Violence against women by their intimate partner during pregnancy and postnatal depression: a prospective cohort study

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Summary

Background **Partner violence against women is common during pregnancy and might have an adverse effect on the mental health of women after delivery. We aimed to investigate the association of postnatal depression with psychological, physical, and sexual violence against women by their intimate partners during pregnancy.**

Methods **In a prospective cohort study undertaken in Recife, northeastern Brazil, between July, 2005, and December, 2006, we enrolled pregnant women (aged 18–49 years) in their third trimester of pregnancy who were attending primary health-care clinics. The women were interviewed during pregnancy and after delivery. The form of partner violence in pregnancy was assessed with a validated questionnaire, and the Edinburgh postnatal depression scale was used to measure postnatal depression. Associations were estimated with odds ratios (ORs), adjusted for confounding factors contributing to the association between postnatal depression and intimate partner violence.**

Findings **1133 pregnant women were eligible for inclusion in the study, of whom 1045 had complete data for all variables and were included in the analysis. 270 women (25·8%, 95% CI 23·2–28·6) had postnatal depression. The most common form of partner violence was psychological (294 [28·1%, 25·4–31·0]). Frequency of psychological violence during pregnancy was positively associated with occurrence of postnatal depression, and although this association was attenuated after adjustment, women reporting the highest frequency of psychological violence were more likely to have postnatal depression even after adjustment (adjusted OR 2·29, 95% CI 1·15–4·57). Women who reported physical or sexual violence in pregnancy were more likely to develop postnatal depression (OR 3·28, 2·29–4·70), but this association was substantially reduced after adjustment for psychological violence and confounding factors.**

Interpretation **Psychological violence during pregnancy by an intimate partner is strongly associated with postnatal depression, independently of physical or sexual violence. This finding has important policy implications since most social policies focus on prevention and treatment of physical violence.**

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Introduction

Violence against women is common, with the intimate male partner as the aggressor in most circumstances.[1–5] Rates of violence perpetrated by intimate male partners during pregnancy vary worldwide from 3% in London[6] to 31% in Mexico City,[7] though this variation also depends on the methods of assessment. Partner violence during pregnancy affects 4–8% of pregnant women in the USA.[5]

Three types of partner violence are most often assessed—physical, sexual, and psychological (including verbal or emotional abuse)—and psychological violence is most frequently reported.[8,9] Few studies have examined the potential association between violence during pregnancy and postnatal depression,[8,10] which is important for women's health as well as that of their children.[11] In India, Patel and colleagues[10] showed that postnatal depression was more common among women who experienced marital violence during pregnancy than in those who did not. However, the study definition of partner violence did not include psychological violence, and the results were not adjusted for potential confounding factors. In a study of a Chinese community, Leung and co-workers[8] also recorded an association between psychological violence and postnatal depression. However, the information about partner violence was obtained retrospectively and so is prone to recall bias.

In view of the limitations of previous studies, whether psychological violence by intimate male partners during pregnancy has an adverse effect on the mental health of women after delivery is still unclear. Longitudinal studies are needed to account for previous psychological problems. Also, women with postnatal depression are likely to retrospectively reinterpret acts as psychological violence.[8]

We aimed to investigate the association of postnatal depression with psychological, physical, and sexual violence against women perpetrated by their intimate partners during pregnancy. Our hypothesis was that violence, especially psychological, during pregnancy would be associated with an increase in risk of postnatal depression. We studied a population-based sample of

pregnant women who were registered with publicly funded primary health care in a poor area of north-eastern Brazil.

Methods

Participants

The study was undertaken in health district two (one of six health areas) in Recife, which is the capital of Pernambuco state in northeastern Brazil. Health district two has a population of 217 293 inhabitants,[12] representing almost 15% of the total population of Recife, with a high proportion of low-income families. We enrolled all pregnant women aged 18–49 years who were in their third trimester and had registered with the primary health-care programme (family health programme, and community health workers programme) in the study area. This programme covered about 78% of the total population. In the Recife health plan,[12] an estimated 10% of the population in health district two had private health insurance and the remainder were not registered with the primary health-care programme. Baseline data for the cohort in our study have been reported elsewhere.[13]

Pregnant women were identified from the antenatal care records of 42 primary care teams, and from the records of community health workers to include women not receiving antenatal care at a family health programme unit. Confidentiality and privacy for the interviewees were guaranteed. All women gave written informed consent before participation. Irrespective of whether the women had experienced partner violence, they all received information that was specifically produced for this purpose about the social, health, legal, and police services available in the area under study. Services were contacted to assist women who were interviewed and shown to be in life-threatening situations. The study received approval from the ethics committee of the Federal University of Pernambuco.

Procedures

We did a cohort study to investigate risk factors for postnatal depression and adverse maternal and perinatal outcomes. Data were obtained by trained female interviewers between July, 2005, and December, 2006. The antenatal interview was most often done at a health-care unit, but some women were interviewed at home on request. Although we planned to do the second interview 3–6 months after delivery, the length of follow-up varied but was recorded precisely. Most follow-up interviews were done in the interviewees' homes between May and December, 2006.

Existing postnatal depressive symptoms were assessed with the Edinburgh postnatal depression scale (EPDS).[14] EPDS includes ten items rated on a 0–3 scale, yielding a range 0–30, with higher scores indicating more depressive symptoms. The psychometric qualities of EPDS have been assessed in the UK,[14] with sensitivity of 86% and specificity of 78%, and in Brazil,[15] with sensitivity of 72% and specificity of 88%. On the basis of previous findings, we defined depression by an EPDS score of 12 or more.[10,15,16] We used self-reported information on depression, rather than observer-rated scales, to reduce measurement bias because interviewers could not be masked to the presence or absence of partner violence.

The questions relating to partner violence were developed by the international WHO Multi-country Study on Women's Health and Domestic Violence against Women Study Team.[4] As in all other countries, the Brazilian-Portuguese translation of the questionnaire was independently back translated and discussed during interviewer training and piloting. We defined an intimate partner as a partner or ex-partner with whom the woman was living or used to live, irrespective of a formal union, and with whom the woman was having or had had sexual relations. Therefore women could report partner violence even if they were not with a partner at the time of the antenatal interview. The respondents were asked about their experience of specific acts of psychological, physical, and sexual violence by a present or former intimate male partner during pregnancy. We used a variable with four levels to describe the exposure to violence in pregnancy: none; physical or sexual violence alone; psychological violence alone; and physical or sexual violence plus psychological violence. To assess the level of psychological violence, the respondent was asked about the frequency of each act of psychological violence: none (score of 0), once or twice (1), a few times (2), or many times (3). The sum of all individual scores was then calculated to derive a psychological violence score of 0–12.

We also investigated other variables described in published reports as associated with postnatal depression and partner violence: age (18–24 years *vs* ≥25 years), living with a partner at present (yes *vs* no), years of schooling (0–4 years *vs* ≥5 years), race, employment status, relationship quality, social support, and mental disorders. To assess race, respondents were invited to use the classification adopted by the Brazilian census[17] to classify themselves as one of five skin colours: white, black, mulatto, yellow, or indigenous. Employment status was categorised according to the classification adopted by the Brazilian census[17] and adapted by Ludermir and Lewis:[18] formal worker, informal worker, housewife, unemployed, student, or retired. However, in this report, we have grouped women as white versus non-white for race, and as unemployed versus other for employment status.

The quality of the relationship with the present or most recent partner[19] was measured by use of two variables: communication with the partner (good or poor), and controlling behaviour of the partner (none, moderate, or very). Social support was assessed by the MOS-SSS,[20] which comprises 19 questions covering five dimensions of social support: emotional, informational, tangible, affectionate, and positive social interaction. Every question has five possible answers from never (score of

1) to always (5), so the total score varies from 19 to 95.

Common mental disorders during pregnancy were assessed by use of the self-reporting questionnaire with 20 items (SRQ-20). SRQ-20 was developed in 1980 by Harding and colleagues[21] to screen for common mental disorders in primary health-care settings. The psychometric qualities of SRQ-20 have been assessed in several studies,[22–24] with sensitivity of 62–90% and specificity of 44–95%. In the data analysis, a score of 1 was awarded for each positive answer and 0 for each negative answer. We set the cutoff point at an SRQ-20 score of 8 to define common mental disorders during pregnancy.[22,24] Additionally, we asked the women if they had had a mental illness before the onset of pregnancy.

Statistical analysis

Analysis was done with Stata for Windows (version 10.1). Logistic regression was used to estimate odds ratios (ORs) and 95% CIs of the association of postnatal depression with forms of partner violence during pregnancy, and with sociodemographic and other characteristics of participants. Linear regression was used to investigate mean differences in EPDS scores between the four levels of exposure to partner violence (none, physical or sexual violence alone, psychological violence alone, and physical or sexual violence plus psychological violence), for women who had complete data on all variables included in the models. We also separated the data into individuals who had experienced physical or sexual violence, irrespective of whether they had also experienced psychological violence, and those who had experienced psychological violence, irrespective of whether they had also experienced physical or sexual violence. Analysis of the psychological violence score could then include the variable of physical or sexual violence as a covariate in the models. We also tested the interaction of physical or sexual violence with psychological violence.

Potential confounding factors were chosen on the basis of published reports and the results of analysis of sociodemographic and other characteristics of the sample. ORs were first adjusted for age, race, marital status, years of schooling, employment status, communication with present or most recent partner, controlling behaviour of present or most recent partner, social support, and length of follow-up; and were further adjusted for history of mental illness and SRQ-20 score during pregnancy. SRQ-20 score was analysed as a continuous variable in the regression model. We calculated the population-attributable fraction (PAF) as an estimate of the proportion of postnatal depression that could be prevented in the total population if its association with psychological, physical, or sexual violence during pregnancy were causal and the risk factors could be eliminated completely. Stata aflogit was used to calculate the PAF and 95% CI from the final multivariate logistic regression model, with adjustment for the same confounding factors as for ORs. Stata aflogit reports PAFs for all terms in a model that are positively associated with the outcome; confounding factors are taken into account and the estimated PAF is a summary for a set of exposures. 95% CIs are based on asymptotic approximations.[25] Technical appendix, statistical code, and dataset are available from the corresponding author.

Role of the funding source

The funders had no involvement with the research, and the authors are completely independent of the funders. All authors had full access to all the data in the study, take responsibility for the integrity of the data and the accuracy of the data analysis, and had the final decision to submit for publication.

Results

1133 pregnant women were eligible for inclusion in the study, of whom 1121 (99%) had completed their assessments during pregnancy. 1057 women completed the postnatal interview, which represented a high response rate of 94% of those who had completed their assessments during pregnancy. Median length of follow-up between the first and second interviews was 8·1 months (IQR 5·2–10·2). Response rate varied dependent on educational level: a higher proportion of the 64 women lost to follow-up after the antenatal interview had 4 years or fewer of schooling (28 [44%])

	Number of participants (n=1045)
Psychological violence	
Has he insulted you or made you feel bad about yourself?	247 (23·6%, 21·1–26·3)
Has he belittled or humiliated you in front of other people?	127 (12·2%, 10·2–14·3)
Has he done things to scare or intimidate you on purpose?	84 (8·0%, 6·5–9·9)
Has he threatened to hurt you or someone you care about?	81 (7·8%, 6·2–9·5)
Any psychological violence	294 (28·1%, 25·4–31·0)
Physical violence	
Has he slapped you or thrown something at you that could hurt you?	83 (7·9%, 6·4–9·7)
Has he pushed or shoved you?	99 (9·5%, 7·8–11·4)
Has he hit you with his fist or with something else that could hurt you?	34 (3·3%, 2·3–4·5)
Has he kicked you, dragged you, or beaten you up?	31 (3·0%, 2·0–4·2)
Has he choked or burnt you on purpose?	20 (1·9%, 1·2–2·9)
Has he threatened to use or actually used a gun, knife, or other weapon against you?	21 (2·0%, 1·2–3·1)
Any physical violence	123 (11·8%, 9·9–13·9)
Sexual violence	
Has he physically forced you to have sexual intercourse when you did not want to?	36 (3·4%, 2·4–4·7)
Did you have sexual intercourse when you did not want to because you were afraid of what he might do?	32 (3·1%, 2·1–4·3)
Has he forced you to do something sexual that you found degrading or humiliating?	22 (2·1%, 1·3–3·2)
Any sexual violence	60 (5·7%, 4·4–7·3)

Data are number (%, 95% CI).

Table 1: **Forms of partner violence during pregnancy**

than did the 1057 women who were interviewed after birth (237 [22%]). However, differences between individuals retained and lost to follow-up were not significant for age, race, living with a partner at present, employment status, communication with the present or most recent partner, controlling behaviour of the present or most recent partner, psychological violence score, or physical or sexual violence during pregnancy (data not shown). 1045 women had complete data on all variables and were included in the analysis.

321 women (30·7%, 95% CI 27·9–33·6) reported some type of partner violence during pregnancy, with reports of any psychological violence more common than any physical or sexual violence (table 1). Physical or sexual violence alone was reported by only a small proportion of women (27 [2·6%, 95% CI 1·7–3·7]), but much larger proportions reported physical or sexual violence plus psychological violence (120 [11·5%, 9·6–13·6]) and psychological violence alone (174 [16·7%, 14·4–19·0]).

	Total participants (n=1045)	Participants with postnatal depression (n=270)*	Odds ratio (95% CI)	p value
Age (years)				
18–24	215 (21%)	57 (27%)	1·00	..
≥25	830 (79%)	213 (26%)	0·96 (0·68–1·34)	0·800
Race				
White	210 (20%)	50 (24%)	1·00	..
Non-white	835 (80%)	220 (26%)	1·14 (0·80–1·63)	0·453
Living with partner				
Yes	908 (87%)	220 (24%)	1·00	..
No	137 (13%)	50 (36%)	1·80 (1·23–2·63)	0·002
Years of schooling				
0–4	235 (22%)	78 (33%)	1·60 (1·17–2·19)	0·004
≥5	810 (78%)	192 (24%)	1·00	..
Employment status				
Unemployed	179 (17%)	63 (35%)	1·73 (1·22–2·44)	..
Other	866 (83%)	207 (24%)	1·00	0·002
Communication with partner				
Good	734 (70%)	175 (24%)	1·00	..
Poor	311 (30%)	95 (31%)	1·40 (1·04–1·89)	0·024
Controlling behaviour of partner				
None	312 (30%)	46 (15%)	1·00	..
Moderate	532 (51%)	138 (26%)	2·02 (1·40–2·93)	..
Very	201 (19%)	86 (43%)	4·32 (2·84–6·58)	<0·0001
Social support				
Many	314 (30%)	37 (12%)	1·00	..
Some	374 (36%)	79 (21%)	2·00 (1·31–3·06)	..
None	357 (34%)	154 (43%)	5·68 (3·80–8·49)	<0·0001
SRQ-20				
<8	598 (57%)	76 (13%)	1·00	..
≥8	447 (43%)	194 (43%)	5·27 (3·88–7·14)	<0·0001
History of mental illness				
No	917 (88%)	208 (23%)	1·00	..
Yes	128 (12%)	62 (48%)	3·20 (2·19–4·68)	<0·0001

Data are number (%), unless otherwise indicated. SRQ-20=self-reporting questionnaire with 20 items. *Percentages are the proportion of the total number of participants in the subgroup.

Table 2: **Sociodemographic and other characteristics of participants, and association of these characteristics with postnatal depression**

270 women (25·8%, 95% CI 23·2–28·6) reported postnatal depression. Sociodemographic variables were strongly associated with postnatal depression, with the exception of age and race (table 2). The risk of postnatal depression was increased for women living without a partner, those with 4 years or fewer of schooling, and those who were unemployed, had a poor quality of relationship with their present or most recent partner, little or no social support, and mental illness during (SRQ-20 ≥8) or before pregnancy.

All forms of violence—physical or sexual, or psychological, or a combination—were more common in women who were unemployed, had no social support, were living without a partner, had 4 years or fewer of schooling, had a very controlling partner, had poor communication with their parther, and had mental illness during or before pregnancy (table 3). More than half of women who reported physical or sexual violence plus psychological violence during pregnancy had postnatal depression (table 4). Postnatal depression was associated with psychological violence alone, but the association was attenuated after adjustment for confounding factors, including history of mental illness and SRQ-20 score during pregnancy. By contrast, the association of postnatal depression with physical or sexual violence alone was eliminated after adjustments for these confounding factors, but this category included few individuals and the 95% CIs were wide. Women reporting physical or sexual violence plus psychological violence had the highest risk of postnatal depression after adjustment for confounding factors, but the OR was not that much larger than that for psychological violence alone (table 4).

We examined postnatal EPDS score as a continuous variable in a linear regression model, with very similar results. EPDS score was associated with psychological violence alone and with physical or sexual violence plus psychological violence even after adjustment for confounding factors, including history of mental illness and SRQ-20 score during pregnancy (data not shown). By contrast, physical or sexual violence alone did not seem to be associated with EPDS score (data not shown).

We assessed the dose-response relation between psychological violence and postnatal depression by use of the psychological violence score (table 5). Postnatal depression was more likely to occur as the psychological violence score increased, even after adjustment for physical or sexual violence. In women with a score of 5 or more, almost two-thirds had postnatal depression and an adjusted OR of more than 2. The association between psychological violence and postnatal depression did not seem to be modified by the occurrence of physical or sexual violence (interaction test p=0·77). Physical or sexual violence was strongly associated with postnatal depression, but this association was substantially reduced

	None (n=724)	Physical or sexual violence alone (n=27)	Psychological violence alone (n=174)	Physical or sexual violence plus psychological violence (n=120)	p value*
Age of ≥25 years	565 (78%)	23 (85%)	136 (78%)	106 (88%)	0·060
Non-white race	567 (78%)	22 (81%)	150 (86%)	96 (80%)	0·139
Living without partner	80 (11%)	4 (15%)	36 (21%)	17 (14%)	0·009
0–4 years of schooling	139 (19%)	11 (41%)	40 (23%)	45 (38%)	<0·0001
Unemployed	105 (15%)	7 (26%)	35 (20%)	32 (27%)	0·003
Poor communication with partner	176 (24%)	8 (30%)	60 (34%)	67 (56%)	<0·0001
Very controlling partner	76 (10%)	12 (44%)	46 (26%)	67 (56%)	<0·0001
No social support	202 (28%)	8 (30%)	73 (42%)	74 (62%)	<0·0001
SRQ-20 of ≥8	240 (33%)	12 (44%)	103 (59%)	92 (77%)	<0·0001
History of mental illness	74 (10%)	5 (19%)	27 (16%)	22 (18%)	0·022

Data are number (%), unless otherwise indicated. SRQ-20=self-reporting questionnaire with 20 items. *p values are for the comparison across the four levels of exposure.

Table 3: **Sociodemographic and other characteristics of participants by level of exposure to partner violence during pregnancy**

	Total participants (n=1045)	Participants with postnatal depression (n=270)*	Unadjusted odds ratio (95% CI)	Adjusted odds ratio (95% CI)†	Adjusted odds ratio (95% CI)†‡
None	724 (69%)	131 (18%)	1·00	1·00	1·00
Physical or sexual violence alone	27 (3%)	7 (26%)	1·58 (0·65–3·82)	1·03 (0·40–2·64)	0·77 (0·27–2·14)
Psychological violence alone	174 (17%)	68 (39%)	2·90 (2·03–4·16)	2·13 (1·45–3·13)	1·58 (1·04–2·39)
Physical or sexual violence plus psychological violence	120 (11%)	64 (53%)	5·17 (3·45–7·76)	2·83 (1·76–4·55)	1·76 (1·05–2·93)
p value§	..	..	<0·0001	<0·0001	0·007

SRQ-20=self-reporting questionnaire with 20 items. *Percentages are the proportion of the total number of participants who have experienced each type of violence. †Adjusted for age, race, marital status, years of schooling, employment status, communication with present or most recent partner, controlling behaviour of present or most recent partner, social support, and length of follow-up. ‡Also adjusted for history of mental illness and SRQ-20 score during pregnancy. §p values are for the comparison of the three groups reporting violence with the group reporting no violence.

Table 4: **Association of postnatal depression with level of exposure to partner violence during pregnancy**

after adjustment for psychological violence and other confounding factors (table 5).

Calculation of the adjusted PAF showed that 10·6% (95% CI 2·0–18·4) of postnatal depression could be explained by partner violence during pregnancy.

Discussion

In this population-based cohort study, we identified a gradient of increasing risk of postnatal depression associated with the coexistence of different forms of intimate partner violence against women during pregnancy. The highest risk of postnatal depression was in women who reported physical or sexual violence plus psychological violence. Postnatal depression was strongly associated with psychological violence, even when it occurred without physical or sexual violence.

We recorded a clear positive association between the frequency of psychological violence during pregnancy and the occurrence of postnatal depression, even after adjustments. As in previous studies,[8,26] psychological violence was much more common than was physical or sexual violence. About 10% of the burden of postnatal depression could be attributed to partner violence during pregnancy, with most attributable to psychological violence, which was the most common form of violence in our study. Although physical or sexual violence was strongly associated with postnatal depression, this association was substantially reduced after adjustment. Therefore, these results suggest that prevention of physical and sexual violence might not be sufficient to reduce the rates of postnatal depression. Prevention or treatment of the psychological aspects of physical violence, together with psychological violence occurring in the absence of physical or sexual violence, is highly important.

As expected, we noted a large overlap in the type of violence reported, especially between physical or sexual violence and psychological violence. In fact, only 27 of 147 women reporting physical or sexual violence did not also report psychological violence. The statistical power available from the small group of women reporting physical or sexual violence alone might have been insufficient to detect differences after adjustment for confounding factors. These factors could have contributed to the reduction in the apparent association of physical or sexual violence with postnatal depression after adjustment for psychological violence. However, the psychological aspects of physical or sexual violence could be the important factors that might lead to postnatal depression.

This study had several strengths. First, the large sample was recruited from family health and community health workers programmes with an excellent response rate,

	Total participants (n=1045)	Participants with postnatal depression (n=270)*	Unadjusted odds ratio (95% CI)	Adjusted odds ratio (95% CI)†	Adjusted odds ratio (95% CI)†‡
Psychological violence score					
None	751 (72%)	138 (18%)	1·00	1·00	1·00
1–2	132 (13%)	46 (35%)	2·38 (1·59–3·55)	1·73 (1·12–2·67)	1·40 (0·88–2·22)
3–4	87 (8%)	39 (45%)	3·61 (2·27–5·72)	2·72 (1·60–4·62)	1·98 (1·13–3·49)
≥5	75 (7%)	47 (63%)	7·46 (4·51–12·33)	3·79 (1·98–7·26)	2·29 (1·15–4·57)
p value§	..	..	<0·0001	<0·0001	0·0037
Physical or sexual violence					
None	898 (86%)	199 (22%)	1·00	1·00	1·00
Yes	147 (14%)	71 (48%)	3·28 (2·29–4·70)	1·03 (0·62–1·69)	0·91 (0·54–1·54)
p value¶	..	..	<0·0001	0·92	0·73

SRQ-20=self-reporting questionnaire with 20 items. *Percentages are the proportion of the total number of participants in each subgroup. †Adjusted for the other violence variable in the table (psychological violence *vs* physical or sexual violence) age, race, marital status, years of schooling, employment status, communication with present or most recent partner, controlling behaviour of present or most recent partner, social support, and length of follow-up. ‡Also adjusted for history of mental illness and SRQ-20 score during pregnancy. §p values are for the comparison of the three groups reporting psychological violence with the group reporting no psychological violence. ¶p values are for the comparison of the group reporting physical or sexual violence with the group reporting no physical or sexual violence.

Table 5: **Association of postnatal depression with psychological partner violence or physical or sexual partner violence during pregnancy**

providing a representative community sample of poor people in Recife. Second, we used an internationally recognised questionnaire that takes a non-judgmental approach to this sensitive subject.[4,19] Last, we were able to adjust for a large number of possible confounding variables, including a measure of psychological distress during pregnancy (SRQ-20) and history of mental illness before pregnancy.

Some limitations are also important to consider. First, the EPDS thresholds used to define postnatal depression are controversial, and the prevalence of postnatal depression might seem high. However, the prevalence is similar to previous studies in developing countries[10,27] and in Brazil,[28,29] and the threshold that we used was validated in studies of similar populations in Brazil[15,16] and other developing countries.[10] Nonetheless EPDS is a symptom questionnaire, and much debate surrounds the appropriate criteria to define depression and its relation with the need for treatment.[30] We recorded similar results when EPDS was used as a continuous outcome, so our results are unlikely to be highly sensitive to a particular threshold score. Although longer and more detailed assessments of postnatal depression than EPDS are available, we would expect any measurement error to be random in relation to partner violence and would have reduced the size of our reported association. Second, EPDS scores during pregnancy were not available, but we do not think that any differences between the SRQ-20 and EPDS could have had a major impact on our results. Both measures are highly correlated and have a similar sensitivity and specificity compared with longer assessments of depression.[31]

Third, the results of the study could have been biased by the study setting and population. The occurrence of partner violence is increased in women with little schooling and living in poverty,[26] so the high frequency of partner violence could be indicative of the characteristics of the community in our study. A measurement bias could have arisen if women who were depressed at baseline had exaggerated the level of violence as a result of their mental state. Conversely, violence could have been under-reported because of the associated stigma and shame.[32] Furthermore, high SRQ-20 scores at baseline could have been a result of previous partner violence, so our adjustment could have led to an underestimate of the strength of association. We recorded reports of violence before pregnancy, but we decided not to include these data in our analysis because they were obtained retrospectively. If some random measurement error had occurred, the strength of the reported association would be reduced.

Last, the interpretation that controlling behaviour by the partner is a violent act is controversial.[4] We have made a theoretical distinction between violence and unequal gender power relations,[33,34] and so we have adjusted for variables indicative of controlling behaviour by the partner and difficulties in communication with the partner. Focus groups in Brazil have suggested that Brazilian women with low or high educational levels welcome some controlling behaviour as a form of attention or even affection by the partner.[35] However, we recognise the potential for overlap between some aspects of psychological violence and these measures of relationship quality. If so, our adjustment would have led to an underestimate in our reported association between experience of psychological violence in pregnancy and postnatal depression, so we believe that this finding is robust.

This study has addressed some of the limitations of previous longitudinal studies to ascertain whether partner violence is causally linked with postnatal depression. In particular, our results argue for the importance of psychological violence.[8,36] Violence involves a belief in the omnipotence of the aggressor,[32] and produces feelings of defeat and loss.[37] In this case, the effects of psychological violence could be exacerbated by the fact that the relationship between the aggressor and victim is intimate. Discrimination, verbal insults, feelings of loss, mistreatment, degradation, and humiliation are features of violence against women that could dent women's self-esteem and reduce their capacity to react, thereby perpetuating their sense of subordination.[38] These issues are likely to be just as important whether the woman lives in a developing or developed country.

Our results have both clinical and public health implications. Interventions for victims of partner violence have included various approaches, such as the use of women's empowerment protocols,[39,40] referral to shelters, transitional housing, legal advice, and psychological support.[40] However, evidence for the effectiveness of such interventions for improvements in psychosocial health is insufficient.[41] Use of evidence-based psychological

approaches, such as cognitive behavioural therapies, in a systematic way could help to improve the effectiveness of these interventions. Similar techniques were successfully used in a randomised controlled trial for the treatment of postnatal depression in Chile.[42]

Partner violence is increasingly becoming recognised as an important public health problem worldwide. However, psychological violence is often not identified because of the emphasis placed on the detection of physical and sexual violence. Prenatal care could provide an opportunity for improved detection by health-care professionals,[5,8] but the precise role of health providers in identification of partner violence against women needs further elucidation.[43] Interventions that might prevent psychological violence, or help to treat the consequences of such violence, should reduce the substantial burden of postnatal depression that affects mothers, children, and the health system as a whole.

Contributors

ABL is the guarantor for the study and participated in all phases of the study, including the original idea, design, and data analysis and interpretation. GL and RA collaborated in the statistical analysis and data interpretation. SAV and TVBdA participated in the choice of the theme, study design, data collection, and data entry. All authors participated in drafting of the report.

Conflicts of interest

We declare that we have no conflicts of interest.

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