

Article

Longitudinal association of intimate partner violence and depressive symptoms

Cynthia H Chuang MD MSc

Associate Professor of Medicine and Public Health Sciences, Division of General Internal Medicine, Penn State College of Medicine, Hershey, USA

Amanda L Cattoi MD

Family Medicine Resident, Altoona Regional Health System, Altoona, USA

Jennifer S McCall-Hosenfeld MD MSc

Associate Professor of Medicine and Public Health Sciences, Division of General Internal Medicine, Penn State College of Medicine, Hershey, USA

Fabian Camacho MS

Senior Instructor

Anne-Marie Dyer MS

Biostatistician/Scientific Coordinator

Department of Public Health Sciences, Penn State College of Medicine, Hershey, USA

Carol S Weisman PhD

Distinguished Professor of Public Health Sciences and Obstetrics and Gynaecology, Departments of Public Health Sciences and Obstetrics and Gynecology, Penn State College of Medicine, Hershey, USA

ABSTRACT

Purpose The association between intimate partner violence (IPV) and depression has been well established in cross-sectional research, but how IPV is associated with depressive symptoms over time has not been well studied.

Methods Using the Central Pennsylvania Women's Health Study, a population-based longitudinal survey of women aged 18–45 ($N = 1,420$), we performed a two-step logistic regression analysis. In step 1, the association of recent IPV exposure at baseline with depressive symptoms 2 years later was analysed adjusting for relevant covariates; in step 2, we additionally included positive coping strategies (social support, physical activity) and negative coping strategies (binge drinking/drug use, smoking) in the model.

Results Baseline IPV was reported by 4.6 percent of the sample and was independently associated with depressive symptoms 2 years later (adjusted OR 1.88, 95% confidence interval [CI] 1.02–3.45). The strongest predictor was depressive symptoms

at baseline, which was associated with a fivefold increase in the likelihood of depressive symptoms at 2-year follow-up. Other predictors of future depressive symptoms were IPV at follow-up, older age, lower educational attainment, and lower household income. When we controlled for potential coping strategies in the model (step 2), the relationship between recent IPV and follow-up depressive symptoms was attenuated (adjusted OR 1.50, 95% CI 0.80–2.80).

Conclusions Exposure to IPV increases the likelihood of depressive symptoms occurring two years later. Greater social support and binge drinking/drug use attenuates this association, suggesting that interventions focusing on coping mechanisms may serve to reduce the impact of IPV on future depression.

Keywords: depression, depressive symptoms, domestic violence, intimate partner violence

Introduction

Intimate partner violence (IPV) is defined by the Centers for Disease Control and Prevention as 'physical, sexual, or psychological harm by a current or former partner or spouse'.¹ It has been estimated that as many as 60% of American women experience IPV at some point in their lives² and that over one-quarter of all intimate relationships involve at least one episode of partner abuse.³ In addition to physical injury, IPV has been associated with mental health problems, including depression. While the association of IPV and depression has been observed repeatedly in cross-sectional studies,^{2,4-9} how exposure to IPV impacts the development of depressive symptoms in the future has not been well studied. Exploring the longitudinal association of IPV with depression may help us better understand the long-term consequences of IPV. Additionally, discovering whether individual coping mechanisms can attenuate or exacerbate depressive symptoms in women experiencing IPV could direct the development of interventions aimed at reducing the mental health sequelae of IPV.

Although IPV has been linked to adverse effects on women's mental health and well-being, it is not yet clear how the correlation develops and which factor initiates the cycle. The association observed between IPV and depression in cross-sectional studies does not indicate whether IPV is causative of depressive symptoms, or if women with depressive symptoms are more likely to become involved in abusive relationships. Longitudinal data are needed to better understand the association between IPV and depressive symptoms over time. However, the limited longitudinal research that has been published has, for the most part, focused upon high-risk populations, such as women in domestic violence shelters, accident and emergency departments or referred for mental health services, rather than population-based samples. Studies that involve treatment-seeking individuals have generally reported a decline in depressive symptoms and anxiety over time.¹⁰⁻¹³ These findings may represent attenuation of depressive symptoms as women leave abusive relationships and seek care, and may not reflect the evolution of depressive symptoms in a community-based sample. To our knowledge, Zlotnick and colleagues have published the only longitudinal study of IPV and psychological functioning that uses a community-based sample of women.¹⁴ In that study, IPV at wave 1 of the National Survey of Families and Households was associated with depressive symptoms at wave 2 (conducted at 5 years) when controlling for age and depression at wave 1. Although that study provides evidence of the

longitudinal effects of IPV and depressive symptoms in a community sample, it was limited by a focus on married women, physical IPV only and did not consider the effect of ongoing IPV.

Previous research suggests that coping mechanisms may, to some extent, explain why some women experiencing IPV develop mental health outcomes, whereas others do not. For example, spiritual well-being and social support have been associated with lower levels of psychological distress in low-income, African American women experiencing IPV.¹⁵⁻¹⁷ Abused women who reported lower levels of social support were more likely to be depressed than women reporting high levels of social support in analysis of Behavioral Risk Factor Surveillance System.¹⁸ Social support has also been shown to be associated with reduced risk for poor mental health outcomes among women experiencing IPV recruited from family practice clinics.¹⁹ Similarly, physical activity may serve as a positive coping mechanism.^{18,20} However, adverse health-related behaviours, such as alcohol abuse, drug use and smoking^{21,22} may serve as negative IPV coping mechanisms. To our knowledge, the role of these positive and negative coping mechanisms in the longitudinal development of depressive symptoms among IPV survivors has not been studied.

Using a unique longitudinal cohort of adult women, we studied the effect of recent IPV on depressive symptoms over a 2-year follow-up period. We hypothesise that experiencing IPV increases the likelihood of future depressive symptoms, even after controlling for baseline depressive symptoms and ongoing IPV exposure. We further hypothesise that positive coping mechanisms, such as greater social support, will decrease the likelihood of depressive symptoms longitudinally, while negative coping mechanisms – such as binge drinking/drug use, smoking, and physical inactivity – will increase the likelihood of depressive symptoms longitudinally.

Methods

Study design and sample

The data source for this project is the Central Pennsylvania Women's Health Study (CePAWHS) which included a longitudinal population-based cohort study of women of reproductive-age living in Central Pennsylvania. The CePAWHS longitudinal survey provided information to estimate the prevalence of multiple risk factors for adverse pregnancy outcomes in a reproductive-age population and assessed how these risks changed over time and

were related to pregnancy and other health outcomes.²³ The Institutional Review Board at the Penn State College of Medicine approved the study protocol.

The baseline CePAWHS survey was a random-digit dial telephone survey of 2,002 English- or Spanish-speaking women aged 18–45, residing in a 28-county region of Central Pennsylvania. The survey was conducted by the Penn State Survey Research Center from September 2004 to March 2005 and resulted in a response rate of 52% and a co-operation rate of 63%. The final sample was highly representative of the target population on key demographics (age, race/ethnicity, educational level and income). Details of the sampling design, survey implementation and response rate have been published elsewhere.²³ At the time of the baseline survey, 90% of participants consented to follow-up contacts and a 2-year follow-up telephone survey was completed, with a response rate of 79% (1,420 participants). The major reason for loss to follow-up was a failure to locate women who had changed residence. Comparisons of those who did and did not respond to the follow-up survey indicated that women who were older (aged 35–45 at baseline), college educated, married or partnered, not in poverty and non-Hispanic white were more likely to respond to the follow-up survey.

Definition of variables

The primary outcome variable was depressive symptoms at the time of the 2-year follow-up survey. Depressive symptoms were measured at both baseline and follow-up using a six-item scale assessing the frequency of symptoms in the past week, based on the Center for Epidemiologic Studies Depression Scale.²⁴ The question read, 'I am going to read you a list of ways you might have felt or behaved recently. How often have you felt this way during the past week – never, rarely, some of the time, or most of the time?'. The list of items were 'I felt depressed', 'My sleep was restless', 'I enjoyed life', 'I had crying spells', 'I felt sad' and 'I felt that people disliked me'. The dichotomised scale score has been validated in surveys of women and has been shown to differentiate between higher risk (score ≥ 4) and lower risk (score < 4) for psychological distress, particularly depression.²⁵

IPV exposure was measured at both baseline and follow-up using an eight-item scale from the 1998 Commonwealth Fund Survey of Women's Health.²⁶ The question read, 'Domestic violence affects many women's lives. In the past 12 months, has a spouse, partner, or boyfriend: threatened to hit you or throw something at you? Thrown something at you?

Pushed, grabbed, shoved, or slapped you? Kicked, bit, or hit you with a fist or some other object? Beaten you up? Choked you? Forced you to have sex against your will? Threatened you with a knife or gun?'. Each item was coded yes or no, and there were no missing data on these items. Women were categorised as having experienced IPV in the past year if they responded 'yes' to any of these eight items. The primary independent variable was IPV reported at baseline; IPV reported at follow-up was included in the analysis as a covariate indicating continued exposure to IPV.

Additional variables included positive coping mechanisms (social support, physical activity) and negative coping mechanisms (binge drinking/drug use, smoking). Social support was measured with an eight-question subset from the original 19-question Medical Outcomes Study Social Support Survey; the eight questions included two from each of four types of social support: tangible, affectionate, emotional and interaction.²⁷ The scale score is a summated rating of the eight responses dichotomised at the median to indicate higher or lower social support. Physical activity was defined as engaging in moderate or strenuous exercise for at least 30 minutes on most days of the week, consistent with prevailing guidelines for recommended physical activity at the time.²⁸ Binge drinking was defined as having had five or more drinks on a single occasion in the past month, and drug use was defined as any illicit drug use in the past month. Binge drinking and illicit drug use were combined into one measure due to the relatively low prevalence of illicit drug use reported (2.6%). Smoking was defined as current cigarette smoking.

Other covariates included sociodemographic characteristics: age group (18–24, 25–34, 35–45), race/ethnicity (white non-Hispanic vs. other), education (high school or less, at least some college), marital status (married, living with partner or not partnered) and annual household income (< \$30,000; \$30,000–44,999; \$45,000–64,999; \$65,000 or more; or missing income data). These covariates, which were all measured at baseline, were included due to the known association of these sociodemographic characteristics with depression.^{29–31}

Statistical analyses

Frequencies of the study variables are presented. Bivariate tests of association between the independent variables (IPV at baseline and covariates) and depressive symptoms at 2-year follow-up were calculated using χ^2 statistics. The longitudinal relationship between recent IPV at baseline and depressive symptoms at 2-year follow-up was analysed using a

two-step multivariable logistic regression model. In step 1, we modelled the effect of IPV at baseline on depressive symptoms at follow-up, adjusting for depressive symptoms at baseline, IPV at follow-up, and sociodemographic characteristics. In step 2, we additionally included variables that were hypothesised to be either positive or negative coping mechanisms for women experiencing IPV. To test whether the longitudinal relationship between IPV and depressive symptoms was attenuated or exacerbated by these positive and/or negative coping mechanisms, we performed step 2 in which we additionally included the coping mechanisms (social support, physical activity, binge drinking/drug use and smoking) in the model. Analyses were conducted using SAS software, Version 9.0 (SAS Institute Inc., Cary, NC, USA).

Results

Table 1 shows the characteristics of the 1420 women participating in the CePAWHS longitudinal cohort. IPV exposure in the past year was reported at baseline by 4.6% ($n = 65$) of the study sample, which is similar to reports of IPV prevalence in the past year in national samples.³² The most common types of IPV reported were 'threatened to hit you or throw something at you' (3%) and 'pushed, grabbed, shoved, or slapped you' (3%). The least prevalent type of IPV reported was 'threatened you with a knife or gun' (0.2%). The prevalence of sexual IPV was 0.8%. Baseline IPV was more likely in women who had higher baseline depressive symptoms, were younger, were not married, had less social support, reported binge drinking/drug use and were smoking. Women reporting IPV at baseline were significantly more likely to also report IPV at follow-up.

Depressive symptoms were reported by a similar proportion of women at both the baseline and 2-year follow-up surveys (19.5% and 19.6%, respectively). Of the women reporting baseline IPV, 43.1% reported follow-up depressive symptoms, compared with 18.5% of women who reported no baseline IPV ($P < 0.01$). Table 1 describes the prevalence of depressive symptoms at the 2-year follow-up survey. Variables with statistically significant associations with depressive symptoms at follow-up included IPV at baseline, depressive symptoms at baseline, IPV at follow-up, non-white race, lower educational status, not married, lower household income, lower social support, physical inactivity, binge drinking/drug use and smoking.

Table 2 shows the results of the two-step multiple logistic regression analysis. In step 1, baseline IPV

had a significant independent effect on depressive symptoms at follow-up (adjusted OR 1.88, 95% CI 1.02–3.45). Depressive symptoms at follow-up were most strongly predicted by depressive symptoms at baseline (adjusted OR 5.16, 95% CI 3.78–7.03). Other statistically significant predictors of depressive symptoms at follow-up were IPV at follow-up, older age, less education and lower income. When the positive and negative coping variables were included in step 2, the relationship between baseline IPV and follow-up depression was attenuated and no longer statistically significant (adjusted OR 1.50, 95% CI 0.80–2.80). Greater social support significantly reduced the odds of depressive symptoms at follow-up, while binge drinking/drug use increased the odds of depressive symptoms at follow-up. Significant effects of follow-up IPV and baseline depressive symptoms remained.

Discussion

Our findings demonstrate an association between IPV and future depressive symptoms in a community-based, longitudinal survey of reproductive-age women. Women exposed to recent IPV at the baseline survey were almost twice as likely to report depressive symptoms at 2-year follow-up, after controlling for depressive symptoms at baseline, continued IPV exposure at follow-up and other potential confounding variables. These findings suggest that women experiencing IPV are at risk for future depression independent of whether or not the IPV is ongoing. Previous studies have shown decreasing depressive symptoms over time after IPV among women seeking care,^{10–13} but our findings show the opposite trend in a population-based sample of women. This suggests that the evolution of depressive symptoms may be quite different for the subset of women experiencing IPV who seek care, compared with a general population of women experiencing IPV.

We found that greater social support reduced the odds of depression at follow-up, while an indicator of negative coping – binge drinking or drug use – was associated with significantly higher odds of depression at follow-up. These findings suggest that women with greater social support and who avoid negative health behaviours may be less likely to experience depressive symptoms over time. The implications of these results include the importance of counselling to reduce negative coping behaviours and to increase use of social support systems in women who have been exposed to IPV.

Table 1 Participant characteristics shown for the total sample, stratified by baseline IPV and by follow-up depressive symptoms, $N = 1,420$

	Total sample (%) $N = 1,420$	Baseline IPV (%)			Follow-up depressive symptoms (%)		
		Yes $N = 65$ (4.6%)	No $N = 1,355$ (95.4%)	P^a	Yes $N = 277$ (19.5%)	No $N = 1,140$ (80.4%)	P^b
Baseline IPV	4.6	–	–	–	10.1	3.3	< 0.01
Baseline depressive symptoms	19.5	44.6	18.3	< 0.01	47.5	12.7	< 0.01
Follow-up IPV	5.2	30.8	4.0	< 0.01	13.0	3.3	< 0.01
Age group (years)				< 0.01			0.56
18–24	11.4	26.2	10.7		9.7	11.8	
25–34	36.8	44.6	36.4		36.3	36.9	
35–45	51.9	29.2	53.0		54.0	51.3	
Race				0.06			0.02
White	92.2	86.2	92.5		88.8	93.1	
Non-white	7.8	13.9	7.5		11.2	6.9	
Education				0.26			< 0.01
High school or less	36.5	43.1	36.2		52.2	32.5	
At least some college	63.5	56.9	63.8		47.8	67.5	
Marital status							
Married	70.5	43.1	71.8	< 0.01	62.6	72.5	< 0.01
Living with partner	9.9	23.1	9.3		14.4	8.8	
Not partnered	19.5	33.9	18.9		23.0	18.7	
Income				0.13			< 0.01
< \$30,000	17.8	23.1	17.5		27.0	15.4	
\$30,000–44,999	19.1	23.1	18.9		23.0	18.2	
\$45,000–64,999	22.8	21.5	22.8		21.6	23.1	
≥ \$65,000	29.9	16.9	30.6		16.6	33.3	
Missing income data	10.5	15.4	10.3		11.9	10.1	
Greater social support	52.6	29.7	53.8	< 0.01	29.1	58.5	< 0.01
Physically active	20.5	13.9	20.8	0.17	13.7	22.2	< 0.01
Binge drinking and drug use	14.9	30.8	14.1	< 0.01	22.3	13.1	< 0.01
Smoking	22.1	38.5	21.3	< 0.01	36.5	18.5	< 0.01

^a P -value for chi-square test comparing participant characteristics by baseline IPV. ^b P -value for chi-square test comparing participant characteristics by follow-up depressive symptoms.

The main strengths of this study are use of longitudinal data to observe the effect of IPV on depressive symptoms over time, and the use of a population-based sample in contrast with shelter- or clinic-based samples. Additionally, we measured a range of types of IPV and were not limited to

physical abuse. Our study has limitations to consider. First, it is possible in studies of this type that IPV is under-reported due to denial or embarrassment. Second, the extent to which IPV predisposes to future depression is likely influenced by whether or not IPV exposure is ongoing. Controlling for

Table 2 Logistic regression modeling baseline IPV on follow-up depressive symptoms, without (step 1) and with (step 2) coping variables

	Adjusted odds of follow-up depressive symptoms Adjusted OR (95% CI)	
	Step 1 (without coping variables) ^a N = 1,405	Step 2 (with coping variables) ^b N = 1,404
Baseline IPV	1.88 (1.02–3.45)*	1.50 (0.80–2.80)
Baseline depressive symptoms	5.16 (3.78–7.03)*	4.49 (3.25–6.20)*
Follow-up IPV	2.32 (1.33–4.05)*	1.91 (1.08–3.36)*
Age group (years)		
18–24	Reference	Reference
25–34	1.72 (0.99–2.98)	1.69 (0.96–2.96)
35–45	2.23 (1.30–3.84)*	2.08 (1.19–3.62)*
Race		
White	Reference	Reference
Non-white	1.21 (0.73–2.01)	1.23 (0.73–2.07)
Education		
High school or less	1.97 (1.45–2.68)*	1.91 (1.39–2.63)*
Some college or more	Reference	Reference
Marital status		
Married	Reference	Reference
Living with partner	1.55 (0.97–2.46)	1.41 (0.87–2.31)
Not partnered	1.34 (0.90–2.00)	1.15 (0.76–1.73)
Income		
< \$30,000	2.00 (1.24–3.24)*	1.64 (0.99–2.70)
\$30,001–44,999	1.81 (1.14–2.88)*	1.59 (0.98–2.58)
\$45,000–64,999	1.59 (1.02–2.50)*	1.45 (0.91–2.30)
≥ \$65,000	Reference	Reference
Missing income data	1.85 (1.06–3.23)*	1.94 (1.09–3.46)*
Greater social support	–	0.38 (0.27–0.52)*
Physically active	–	0.71 (0.47–1.07)
Binge drinking and drug use	–	1.56 (1.05–2.32)*
Smoking	–	1.41 (0.99–1.99)

* $P < 0.05$. ^a The step 1 model is adjusted for baseline depressive symptoms, follow-up IPV, age group, race, education, marital status and income. ^b The step 2 model is adjusted for baseline depressive symptoms, follow-up IPV, age group, race, education, marital status, income, greater social support, physically active, binge drinking and drug use, and smoking.

follow-up IPV in our analysis partially addresses this, but we were not able to distinguish between women who reported continuous IPV from the same partner at both time points and women who may have experienced new exposure to IPV (from a different partner) during the study period. Moreover, type of IPV (physical vs. sexual) may be relevant to depression risk in IPV,¹⁸ which we were unable to

explore due to sample size limitations. Future studies should consider IPV duration, type and intensity, as well as measures of childhood adverse events. Finally, although our sample was highly representative of the underlying Central Pennsylvania population of reproductive age, our findings may not be generalisable to other populations or age groups.

The CePAWHS survey provided a unique opportunity to study the longitudinal impact of IPV in reproductive-age women in the general population, and our findings demonstrated that IPV exposure was associated with increased risk for depressive symptoms 2 years later, controlling for baseline depressive symptoms and recent IPV victimisation. Additionally, we identified that social support and avoidance of binge drinking/drug use attenuated the association between IPV and depressive symptoms over time. In 2011, the Institute of Medicine recommended screening all women for interpersonal and domestic violence.³³ Routine screening would increase the opportunity to identify women with IPV and the associated long-term mental health sequelae. Until screening for IPV is universally adopted, primary care providers need to be alerted to the association between IPV and depression, and screen women presenting with depression for IPV.³⁴ Evidence-based interventions that can effectively attenuate the negative physical and mental health outcomes for women who experience IPV are needed. Our findings suggest that interventions should focus on fostering positive coping mechanisms, such as tapping social support networks, and on avoiding negative coping behaviours, to reduce longer-term mental health problems in reproductive-age women exposed to IPV.

ETHICAL APPROVAL

The Institutional Review Board at the Penn State College of Medicine approved the study protocol.

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CONFLICTS OF INTEREST

The authors do not have any conflicts of interest to report.

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ADDRESS FOR CORRESPONDENCE

CH Chuang, Division of General Internal Medicine, 500 University Drive, HO34, Penn State College of Medicine, Hershey, PA 17033 USA; Tel.: +1 717 531 8161; Fax: +1 717 531 7726; email: cchuang@hmc.psu.edu

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