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The Association between Intimate Partner Violence, Depression and Influenza-like Illness Experienced by Pregnant Women in Australia

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Abstract: Intimate Partner Violence (IPV) is a major public health issue, including during pregnancy where it poses a serious risk to the woman's health. Influenza-Like Illness (ILI) also causes significant morbidity for women during pregnancy. It may be possible that ILI in pregnancy is associated with IPV, and that depression and trauma history play a role in the connection. 524 Australia-born women and 578 refugee-background women participated in the study. Baseline participants were randomly recruited and interviewed from antenatal clinics between January 2015 and March 2016, and they were reinterviewed six months post-partum. Bivariate and path analysis were used to assess links between IPV, depression and ILI. One in 10 women (10%; 111 out of 1102) reported ILI during their pregnancy period and this rate was significantly ($p < 0.001$) higher for women born in conflict-affected countries (13%; 76 out of 578) as compared to Australian-born women (7%; 35 out of 524). In both groups, Time 1 traumatic events, IPV and depression symptoms were significantly associated with ILI at Time 2. A significant association between IPV at Time 1 and ILI at Time 2 was fully mediated by depression symptoms at Time 1 (*Beta* = 0.36 $p < 0.001$). A significant direct path was shown from depression symptoms to ILI (*Beta* = 0.26, $p < 0.001$). Regardless of migration history, pregnant women who have experienced IPV and depression are more likely to report influenza-like symptoms in pregnancy. This may suggest that trauma and depression negatively affect immunity, although it could also indicate a connection between depressive symptoms and physical experiences of ILI.

Keywords: intimate partner violence; influenza-like illness; depression; trauma; pregnancy

1. Introduction

Intimate Partner Violence (IPV) is a form of trauma that is associated with common mental disorders and can lead to physical injury, illness, and mortality [1,2]. The prevalence and pathways between IPV and Influenza-Like Illness (ILI) remain unexplored, including during the high-risk antenatal period where IPV is acknowledged to increase in frequency [3]. Before COVID-19, ILI, a term commonly used to describe an acute respiratory illness with fever that has not been laboratory proven, caused more morbidity and mortality than any other infectious disease in Australia, UK or the USA [4]. ILI can cause a primary viral or secondary bacterial pneumonia, and pre-existing chronic diseases

contribute to a higher risk for severe illness and mortality. There are specific risks associated with ILI during pregnancy. Pregnant women are overrepresented among patients with severe illness and complications from influenza and are more likely to require hospitalization and intensive care unit admission [5]. Fetuses and neonates born to women affected by influenza during pregnancy are also at risk of more serious health problems [5].

Depression is more common during pregnancy and in the post-partum period, and independently, IPV is also strongly associated with depression [6,7]. ILI may also be a health correlate of IPV and depression. One possible pathway is supported by existing evidence of a link between exposure to traumatic events such as early life adversity, mental disorders including depression, and impaired immunity [8,9]. The association found between depressive disorders and impaired immunity is compelling, and the link has been reported when depression occurs in the perinatal period [10,11]. A trauma and immunity pathway may also explain evidence that physical and psychological IPV were both associated with an increased susceptibility for HIV infection [12]. In similar studies, IPV-related post-traumatic stress disorder and comorbid depression were associated with impaired immunity and HIV acquisition [13–15]. No studies have examined whether exposure to IPV is associated with higher risk for ILI via an immune pathway.

ILI is usually a mild illness that is self-treated. Many of its symptoms (malaise, headache, aches, fatigue) may overlap with the identified somatic symptoms of depression [16,17]. We examined a theoretical relationship between exposure to IPV during pregnancy, association with trauma events and depression symptoms, and reporting of ILI in a cohort study of 1335 Australian women (approximately half had arrived in Australia from conflict-affected countries) recruited from antenatal clinics. Women were interviewed at approximately 12–20 weeks into their pregnancy and then again approximately 6 months after giving birth. We postulated that IPV exposure from the current or previous partner measured at Time 1 would be associated with reports of ILI during pregnancy, which we evaluated at Time 2, approximately 6 months after the birth of the child. We anticipated that cultural background or being exposed to prior trauma may be factors that contributed to reporting ILI. We previously reported findings within this cohort of an association between IPV and traumatic events with depression symptoms during pregnancy [18]. Given a theoretical relationship between depressive symptoms and self-reports of physical illness, we further hypothesized that the relationship between IPV and ILI would be mediated by depression symptoms. We reasoned that the hypothesized relationship between IPV, ILI and depression symptoms may theoretically be via either a psycho-immunological pathway or a depression-related psychosomatic experience of illness. If a relationship was found to exist, we planned to promote the need for further investigations to establish the empirical foundations and directionality.

2. Materials and Methods

2.1. Procedure

Participants were recruited between January 2015 and March 2016 to the Women Aware Together with Their Children (WATCH) study. Consecutive women belonging to the largest intake groups migrating to Australia from conflict-affected countries and an approximately equal number of randomly sampled Australian-born women were recruited at their first appointment (12–20 weeks gestation) at three antenatal clinics in Australia's two biggest cities (Sydney and Melbourne). Women with overt psychosis, intellectual impairment or severe medical illness were excluded. Follow-up interviews were conducted approximately 6 months postpartum via telephone. In cases where telephone interviews were not possible, home visits were conducted.

2.2. Ethics and Research Personnel

The study was approved by the Southwestern Sydney Local Health District Human Research Ethics Committee (HREC/15/POOL/28), with site approval from Monash Health HREC and the Western Sydney Local Health District. Participants provided written consent

and were remunerated for their time. In total, eight women field workers from the target group ethnic or language backgrounds were given extensive training in using the research interview and standardized process [18]. We adhered strictly to WHO guidelines for conducting safe and ethical IPV research. This study followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guideline.

2.3. Survey Measures

2.3.1. Cultural Accuracy

All measures were selected based on their previous psychometric evaluations and use across cultures. Measures were subjected to rigorous assessment of cultural and linguistic accuracy. Translation and back-translation procedures were performed, and refinements made by groups of linguistic experts.

2.3.2. Sociodemographic Characteristics

We drew on the Australian National Census for items recording age, marital status, level of education and country of origin.

2.3.3. Influenza-Like Illness

The influenza item was drawn from the New South Wales (NSW) Australia Health Perinatal Questionnaire, a series of health-related questions routinely asked of women following the birth of their child, commonly as they exit NSW Health antenatal services. The single self-report item asked was whether the woman had experienced influenza during her pregnancy. Items were scored as either Yes (1) or No (0). Other health conditions in the perinatal questionnaire, such as preeclampsia, were not associated with IPV and were excluded from the analysis. The limitations of a single item measure for ILI are described in the Discussion.

2.4. Mental Health Measures

We used the Mini-International Neuropsychiatric Interview (MINI) based on the Diagnostic and Statistical Manual of Mental Disorders (Fourth Edition) (DSM-IV) to assess current Major Depressive Disorder (MDD) and Post-Traumatic Stress Disorder (PTSD). We selected DSM-IV in preference to DSM-V, because the latter had not yet been used extensively across cultures at the commencement of the study. The MDD interview consisted of 9 items assessing depression symptoms in the last 2 weeks. For further detail on the MINI measures, see Appendix A.

2.5. Traumatic Events

We assessed lifetime exposure to Trauma Events (TEs) based on the inventory used in the World Mental Health Survey. Overall, 13 items were classified as general TEs that could occur in any society. Items for lifetime exposure were coded 1 for yes, and 0 for no. Because of skewed distribution, we grouped scores into 3 categories: 0 (none); 1 (one to two); 2 (three or more). Refer to Appendix A.

2.6. Intimate Partner Violence

The World Health Organization measure, tested across many cultures, includes items inquiring into physical, psychological, and sexual violence perpetrated by an intimate partner. Questions were asked about IPV perpetrated by the last or current partner. Cultural experts advised against including explicit sexual abuse items. Women were initially assigned to one of three hierarchically ordered categories: (1) No IPV; (2) Psychological IPV (without physical abuse, including jealous or angry if she talks to other men, frequent accusations of being unfaithful, does not permit meetings with female friends, limits contact with family, insists on knowing woman's whereabouts, humiliates her in front of others, threatens harm to her or someone close to her); and (3) Physical IPV with or without psychological IPV (any physical abuse including pushing, shaking, throwing items,

slapping, twisting arm, punching, kicking, dragging, strangling, burning, threats with a knife, gun or other weapon, attacks with a knife, gun or other weapon). Considering the sample size and reliable estimates for IPV prevalence in a subgroup analysis, we assigned women to 2 categories: (1) no IPV or low respect or regard only; (2) severe psychological IPV and/or physical IPV [18].

2.7. Statistical Analysis

Descriptive statistics and χ2 tests are reported for bivariate comparison of variables with reported contraction of ILI during pregnancy. Variables included sociodemographic characteristics, trauma events at Time 1, IPV at Time 1, depression symptoms at Time 1 (No = 0, Yes = 1), PTSD symptoms at Time 1 (No = 0, Yes = 1).

2.8. Path Analysis

Given that the associations between IPV, trauma events, depression and ILI were significant, a path analysis was conducted to better understand mediating factors. First, a direct path from IPV prior to Time 1 was drawn to ILI during pregnancy. We previously established in this same cohort that IPV is related to World Mental Health Survey trauma events that can be experienced in the general community [18]. We therefore drew a path from trauma count at Time 1 to IPV at Time 1, as we wanted to examine the impact of IPV after taking previous trauma exposure into account. As age showed a significant bivariate relationship with both trauma events and IPV (Table 1), this was entered as a controlling variable for both IPV and trauma events.

Table 1. Influenza-Like Illness in pregnancy and sociodemographic characteristics.

Sociodemographic Characteristics	All Women	Trauma Events at T1	Depression at T1	IPV at T1	ILI during Pregnancy at T2
	n (%)	*n* (%) 3 or More	*n* (%) Yes	*n* (%) Yes	*n* (%) Yes
All women	1102	225 (20)	216 (19)	390 (35)	111 (10)
Age group at T1					
<25	213 (19)	39 (18)	51 (24)	105 (48)	19 (8.9)
25–35	678 (62)	112 (16)	122 (18)	219 (32)	72 (10.6)
>35	211 (19)	74 (35)	43 (20)	66 (31)	20 (9.5)
p value		**<0.001**	0.175	**<0.001**	0.734
Marital Status at T1					
Married/domestic partnership	1021 (93)	204 (20)	191 (19)	350 (34)	103 (10.1)
Separated/divorced/other	81 (7)	21 (26)	25 (31)	40 (49)	8 (7.2)
p value		0.443	**0.009**	**0.007**	0.951
Highest level of educational attainment at T1					
No postschool qualification	508 (46)	110 (49)	114 (53)	230 (59)	51 (10)
Diploma and vocational education	234 (21)	49 (22)	44 (20)	68 (17)	23 (10)
University degree	360 (33)	66 (29)	58 (27)	92 (24)	37 (10)
p value		0.228	0.063	**<0.001**	0.984
Country of Origin					
Women born in Australia	524 (48)	106 (47)	74 (34)	137 (35)	35 (7)
Women from refugee background	578 (52)	119 (53)	142 (66)	253 (65)	76 (13)
Significant findings are in bold		0.452	**<0.001**	**<0.001**	**<0.001**

There were no significant differences in reported ILI during pregnancy by age, marital status, or level of education. More women from a refugee background reported ILI (13% vs. 7%; *p* < 0.001). There were significant differences between all reported sociodemographic groups in IPV, between marital status and country of origin for depression and in age for trauma events (Table 1).

In the second step, we again drew on our previously published findings of significant relationships between trauma events, IPV and depression [18] to hypothesize that the relationship between IPV at Time 1 and ILI at Time 2 would be mediated by depression at Time 1. We entered depression symptoms as a mediating variable between IPV and ILI. We also controlled depression symptoms for trauma count. We reasoned that reported IPV preceded depression symptoms, as the IPV questions were about events preceding the interview, while depression symptoms covered current depression symptoms at Time 1 and two weeks preceding. Non-significant paths were removed.

The cohort study within which this study is embedded is comprised of 49% Australian-born and 51% refugee-background women [18]. We conducted a multiple-group analysis to determine whether conducting separate path analyses for each group (Australian-born vs. conflict-affected countries) provided a better explanation of the data. We tested whether allowing the paths to vary between groups significantly improved model fit. The model with free estimation of paths was compared to a nested model with paths fixed across groups. Chi-square difference tests with scaling correction factors were used to test for invariance across groups. We determined that the absence of a significant Chi-square difference test meant that analyzing all women in a single model was justified.

The goodness of fit for each model was evaluated by using a conventional suite of indicators including a non-significant Chi-square test; for Tucker–Lewis Index (TLI) > 0.90; Comparative Fit Index (CFI) > 0.90; Root Mean Square Error of Approximation (RMSEA) < 0.08 and Weighted Root Mean Square Residual (WRMR) < 0.90. In addition, Chi-square values were used to test for significant differences between models. The descriptive analysis was performed by using SPSS version 25 (IBM), and path analyses were conducted in the software program Mplus Version 8 by Author 2. Because ILI, IPV and depression symptoms were dichotomous, the weighted least squares estimator with a diagonal weight matrix, robust standard errors and a mean- and variance-adjusted $\chi2$ test statistic (WLSMV) and theta parameterization were used for parameter estimation in Mplus.

3. Results

3.1. Participant Characteristics

Of 1574 eligible women recruited at the time of first appointment in the antenatal clinic, 1335 were interviewed at baseline (84.8% response rate), including 650 women born in Australia (48.7%) and 685 from conflict-affected countries (51.3%). The follow-up interview was completed by 1111 women (83.2% retention, 1111 of 1335). The most common reason for non-participation in follow-up was being uninterested in the study, followed by being generally too busy, feeling unwell, due to the index child being present, and due to partners/relatives being hostile. Women who did not participate at the follow-up survey were excluded from this analysis. The final analytic sample presented here is for 1102 women who completed the perinatal question about ILI contracted during pregnancy (see Figure 1 for flow diagram of inclusion and attrition).

The attrition groups were significantly younger, single, and less likely to have completed secondary education. They did not differ on their country of origin (see Supplementary Table S1 for details). In the final analytic sample, 524 women were born in Australia (48%) and 578 were born in conflict-affected countries (52%) (see Table 1). Table 1 shows that, among the analytical sample of 1102 women, one in five (20%, $n = 225$) reported exposure to three or more general traumatic events, 19% ($n = 216$) met the threshold for depression, more than a third (35%, $n = 390$) of women had experienced IPV and one-tenth (10%, $n = 111$) reported ILI during their last pregnancy period.

Women who reported past trauma events were more likely to report ILI (Table 2). In addition, women with depression at T1 were more likely to report ILI (15% vs. 9%; $p < 0.01$). In terms of IPV, more women who had experienced IPV at T1 reported ILI at T2 (Table 2).
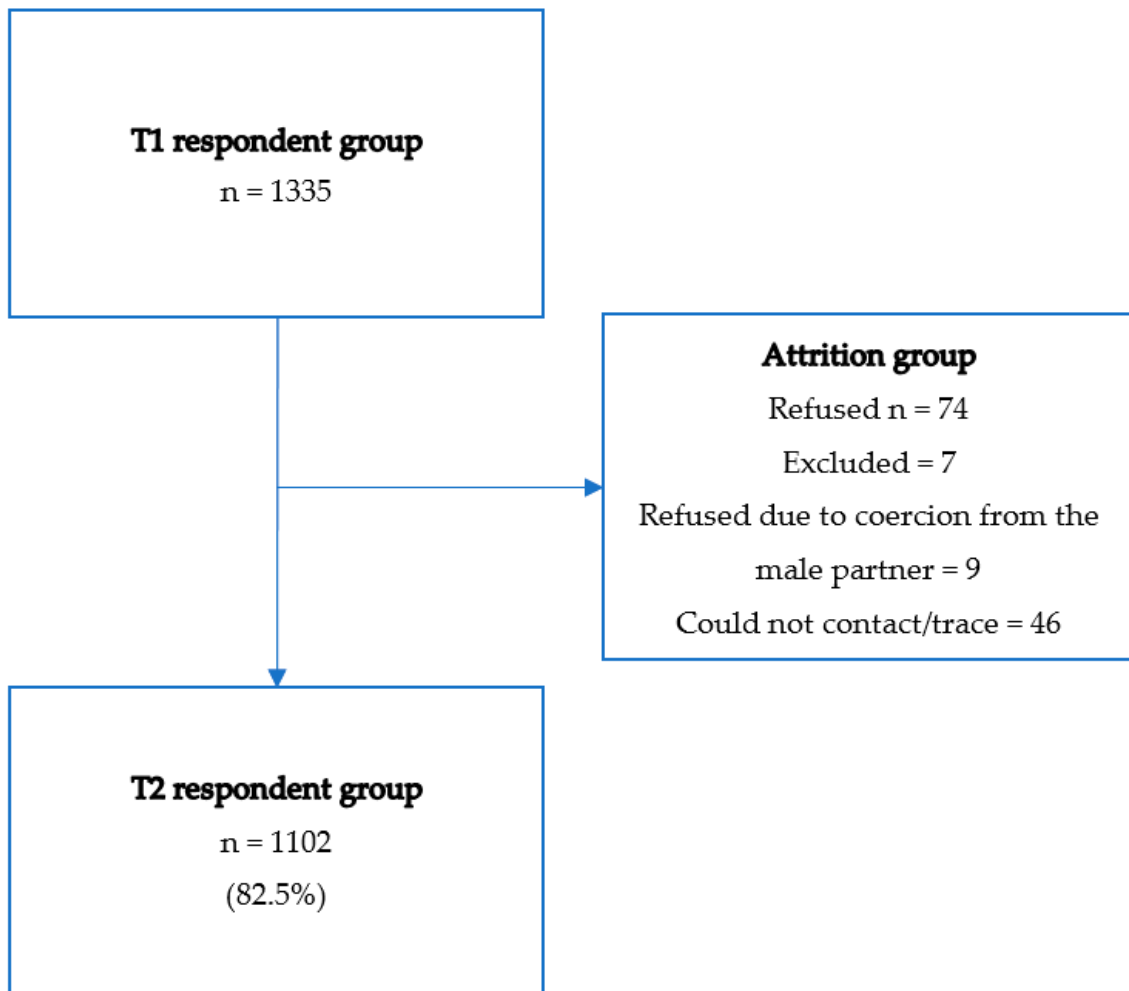
Figure 1. Flow diagram of inclusion and attrition.

Table 2. Influenza-Like Illness in pregnancy in relation to trauma, IPV, depression and PTSD.

	All Women *n* (%)	ILI at T2 *n* (%) Yes
All women	1102	111 (10)
Trauma events at T1		
none	545	39 (7)
1–2	333	42 (13)
3 or more	224	30 (13)
p value		0.006
IPV at T1		
No IPV and/or low respect	717 (65)	61 (9)
Severe Psychological and/or Physical IPV	385 (35)	50 (13)
p value		0.018
Depression at T1		
No	886 (80)	78 (9)
Yes	214 (20)	33 (15)
p value		0.004
PTSD at T1		
Yes	1038 (94)	100 (10)
No	64 (6)	11 (17)
p value		0.051

3.2. Path Analysis

Step 1 involved examining the direct effect of IPV at T1 on ILI at T2, accounting for trauma and age at T1. A path was drawn from the categorical variable of whether the participant experienced IPV at T1 to ILI during pregnancy reported at T2. Given the observed pairwise relationships between IPV and previous trauma events, along with the previous literature showing that people who have experienced past trauma are more likely to experience IPV, a path was drawn from trauma events to IPV. Due to significant observed pairwise relationships between age and trauma and age and IPV (Table 1), the analysis controlled for age, with a path from age to trauma and IPV. The direct path from IPV at T1 to ILI at T2 was significant (*Beta* = 0.18, *p* = 0.005). The model showed poor fit, $\chi^2(6) = 117.09$, *p* < 0.001; RMSEA = 0.129; CFI = 0.272; TLI = −0.214; SRMR = 0.113, indicating that the step 1 model did not adequately explain the data (Table 3). We therefore undertook a second step, testing our hypothesis that the relationship between IPV and ILI would be mediated by depression.

Table 3. Path Analyses.

Relationship	Standardized Path Co-Efficient (*Beta*)	Standard Error (SE)	*p*-Value
Step 1–ILI at T2 on IPV at T1, IPV at T1 on Trauma at T1			
ILI at T2 on			
IPV atT1	0.181	0.065	0.005
IPV at T1 on			
Age at T1	−0.145	0.036	<0.001
Trauma events at T1	0.199	0.044	<0.001
Trauma events at T1 on			
Age at T1	0.134	0.033	<0.001
Step 2–ILI at T2 on IPV at T1 mediated by depression, IPV on Trauma			
ILI at T2 on			
Depression at T1	0.256	0.07	<0.001
Depression at T1 on			
IPV at T1	0.358	0.049	<0.001
Trauma events	0.229	0.047	<0.001
IPV at T1 on			
Age	−0.151	0.036	<0.001
Trauma events	0.186	0.044	<0.001
Trauma events at T1 on			
Age	0.131	0.033	<0.001
Indirect effect			
ILI at T2, Depression at T1, IPV at T1	0.092	0.029	0.001
ILI at T2, Depression at T1, Trauma at T1	0.059	0.020	0.004
ILI at T2, Depression at T1, IPV at T1 Trauma at T1	0.017	0.007	0.011

In step 2, depression symptoms at T1 (controlling for trauma count) were entered as a mediating variable between IPV at T1 and ILI at T2. The direct effect of IPV on ILI was fully mediated by depression symptoms, so this path was removed. There were significant paths from IPV at T1 to depression symptoms at T1 (*Beta* = 0.36, *p* < 0.001), and from depression symptoms at T1 to ILI at T2 (*Beta* = 0.26, *p* < 0.001) (Table 3). The model showed good fit $\chi^2(2) = 5.473$, *p* = 0.2421; RMSEA = 0.018; CFI = 0.990; TLI = 0.976; SRMR = 0.029.

In step 3, we tested the same model as in step 2 with two groups (Australian born vs. refugee background); allowing free estimation of paths for each group would improve model fit. That is, based on our previous research demonstrating differences in risk factors for depression for people from conflict-affected countries at Time 1 [18], we hypothesized that the relationships between IPV, depression and ILI may differ between Australian born and refugee background. The same model in step 2 was analyzed grouped by people from a refugee background (*n* = 583) and people born in Australia (*n* = 528). The model showed

good fit $\chi 2(8) = 9.673$, $p = 0.2887$; RMSEA = 0.019; CFI = 0.988; TLI = 0.970; SRMR = 0.04. The Chi-square difference test comparing the freely estimated model to the nested model (with parameters constrained to be equal across groups) was not significant, $\chi 2(5) = 8.980$, $p = 0.1747$, indicating that constraining the paths to be equal across the groups did not significantly worsen model fit. That is, allowing for differential relationships between the two groups did not add significant explanatory power to the model. Since the focus of this paper is on the impact of IPV on physical and mental health outcomes for pregnant women, we present the model from step 2, which did not take country of birth into account.

Step 2 model: Direct and indirect effects

The effect of IPV at T1 on ILI at T2 was fully mediated by depression symptoms. There were significant indirect paths from IPV to depression to ILI (*Beta* = 0.09, $p = 0.001$); trauma events through depression to ILI (*Beta* = 0.06, $p = 0.003$); and from trauma events through IPV via depression to ILI (*Beta* = 0.02, $p = 0.01$) (refer Figure 2 below).
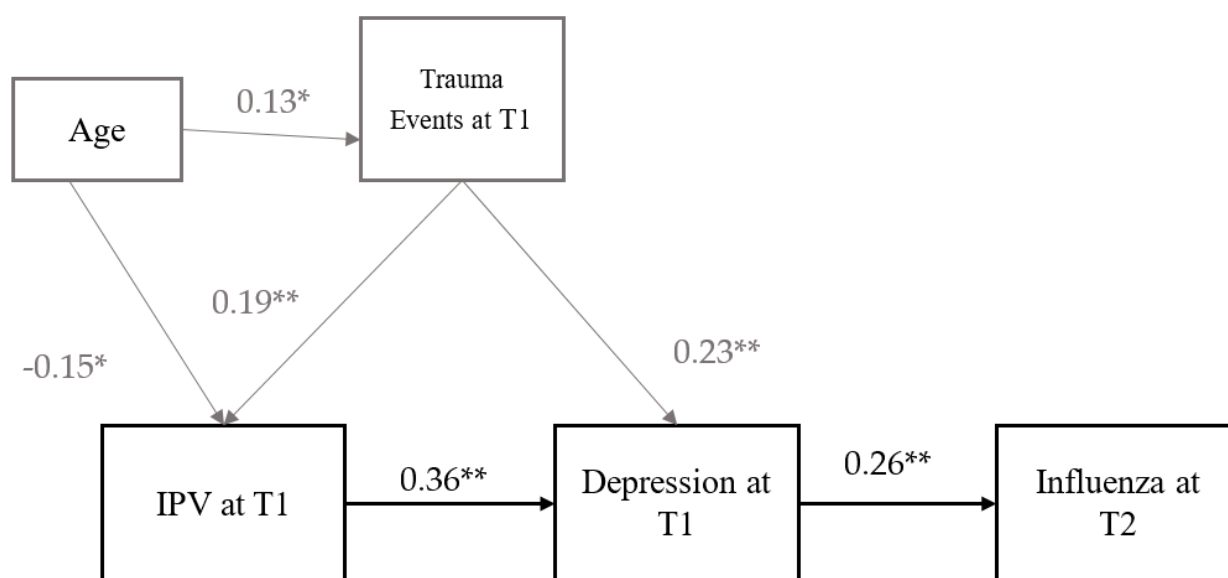
Figure 2. Path diagram including standardized significant direct path co-efficients. * indicates path co-efficient is significant at $p < 0.05$; and ** indicates path co-efficient is significant at $p < 0.01$.

4. Discussion

Our study found an association between IPV and ILI, and that IPV has a significant effect on depressive symptoms, which influences whether women reported ILI during pregnancy. The study contributes new knowledge to understanding the negative health-related correlates of IPV [6,19], exposing ILI as a novel health impact. The path analysis enabled us to consider multiple associations and covariance and to assess direct and indirect paths in one model. Another strength is that the study includes systematically recruited women from a heterogenous pool of cultural backgrounds, and with trauma histories. Although general trauma exposure was significant, differences related to refugee background or Australian-born background did not influence the general findings.

Our self-report ILI item inquiring whether the participant had experienced influenza during pregnancy relies on recall and on their knowledge of the symptoms of influenza, usually described as an acute respiratory illness, cough, sore throat and fever [5]. It is never-theless recognised that influenza and its related symptoms are distinguished and described in similar ways across all populations in the world [20]. Our single-item question does not confirm prevalence of laboratory-proven influenza; hence, we applied the established term Influenza-Like Illness.

Depression, as well as IPV, have been associated in previous studies with somatic complaints which could also resemble ILI [20]. Further, cultural background can influence

perception of illness. In this context, we note that women from refugee backgrounds reported more ILI than women born in Australia (Table 1). Nevertheless, our analysis showed that the relationship between IPV and ILI applied to both refugee-background women and Australian-born women, suggesting that cultural background or migration history were not a major influence on reporting. This consistency across groups in findings strengthens the robustness of the association.

Although there are direct or indirect associations between IPV, depression and traumatic events at T1 and ILI at T2 (T2 at 6 months post-partum was when women were asked to recall if they had influenza during pregnancy), we cannot claim a temporal or causal relationship between these factors.

Although we did not test for biological markers for immune-related change, the association we found between depressive symptoms and ILI could be via impaired immunity, a link also described in the perinatal period [10,11]. A trauma and immunity pathway, by way of dysregulation in the systems that control the stress response, may also explain evidence that IPV was associated with ILI in our study [12]. Future research needs to assess potential causal links.

Our findings also suggest that the phenomenological experience of depression may explain the propensity to report symptoms of ILI. Depression, for example, has been shown to be hard to distinguish from a general feeling of being systemically unwell. Further, in some cultures, the distinction between psychiatric and somatic illness may be even harder to identify [16,17]. This alternative pathway to understanding the association between IPV and ILI via depression also needs to be further investigated.

There was an indirect path demonstrated from generic forms of trauma event (that could theoretically impact any women regardless of background) through depression to ILI. This finding further underscores the salience of the trauma, depression and ILI pathway, and the significance of traumas other than IPV, including social adversity [21].

Future Directions for Practice and Policy

Our study alerts practitioners and policy makers to understanding that IPV and depression may signal an increased risk of ILI to women's health during pregnancy. Depression in pregnancy is a known risk factor for poorer outcomes related to maternal health and the health of the fetus or infant [22,23]. ILI is also a risk factor for poorer health outcomes in pregnancy [24–26]. It is also possible that, if a psycho-immunological pathway is present, risks of all viral illnesses, including COVID-19, may be higher amongst women who have experienced IPV [8].

The most salient aspect of our findings is that IPV-affected women experienced and reported what felt to them like influenza during their pregnancy. This finding underscores why general practitioners need to be aware of the possibility of IPV as well as depression in patients presenting with or concerned about having ILI [16]. Our study adds substantially to the evidence for health policy responses to target multimodal interventions to protect women's health by diagnosing depression and preventing IPV, as a priority.

5. Conclusions

In our study, women with histories of IPV subjectively reported experiencing influenza-like symptoms significantly more often than those reporting no IPV. Our recommendation supports an argument to routinely ask about IPV in primary care, antenatal and mental health settings. Our study findings may be relevant to the field of psychoimmunology, as well as the study of cultural and psychosomatic expressions of mental disorder [8–13,16].

Appendix A

Mental Health Measures

Major Depressive Disorder

(Items are: 1. Have you been consistently depressed or down, most of the day, nearly every day, for the past 2 weeks?; 2. In the past 2 weeks, have you been much less interested in most things or much less able to enjoy the things you used to enjoy most of the time?; 3. Was your appetite decreased or increased nearly every day? Did your weight decrease or increase without trying intentionally (i.e., by $\pm 5\%$ of body weight or ± 8 lbs or ± 3.5 kgs, for a 160 lb/70 kg person in a month?; 4. Did you have trouble sleeping nearly every night (difficulty falling asleep, waking up in the middle of the night, early morning wakening, or sleeping excessively?; 5. Did you talk or move more slowly than normal or were you fidgety, restless, or having trouble sitting still almost every day?; 6. Did you feel tired or without energy almost every day?; 7. Did you feel worthless or guilty almost every day?; 8. Did you have difficulty concentrating or making decisions almost every day?; and 9. Did you repeatedly consider hurting yourself, feel suicidal, or wish that you were dead?). Women who answered yes for either item 1 or 2 and answered yes for at least 3 other items were classified as having MDD.

PTSD

PTSD items are: 1. Have you ever experienced or witnessed or had to deal with an extremely traumatic event that included actual or threatened death or serious injury to you or someone else?; 2. Did you respond with intense fear, helplessness or horror?; 3. During the past month, have you re-experienced the event in a distressing way (such as, dreams, intense recollections, flashbacks or physical reactions)?; In the past month: 4. Have you avoided thinking about or talking about the event?; 5. Have you avoided activities, places or people that remind you of the event?; 6. Have you had trouble recalling some important part of what happened?; 7. Have you become much less interested in hobbies or social activities?; 8. Have you felt detached or estranged from others?; 9. Have you noticed that your feelings are numbed?; 10. Have you felt that your life will be shortened or that you will die sooner than other people?; 11. Have you had difficulty sleeping?;

12. Were you especially irritable or did you have outbursts of anger?; 13. Have you had difficulty concentrating?; 14. Were you nervous or constantly on your guard?; 15. Were you easily startled?

Traumatic Events

(1) Were you ever kidnapped or held captive?; (2) Were you ever involved in a life-threatening automobile accident?; (3) Did you ever have any other life-threatening accident, including on your job?; (4) Did you ever have a life-threatening illness?; (5) As a child, were you ever badly beaten up by your parents or the people who raised you?; (6) Were you ever mugged, held up, or threatened with a weapon?; (7) Did someone very close to you ever die unexpectedly; for example, they were killed in an accident, murdered, committed suicide, or had a fatal heart attack at a young age?; (8) Did you ever have a son or daughter who had a life-threatening illness or injury?; (9) Did anyone very close to you ever have an extremely traumatic experience, like being kidnapped, tortured or raped?; (10) Did you ever do something that accidentally led to the serious injury or death of another person?; (11) Did you ever on purpose either seriously injure, torture, or kill another person?; (12) Did you ever experience any other extremely traumatic or life-threatening event that I haven't asked about yet?; (13) Did you ever have a traumatic event that you didn't report because you didn't want to talk about it?

WHO Intimate Partner Violence Measure

Women were initially assigned to one of three hierarchically ordered categories: (1) No IPV; (2) Psychological IPV (without physical abuse, including jealous or angry if she talks to other men, frequent accusations of being unfaithful, does not permit meetings with female friends, limits contact with family, insists on knowing woman's whereabouts, humiliates her in front of others, threatens harm to her or someone close to her); and (3) Physical IPV with or without psychological IPV (any physical abuse including pushing, shaking, throwing items, slapping, twisting arm; punching, kicking, dragging, strangling, burning, threats with a knife, gun or other weapon, attacks with a knife, gun or other weapon). Considering the sample size and reliable estimates for IPV prevalence in a subgroup analysis, we assigned women to 2 categories: (1) no IPV or low respect or regard only; (2) severe psychological IPV and/or physical IPV.

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