS Inc. Chicago, Illinois).

This study was approved by the Conjoint Health Research Ethics Board of the University of Calgary. Participants provided informed consent at the time of recruitment and were provided copies for their records.

## Results

Sample characteristics are presented in Table 1. The AOB cohort is well-educated and has above-average affluence, and is comparable to the target population of women who plan to become pregnant and parent in Canada [55,56]. Women who experienced interpersonal violence were more likely to have lower socioeconomic status, single, Caucasian, and Canadian born, compared to women with no reported experiences of interpersonal violence. The proportion of women with a history of mental illness and drug or alcohol abuse was higher among women with exposure to interpersonal violence. Approximately 30% recorded at least one exposure to interpersonal violence. Women with experiences of interpersonal violence reported mental health concerns at 4 months postpartum at rates that were approximately twice as great as those reported by women without experiences of interpersonal violence: depression (22% vs. 10%), anxiety (24% vs. 12%), high perceived stress (24% vs. 14%), and low parenting morale (29% vs. 16%).

Bivariate analysis was completed to determine which sociodemographic and socioeconomic variables, as well as maternal characteristics, were significantly associated with anxiety, depression, stress, and low parenting morale at 4 months postpartum (Table 2). Variables that were significant ( $p < 0.01$ ) at the bivariate level were

**Table 1 Comparison of demographic and maternal characteristics between women with and without experiences of interpersonal violence (IPV)**

Characteristic	Total sample (n = 1382) n (%)	Experienced IPV (n = 410) n (%)	No experiences of IPV (n = 972) n (%)
<b>Maternal Age</b>			
<25 yrs	120(8.8)	43(10.7)	77(8.0)
25–34 yrs	990(72.6)	280(69.5)	710(74.0)
35+ yrs	253(18.6)	80(19.9)	173(18.0)
<b>Education</b>			
High school or less	139(10.1)	57(14.0)	82(8.5)
Completed degree or some post-Secondary	1232(89.9)	349(86.0)	883(91.5)
<b>Household Income</b>			
<60,000	240(18.1)	80(20.1)	160(17.3)
>60,000	1086(81.9)	319(79.9)	767(82.7)
<b>Marital Status</b>			
Married/common-law	1291(94.2)	353(87.2)	938(97.2)
Other	79(5.8)	52(12.8)	27(2.8)
<b>Ethnic Origin</b>			
White/Caucasian	1041(75.9)	319(78.6)	722(74.8)
Other	330(24.1)	87(24.1)	243(25.2)
<b>Born in Canada</b>			
Yes	1048(76.4)	330(81.3)	718(74.3)
No	324(23.6)	76(18.7)	248(25.7)
<b>Parity</b>			
0	724(53.1)	221(54.4)	503(52.5)
1+	640(46.9)	185(45.6)	455(47.5)
<b>History of Mental Health Problems</b>			
No	898(65.5)	187(46.1)	711(73.6)
Yes	474(34.5)	219(53.9)	255(26.4)
<b>History of Alcohol or Drug Abuse</b>			
No	1319(96.1)	366(90.1)	953(98.7)
Yes	53(3.9)	40(9.9)	13(1.3)

considered for inclusion in the multivariable analyses. For each postpartum mental health outcome (e.g. depression, stress, anxiety, and low parenting morale), three separate multivariable regression models were performed – one for each type of interpersonal violence. The reference category for each type of interpersonal violence was no experience of any abuse. All final models controlled for the following covariates and potential confounding variables: household income, history of mental health, maternal optimism, perceived prenatal social support, perceived postpartum social support, and postpartum energy levels. Exposure to child maltreatment was an independent significant risk factor for depression (OR = 1.8, 95% CI = 1.1-3.0) and low parenting morale (OR = 1.8, 95% CI = 1.1-2.8) in the postpartum, controlling for other variables. Exposure to other forms of interpersonal violence did not significantly contribute to the risk for depression or low parenting morale,

although the confidence interval for the estimate of intimate partner violence exposure was close to crossing the threshold for significance, with a lower bound of 1.00 (OR = 1.66, 95% CI = 1.00-2.78). Anxiety and stress in the postpartum were not associated with any types of interpersonal violence. Table 3 presents the final multivariable logistic regression models for depression and parenting morale, and each category of interpersonal violence.

## Discussion

This study among relatively affluent and well-educated Canadian women found that 29.7% of women had experienced at least one incident of interpersonal violence at some point in their lives. A recent Canadian study of postpartum women showed that 30% reported adult emotional abuse, 7% reported adult physical abuse, 13% reported adult sexual abuse, and 14% and 7%

**Table 2 Characteristics of women who experience poor mental health outcomes at 4 months postpartum**

Independent variable	Depression (EPDS $\geq$ 10) n(%)		Anxiety (SSAI $\geq$ 40) n(%)		High stress n(%)		Low parenting morale n(%)	
	Yes (n = 177)	No (n = 1170)	Yes (n = 206)	No (n = 1125)	Yes (n = 229)	No (n = 1115)	Yes (n = 265)	No (n = 1074)
<b>Maternal Age</b>								
<25 yrs	19(11.0)*	89(7.7)	21(10.4)	85(7.7)	19(11.0)	80(7.3)	21(8.0)	87(8.2)
25–34 yrs	110(63.6)	863(74.6)	138(68.7)	827(74.4)	110(63.6)	826(75.2)	186(71.0)	779(73.6)
35+ yrs	44(25.4)	203(17.6)	42(20.9)	199(17.9)	44(25.4)	193(17.6)	55(21.0)	192(18.1)
<b>Education</b>								
High school or less	24(13.6)	111(9.6)	22(10.7)	114(10.2)	38(16.7)*	100(9.0)	31(11.7)	106(9.9)
Completed degree or some post-Secondary	152(86.4)	1051(90.4)	183(89.3)	1003(89.8)	190(83.3)*	1007(91.0)	233(88.3)	960(90.1)
<b>Household Income</b>								
<60,000	51(29.7)*	180(160)	59(29.8)*	170(15.7)	67(30.6)*	165(15.3)	62(24.1)*	170(16.5)
60,000+	121(70.3)*	944(84.0)	139(70.2)*	912(84.3)	152(69.4)*	912(84.7)	195(75.9)*	861(83.5)
<b>Marital Status</b>								
Married/common-law	159(90.3)*	1106(95.3)	184(90.2)*	1064(93.5)	208(91.2)	1053(93.3)	246(93.2)	1009(94.8)
Other	17(9.7)*	54(4.7)	20(9.8)*	52(4.7)	20(8.8)	52(4.7)	18(6.8)	55(5.2)
<b>Ethnic Origin</b>								
White/Caucasian	125(71.0)	894(77.1)	150(73.5)	860(77.1)	166(72.8)	850(76.9)	210(79.5)	802(75.4)
Other	51(29.0)	266(22.9)	54(26.5)	256(22.9)	62(27.2)	255(23.1)	54(20.5)	262(24.6)
<b>Born in Canada</b>								
Yes	128(72.7)	898(77.2)	159(77.6)	861(77.0)	170(74.6)	853(77.0)	205(77.7)	814(76.3)
No	48(27.3)	265(22.8)	26(22.4)	257(23.0)	58(25.4)	255(23.0)	59(22.3)	253(23.7)
<b>History of Mental Health Problems</b>								
	113(64.6)*	337(29.0)*	127(62.3)*	317(28.3)*	129(56.8)*	320(28.9)*	149(56.7)*	299(28.0)*
<b>History of Alcohol or Drug Abuse</b>								
	11(6.3)	32(2.7)	11(5.4)	33(2.9)	13(5.7)	30(2.7)	15(5.7)	29(2.7)
<b>Low Optimism (below 20<sup>th</sup> percentile of distribution)</b>								
	43(28.7)*	121(12.7)*	57(33.7)*	106(11.5)*	63(33.0)*	102(11.2)*	62(27.1)*	101(11.6)*
<b>Low Social Support</b>								
	75(43.4)*	115(10.0)*	78(39.2)*	110(9.9)*	91(41.0)*	100(9.1)*	96(37.4)*	93(8.8)*
<b>Low Energy</b>								
	75(42.6)*	142(12.1)*	91(44.0)*	126(11.2)*	93(40.8)*	123(11.0)*	118(44.7)*	99(9.2)*

\*significant at  $p < 0.01$ .

**Table 3 Final multivariable logistic regression models examining the independent contribution of interpersonal violence to depression and parenting morale at 4 months postpartum**

	Depression, EPDS $\geq$ 10			Low parenting morale		
	OR(CI)			OR(CI)		
Income	2.21(1.34-3.65)	1.96(1.15-3.35)	2.07(1.18-3.64)	1.44(0.91-2.30)	1.48(0.91-2.41)	1.60(0.97-2.66)
Past Mental Health Problems	3.10(1.95-4.93)	2.68(1.66-4.34)	2.83(1.71-4.71)	2.11(1.42-3.13)	2.63(1.75-3.96)	2.55(1.65-3.93)
Low Social Support early pregnancy (<25wks)	0.62(0.32-1.20)	0.66(0.33-1.32)	0.81(0.39-1.68)	0.54(0.29-1.00)	0.63(0.34-1.19)	0.55(0.28-1.10)
Low Social Support late pregnancy (34–36 wks)	4.66(2.58-8.44)	4.60(2.47-8.55)	3.94(1.99-7.81)	4.68(2.67-8.18)	3.82(2.15-6.80)	3.83(2.04-7.19)
Optimism	0.94(0.89-0.99)	0.93(0.88-0.98)	0.81(0.39-1.68)	0.90(0.86-0.94)	0.90(0.86-0.94)	0.90(0.85-0.94)
Low Energy	2.80(1.71-4.59)	3.37(2.04-5.56)	2.61(1.49-4.55)	4.92(3.18-7.62)	4.75(3.04-7.41)	4.01(2.49-6.47)
Exposure to Child Maltreatment	1.83(1.11-2.99)*			1.78(1.13-2.81)*		
Exposure to Partner violence	1.66(0.95-2.90)			1.66(1.00-2.78)		
Exposure to Other Abuse	1.93(0.81-4.64)			0.92(0.38-2.24)		

\*significant at  $p < 0.05$ .

reported child sexual and physical abuse, respectively [57]. Although it is difficult to compare prevalence rates across populations, the prevalence of interpersonal violence in this study and other studies reveals that exposure to interpersonal violence cannot be predicted by adverse socioeconomic circumstances or maternal education. Results from multivariable regression analyses showed that a history of child maltreatment had an independent effect on depression in the postpartum, while both child maltreatment and intimate partner violence were associated with low parenting morale. Interpersonal violence did not have an independent effect on anxiety or stress in the postpartum.

Exposure to child maltreatment was an independent risk factor for postpartum depression, even while controlling for other factors that are known to influence postpartum depression such as a history of mental illness, social support, and income [58]. There is strong evidence in the literature that child maltreatment is associated with adult depression [9-15], but few studies have examined the association between child maltreatment and postpartum depression. To our knowledge, no studies have considered *all* types of child maltreatment in a general population of postpartum women. In one of the few studies that have been done on this topic, more severe depression was noted among women with a history of child abuse [36]. Two studies have found an association between child sexual and physical abuse and postpartum depression [32] and depressive symptoms [34]. However, both of these studies had small sample sizes, and did not consider other forms of child maltreatment such as psychological abuse and neglect.

Both child maltreatment and intimate partner violence were significantly associated with low parenting morale at 4 months postpartum. Parenting morale is an outcome that has not been considered previously in postpartum women in the literature, but can be useful in understanding parenting enthusiasm or attitudes of women to the parenting role [59]. Previous research has shown that abused women had a more negative parent-child interaction observed in an assessment of parenting stress [36], and research has shown that abusive experiences have a range of negative effects on parenting such as poorer maternal-child interaction, more psychological aggression and physical punishment, less parental warmth, a negative view of self as a parent, decreased parenting satisfaction, problems establishing boundaries as parents, and being too permissive as parents [60-68]. Research indicates that a mother's current state of mind regarding the abuse and whether the abuse has been resolved is important in experiencing a more healthy adjustment to parenthood [69]. In light of these findings, and the results of this study, it may be useful to identify women with histories of child maltreatment and provide

support during the antenatal period to help these women navigate a healthy transition as parents in the postpartum period.

Major strengths of this study refer to its inclusion of all possible types of abuse throughout a woman's life and its examination of important mental health outcomes that are relatively understudied in postpartum women. For example, this study included psychological abuse, which is often ignored in research and policies, but may have an even greater negative impact on women than physical abuse [70]. Other strengths of the study include its community-based sample of women (rather than a clinical sample), relatively large sample size, and prospective nature of data collection, with interpersonal violence information obtained during pregnancy before the assessment of postpartum depression and parenting morale. In multivariable analyses, this study was able to adjust for a number of relevant confounding variables across the perinatal period, such as fatigue, optimism, and social support, which allowed for a more detailed understanding of the independent influence of interpersonal violence.

Study limitations include the use of several models that were run simultaneously, which could have resulted in an increased risk for type 1 error. However, given the number and quality of adjustment variables used in the multivariable models, independent effects of the interpersonal violence exposure variables for depression and parenting morale suggest that they are robust. Other limitations include the tendency of underreporting that occurs among victims of abuse, as well as barriers that prevent women from disclosing details of their experiences of interpersonal violence. Examples of possible barriers are a hesitancy to discuss traumatic experiences and a fear of disclosing information regarding abuse. Indeed, 7% of women in the study reported at least one incident of abuse, yet did not provide sufficient details for the abusive experiences to be classified as child maltreatment or intimate partner violence. In an effort to not exclude these women from the study or discount their traumatic experiences, they were categorized as 'other abuse', along with women who experienced other types of abusive experiences as adults or sexual assault as adults (1.7%). For the purpose of this analysis, dating violence was included in the category of intimate partner violence, which has been supported by the Centers for Disease Control [53], but is differentiated by WHO [2,3]. Although we cannot discount exposure misclassification, the collection of detailed information on experiences of interpersonal violence in the present study allowed for the differentiation and examination of different types of experiences, albeit crude, not seen in previous studies. This information was especially useful for classify past abuse experiences. Unfortunately the level of detail was

not enough to fully understand more recent and/or current abuse experiences. For example, we could not distinguish whether interpersonal violence resulted in any of the pregnancies in our study (i.e., sexual assault), nor were we able to fully differentiate current and past intimate partner violence. Despite this, our ability to examine both child maltreatment and intimate partner violence in the same study in relation to a range of postpartum mental health outcomes adds to the evidence base in this area.

There are limitations associated with the use of the SSAI and the EPDS. The SSAI assessed state anxiety only, not general symptoms of anxiety. Although not employed in this study, the trait subscale of the Spielberger Anxiety Inventory may have provided additional information to help in the assessment of anxiety. The cut-off scores for the EPDS in the literature are 10 and 13. In this study, a score of 10 was used to identify women who are experiencing distress and who may be at risk of major depression. Although there is a greater likelihood of including false-positives when using a cut-off score of 10 instead of 13, use of the latter may have led to the exclusion of women with milder symptomatology, whose distress or depression needs identification and support, and whose parenting or ability to bond with their newborn may be compromised by depressive mood.

The results of this study provide direction for further research in this area, including validation of study findings. Further quantitative studies as well as qualitative studies are needed to understand the full impact of previous experiences of violence on mothering and how to provide specific services to this population of women during pregnancy and the postpartum period. Study findings have implications for pregnancy and postpartum care as they indicate that a history of child maltreatment may be an important consideration in prenatal screening as well as prenatal and postpartum services. While it has been recommended that adult women in the general population be questioned about past abusive experiences, including child abuse [71,72], a history of child maltreatment is not routinely considered during prenatal or postpartum care since assessments by clinicians focus on current domestic violence. The Society of Obstetrics and Gynaecology Canada clinical practice guidelines recommend that health care providers ask about intimate partner violence during assessment of new patients, as a part of prenatal care, at annual preventative visits, and if symptoms or conditions are present which are linked with interpersonal violence. However, evidence suggests that only 22.4% and 25.7% of women are asked about emotional and physical abuse, respectively, during pregnancy [73]. Consideration of child maltreatment in screening and follow-up could help to identify women who are at risk, and additional

treatment and support may reduce the burden of depression and parenting difficulties in the postpartum period for these women. An emerging area of research in antenatal screening for postpartum depression refers to psychosocial assessment tools that incorporate questions across a number of domains of functioning and experiences in a woman's life beyond current symptomatology. An important area of focus in these tools includes a woman's past history of adverse child experiences and abuse. A number of recent studies in this area advocate for routine psychosocial assessment as part of a revised perinatal mental health agenda [74,75]. The results of this study suggest that experiences of interpersonal violence constitute an important area to consider as part of a comprehensive examination of a woman's risk profile.

## Conclusion

In conclusion, child maltreatment is an important risk factor for postpartum depression and low parenting morale that needs to be identified and assessed by clinicians. Identifying women in the prenatal period who are at risk of depression and low parenting morale may allow for targeted strategies to support women and optimize child development. Further research is needed to validate the important impact that child maltreatment appears to have on mothers in the postpartum period, and investigate possible changes in prenatal care to better meet the needs of women who have experiences of interpersonal violence.

## Additional file

**Additional file 1: Select variables assessed in the All Our Babies study and timing of data collection.**

### Competing interests

The authors declare that they have no competing interests.

### Authors' contributions

LM performed the literature review and drafted the manuscript; SM assisted in statistical analysis and interpretation of results; KM participated in interpretation of results and contributed content expertise; CW assisted in interpretation of results and coding of interpersonal violence; ST conceived the design of the study and participated in all phases of the manuscript. All authors read and approved the final manuscript.

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