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Triple jeopardy: impact of partner violence perpetration, mental health and substance use on perceived unmet need for mental health care among men

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Abstract

Objectives—To examine the relationship between intimate partner violence (IPV) perpetration, serious mental illness, and substance use and perceived unmet need for mental health treatment in the past year among men in the general population using the behavioral model for health-care use (Aday and Anderson in *Health Serv Res* 9:208–220, 1974; Andersen in *A behavioral model of families' use of health services*, 1968; Andersen in *Med Care* 46:647–653, 2008).

Methods—Non-Hispanic black, Hispanic, and non-Hispanic white males aged 18–49 years and cohabiting with a spouse/partner were included in this analysis of the 2002 National Survey on Drug Use and Health. Adjusted odds ratios (AOR) and 95% confidence intervals (CI) were calculated using logistic regression.

Results—The proportion of men reporting unmet treatment need was greater among IPV perpetrators than nonperpetrators (12.1 vs. 3.4%, respectively). Hazardous drinking, illicit drug use, alcohol and drug abuse/dependence, and SMI were also more common among perpetrators. Perpetrators were twice as likely to report unmet need for treatment after taking predisposing, enabling, and need factors into account (AOR 2.00, CI 1.13–3.55). Alcohol abuse/dependence (AOR 2.96, CI 1.79–4.90), drug abuse/dependence (AOR, 1.79, CI 1.01–3.17), substance abuse treatment (AOR 3.09, CI 1.18–8.09), and SMI (AOR 8.46, CI 5.53–12.94) were independently associated with perceived unmet need for treatment.

Conclusions—These findings suggest that men who perpetrate IPV are at increased risk of perceived unmet need for mental health care. This study also emphasizes the need to identify substance use disorders and mental health problems among IPV perpetrators identified in health, social service, or criminal justice settings. Further research should address barriers to care specific to men who perpetrate IPV beyond economic factors.

Keywords

Partner abuse; Mental health; Health services need; Substance abuse

Introduction

Intimate partner violence (IPV) impacts the mental as well as the physical health of both women and men. While the majority of health services research has focused on women victims [4,5], issues of public health and clinical importance associated with the perpetration of IPV among men also require our attention. Mental health problems have been associated with IPV perpetration in a number of cross-sectional studies, including depressive symptomatology, anxiety, hostility, borderline personality, antisocial personality disorder, psychotic-like experiences, posttraumatic stress disorder, suicidality, and impulsive behaviors including impulsive violence [6–13]. At least two studies suggest that premarital or early life (<20 years of age) onset of mental disorders predict IPV perpetration among men [14,15]. For example, Kessler et al. [14] found that premarital mood disorders, general anxiety disorders, antisocial behavior, and nonaffective psychosis each predicted IPV perpetration among married or cohabiting men in the US general population.

While not all perpetrators have mental health disorders, studies of batterer typologies [16,17] suggest that men who perpetrate moderate to severe IPV but little outside violence (dysphoric or borderline group) and those with moderate to severe levels of marital violence and the highest levels of nonfamily violence (generally violent and antisocial batterers) are most likely to have borderline personality characteristics or antisocial personality disorder, respectively. Those with the lowest levels of marital violence and the least violence outside the home (family-only batterers) are likely to have little or no psychopathology.

Substance use, particularly alcohol, also has been identified as one of the major risk factors associated with IPV perpetration. General population surveys as well as clinic-based studies have provided substantial evidence linking IPV perpetration by men to heavy or hazardous drinking [18], alcohol problems or problem drinking [19,20], and dependence-related symptoms [21,22]. The relationship between IPV and other drug use has been less studied, but the evidence suggests that illicit drug use is greater among men who perpetrate IPV [19,23].

Given the known relationships between IPV and mental health and substance use, it is remarkable that the link between these factors and mental health treatment utilization is yet to be explored in the extant literature. Prior studies have demonstrated an association between cooccurring mental health and substance use disorders and increased mental health service utilization [24,25] as well as perceived unmet need for mental health treatment [26], but few studies have specifically examined IPV perpetration and mental health service utilization [27,28]. Defining the extent and nature of unmet need for mental health treatment among IPV perpetrators would be a first step toward developing and testing effective prevention and intervention efforts. Population-based studies are essential to include individuals in the general population who may not access services and to provide generalizability to study findings.

Perceived unmet need for treatment can be conceptualized using the behavioral model for health-care use developed by Anderson and Aday [1–3]. This model has been adapted to explore substance abuse treatment as well [29–31]. The behavioral model takes into account three constellations of factors: predisposing (demographics, health beliefs, social structure); enabling (individual, family, and community resources that influence access to or utilization

of services); and need (perceived and evaluated health) factors. The main components of the behavioral model can be readily implemented using the National Survey on Drug Use and Health (NSDUH: [32]), providing a unique opportunity to examine these factors among the general population in the USA.

On the basis of the extant literature on IPV perpetration and the broader literature on mental health treatment utilization, we hypothesized that men who perpetrate IPV are more likely than those who do not perpetrate IPV to report unmet need for mental health treatment. The current study seeks to address the present gaps in literature by examining the relationship between IPV perpetration, mental health, and substance use and perceived unmet need for mental health treatment in the past year among men in the general population. The implications of the study findings are also discussed.

Materials and methods

Study design and setting

The sample was drawn from the 2002 NSDUH public use file [33]. The NSDUH is a cross-sectional survey conducted each year by the Substance Abuse and Mental Health Services Administration. The survey methodology has been reported elsewhere [32]. Briefly, data are obtained from a representative sample of the noninstitutionalized civilian population of the USA through face-to-face interviews at their place of residence employing computer-assisted administration of the questionnaire. Youths (aged 12–17 years) and young adults (aged 18–25 years) were oversampled, but oversampling of racial/ethnic groups was not conducted. The study yielded a weighted screening response rate of 91% and a weighted interview response rate for the computer-assisted interview of 79%. The overall weighted response rate, defined as the product of the two response rates, was 71.3%. The NSDUH response rate is comparable to other national surveys, such as the National Comorbidity Survey Replication [34] and the 1995 National Alcohol Survey [35]. Missing data in NSDUH were imputed and recoded for core variables (substance use), but imputation for missing data generally was not conducted prior to the recoding of noncore variables. Imputed or recoded variables were utilized where provided to produce estimates. This study was approved by the Institutional Review Board at the University of Washington.

Participants

Non-Hispanic black, non-Hispanic white, and Hispanic (of any race) married or cohabiting male respondents aged 18–49 years of age were included in the current analysis. The study sample was restricted to these racial/ethnic groups given the small numbers of individuals who identified otherwise and to married/cohabiting individuals due to the study design (see “Measures” below). The age range was restricted given the substantial decline in IPV victimization in the older age groups [36]. The total sample size for this analysis was 6,273.

Measures

The outcome measure was the perceived unmet need for mental health treatment in the previous year. Respondents were asked “During the past 12 months, was there any time when you needed mental health treatment or counseling for yourself but didn’t get it?”

IPV perpetration in the previous 12 months was the primary exposure measure. Only subjects who were married or cohabiting with a partner (gender not determined) at the time of survey were asked a single question regarding perpetration, “How many times during the past 12 months did you hit or threaten to hit your spouse or partner?” Possible responses included 0, 1 or 2, a few, or many times. The measure was dichotomized (yes/no), since

96% of men reported no perpetration and the majority (71%) of those reporting perpetration stated that it occurred one or two times.

Predisposing factors—Predisposing factors included sociodemographic factors: self-identified race and Hispanic ethnicity (non-Hispanic white, non-Hispanic black, and Hispanic of any race); age group; education level; and employment status [in the past week, employed (full time or part time) or unemployed (looking for work, other/not in workforce, disabled, keeping house full time, in school/training, retired, some other reason)].

Enabling factors—Enabling factors included marital status, annual household income, current health insurance type, and social support. Social support is defined as the number of friends: (1) the respondent shares personal issues and concerns with; (2) the respondent spends time with on shared interests and activities; and (3) who really like and care about the respondent. The original responses were: none, one, two or three, four to five, and more than five; the three sets of responses were combined and recoded as 0–1, 2–3, and 4 or more.

Need factors—Substance misuse may negatively impact mental health status [37] as well as mental health service utilization [26,38], and thus may contribute to ‘need’ for mental health treatment [39]. Alcohol measures included (1) five or more drinks per occasion in the past 30 days (‘binge drinking’); (2) five or more drinks per occasion on each of 5 or more days in the past 30 days (‘heavy drinking’); and (3) alcohol abuse or dependence disorders (AUD). Other drug measures included (1) illicit drug use in the previous 12 months, and (2) illicit drug abuse or dependence disorders based on the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV: [40]). Abuse and dependence were identified using questions based on and defined by the criteria listed in the DSM-IV [40]. The questions on abuse asked about problems at work, home, and school; problems with family or friends; physical danger; and trouble with the law due to substances used. The questions on dependence asked about health, emotional problems, attempts to cut down on use, tolerance, withdrawal, and other symptoms associated with substances used. Substance abuse treatment may modify the effect of substance use on mental health treatment need, or may be an indicator of substance abuse severity, and is therefore included as a need factor. Substance abuse treatment was measured as having received treatment for use of alcohol or any drug in the past year at a specialty facility (i.e., a hospital, a residential rehabilitation facility as an in- or outpatient, or a mental health facility).

Actual need for mental health treatment was measured as serious mental illness (SMI). SMI was based on data collected from a series of six questions (K6 scale) asking respondents how frequently they experienced symptoms of psychological distress during the 1 month in the previous year when they were at their worst emotionally [32]. The symptoms of distress are felt nervous, hopeless, restless or fidgety, so sad or depressed that nothing could cheer you up, everything was an effort, and no good or worthless. To score the items on the K6 scale, the items were first coded from 0 to 4 (‘none of the time’ to ‘all of the time’) and then summed to yield a score between 0 and 24. A cut point of 13 or greater was classified as SMI; this cut point was chosen to equalize false positives and false negatives. The development of the K6 scale was based on a study designed to evaluate several screening scales for measuring SMI in the NSDUH [41]. The most efficient screening scale, K6, had a sensitivity (SE) of 0.36 (0.08) and a specificity of 0.96 (0.02) in predicting SMI. This scale has been utilized and performed well in other surveys internationally [42–45].

Data analysis

Chi-square tests were used to compare IPV perpetration with predisposing, enabling, and need factors, and perceived unmet need for mental health care; *p* values of <0.05 were

considered to be significant. Logistic regression analyses were performed to examine the relationship between the outcome variable, perceived unmet need for treatment (0 = no 1 = yes), and the exposure variable, IPV perpetration; adjusted odds ratios (AOR) with 95% confidence intervals (CI) were computed. To be consistent with the conceptual model, predisposing, enabling, and need factors were considered sequentially. After IPV, all predisposing and enabling factors were entered as a block and retained in the model. Subsequently, each substance use factor was assessed separately in a forward step-wise method, starting with the most serious condition (e.g., abuse/dependence preceded heavy drinking) to determine the effect of specific levels of substance abuse; a factor was retained in the model if the Wald statistic p value was ≤ 0.10 . The remaining need factors, substance abuse treatment, and SMI were then entered into the model and retained. Analyses were conducted with the Software for Survey Data Analysis (SUDAAN; Research Triangle Institute, Research Triangle Park, NC, Version 10.0.1, 2009). SUDAAN takes into account the complex multistage sampling design to more accurately estimate the standard errors. The data were weighted to correct for the probability of selection into the sample, nonresponse, and to adjust the sample to known population distributions; percentages were reported as weighted and numbers as unweighted.

Results

Characteristics of study subjects

Overall, 4% of the sample reported perpetrating IPV at least once in the previous year, representing nearly 1.5 million cohabiting or married male perpetrators in the USA. All but one (education) of the predisposing and enabling factors examined were significantly associated with perpetration (Table 1). Black and Hispanic men were disproportionately represented among perpetrators. Younger age, unemployment, not currently married to cohabiting partner, lower income, and having no health insurance or government subsidized health insurance were positively and significantly associated with IPV perpetration. Similarly, all of the need factors were associated with perpetration, including risky drinking patterns, alcohol and drug abuse/dependence, substance abuse treatment, and SMI.

Perceived unmet need for mental health treatment

A greater proportion of perpetrators reported unmet need for treatment compared to nonperpetrators (12.1 and 3.4%, respectively). The odds of perceived unmet need were nearly four times greater among perpetrators than nonperpetrators (AOR = 3.85, CI 2.37–6.28) in the first model of the multivariable analysis, including only predisposing factors (Table 2). This estimate decreased but remained significant after further taking into account enabling factors (AOR = 3.22, CI 1.97–5.27) as well as need factors (AOR = 2.00, CI 1.13–3.55). In the final model, younger age (18–25 years), lack of health insurance, less social support, alcohol and other drug abuse/dependence, previous year substance abuse treatment, and SMI were also independently associated with perceived unmet need. Binge and heavy drinking as well as illicit drug use were not found to be independent predictors of perceived unmet need for mental health treatment after the inclusion of alcohol and other drug abuse/dependence, respectively.

Discussion

The most salient finding revealed in this study is that men who perpetrate IPV are more likely than nonperpetrators to perceive unmet need for mental health treatment. Although there are no studies to our knowledge with which to directly compare these findings, several potential explanations can be derived from related studies. First, social stigma likely surrounds IPV perpetration, as suggested by lower rates of reporting by men compared to

their partner reports [46]. This stigmatization may then act as a barrier to seeking care in addition to the stigma and discrimination surrounding violence and mental illness [47–49]. Fear of discovery surrounding IPV, then, may add to the burden of unmet need for mental health care. An alternative explanation is that men who commit IPV are less likely to seek care due to antisocial or other adverse personality traits. Impulsivity, for example, has been associated with the incidence of male-perpetrated IPV [50], and individuals with impulse control disorders (i.e., intermittent explosive disorder) have the lowest rates of mental health treatment utilization and minimally adequate treatment compared to those with other disorders [51]. Finally, it has been proposed that “masculinity ideology”, the male gender role (i.e., cultural norms and values regarding masculinity), and “gender role conflict” (negative consequences for men’s well-being of adopting particular masculinity ideologies), as well as the social context in which they are constructed, may play a role in underutilization of mental health services [52]. Given the greater potential for men who hold traditional male gender role beliefs, including attitudes condoning IPV, to perpetrate IPV [21,53,54], they may be more likely to underutilize mental health services even in the face of mental illness symptoms.

Another important aspect highlighted in the current study is the significant relationship between alcohol and other drug use disorders and perceived unmet need for mental health treatment. Although other studies have found co-occurring substance use and mental health disorders to be positively associated with mental health treatment utilization [24,25], there remains a substantial proportion (approximately 50%) of individuals with co-occurring disorders who do not access treatment [25]. Indeed, the Canadian Community Health Survey revealed that respondents with co-occurring substance use and mental health disorders were three times more likely (AOR = 3.25, CI: 1.96–5.37) to report unmet need for mental health treatment than those with substance dependence alone [26]. This is consistent with our findings that the odds of perceived unmet need were two to three times greater among men with drug or alcohol use disorders, respectively.

Lack of health insurance also contributed to perceived unmet need for mental health treatment. NSDUH respondents with no insurance were twice as likely to report unmet need compared to those with private insurance. This finding is supported by and large by prior studies [51,55,56]. For example, in the 2003 Joint Canada/United States Survey of Health [55], the odds of perceived unmet need for any mental health treatment was six times greater (AOR 6.1, CI 2.6–14.5) among US respondents without health insurance compared to their insured counterparts, after controlling for predisposing and enabling factors.

Further, ethnicity did not appear to be a factor in perceived unmet need for treatment in the current study. Contrary to our findings, other national surveys have consistently found ethnic disparities in mental health treatment [29,57–59]. This may be explained by methodologic differences between surveys. For example, the NSDUH employed a single question to assess perceived unmet need, while other surveys have utilized more specific measures, including timing, number of visits, and types of mental health service. Moreover, need may be informed by cultural factors not accounted for in the current study, such as perceptions of mental illness and competing needs [60–62].

Another finding of note in the current study is the relationship between IPV perpetration, substance misuse and mental health disorders, including risky drinking patterns, alcohol and drug abuse/dependence, and SMI. Perpetrators were two to three times more likely to use illicit drugs, abuse or be dependent on alcohol or other drugs, or have SMI. Our findings are consistent with a number of other studies, including clinical and forensic as well as population-based studies, demonstrating substantial risk of substance abuse and mental disorders among male perpetrators [11,14,19,21,23,63–65].

Implications

Taken together, the findings in this study call attention to the critical need for primary and secondary prevention efforts focused on IPV. That IPV perpetration was significantly associated with greater perceived unmet need for mental health treatment above and beyond mental health and substance abuse disorders is striking, given the strength of association between the latter factors and perceived unmet need. It is incumbent upon social and health services, then, to screen for IPV as well as mental health needs, including substance abuse, among men. Rhodes et al. [11,66] and others [54,67,68] have demonstrated that at least a small proportion of men are willing to disclose IPV and mental health problems in health-care settings. Innovative methods, such as computer-assisted screening, and other strategies that have been implemented for routine medical problems (e.g., chart prompts) also could be adapted for use in social service settings.

Another prime opportunity for screening and referral is in the judicial system. Male perpetrators identified through the courts and those in batterer treatment programs could be screened and provided parallel or integrated mental health treatment as appropriate. Researchers and practitioners have historically emphasized the need for integrating mental health treatment into batterer treatment programs [65,69,70]. Although efforts to screen and refer IPV perpetrators in batterer intervention programs for supplemental mental health treatment have been increasing, implementation has been hindered by substantial administrative and client obstacles [71]. Consequently, studies to date provide insufficient data to determine if these efforts have decreased IPV [71–73]. At least a few substance abuse treatment studies, however, suggest that IPV as well as substance abuse may decrease with substance abuse treatment [74,75]. Clearly, further studies examining the effectiveness of mental health treatment among perpetrators, as well as addressing the barriers to providing treatment, will better inform efforts to reduce mental health problems and partner violence.

Strengths and limitations

The main strength of this study is the use of population-based data. The majority of studies addressing the relationship between partner violence and health-care utilization have been clinic based or conducted among convenience samples, which introduces bias by including only those who access or are mandated to services. There are a number of limitations, however, associated with the NSDUH. First, only one question regarding perceived unmet need was employed in this survey, as previously discussed, which likely underestimates unmet need for mental health treatment. The validity of this survey item has not been tested to our knowledge, although it has been employed in previous studies [76–79]. While there is an association between perception of unmet need and actual need, estimates of perceived need do not always mirror that of actual/measured need for a variety of reasons [76]. As Mojtabai et al. [80] point out, "...perceptions of need differ between different stakeholders, and no one perspective can be said to be necessarily more accurate or true than another".

In addition, a single question measured IPV perpetration in the survey, which does not allow for a full assessment of IPV. This may explain, in part, the low prevalence of IPV perpetration in this survey compared to the majority of other national surveys [81]. In the National Couples Survey, however, men reported perpetrating partner violence in the range of 4–5% [46], comparable to the current study. Further, IPV was only assessed among married or cohabiting respondents. Men may also perpetrate IPV against a current noncohabiting or previous partner, and separation may increase the risk and severity of violence [82–84]. Prior studies assessing victimization among women, however, have found comparable rates of IPV among cohabiting/ married versus all respondents [85]. Overall, the

effect of these limitations may have biased the estimate of the association between IPV and perceived unmet need downward.

Second, sample size limited the analyses. The small number of respondents with SMI in the NSDUH limited the analytic strategy to controlling for SMI rather than restricting the analyses to only those with SMI. In addition, the measure of perceived unmet need for mental health treatment was assessed with only one question. While this measure took into account the perceived need of the respondent, it did not address the perceptions of individuals in the respondent's social networks or recommendations from health-care providers. The small number of respondents reporting perceived unmet need and the smaller sample size among blacks and Hispanics precluded ethnicspecific analyses. Important ethnic differences in IPV [86] and mental health-care utilization [58,59,87] have been revealed in previous studies.

Third, the NSDUH does not survey homeless or institutionalized persons who may have more severe mental health problems or IPV. The main aim of the study, however, was to assess need among the general population rather than those who access services. Finally, causality cannot be established due to the cross-sectional study design, with both the outcome and exposure of interest assessed for the previous 12 months.

Conclusions

This novel study highlights a substantial perceived unmet need for mental health treatment among men who perpetrate IPV in the US general population. It will be important in future research to conduct studies that oversample ethnic minorities to better elucidate the relationship between IPV and treatment need among ethnic minority men. Further investigation of the social and cultural factors that may interact with partner violence and mental health needs is also needed to clarify barriers to care, with regard to ethnic-specific factors as well as those related to gender roles.

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Table 1

Characteristics of male study participants by intimate partner violence (IPV) perpetration, National Survey on Drug Use and Health, 2002

Characteristic	IPV perpetrators (N = 323)		Nonperpetrators (N = 5,950)		χ^2	df	p
	% ^a	SE	% ^a	SE			
Predisposing factors							
Race					13.94	2	<0.01
Non-Hispanic black	17.4	2.7	9.9	0.6			
Hispanic	23.0	3.6	16.1	0.8			
Non-Hispanic white	59.7	3.9	74.0	0.9			
Age (years)					48.59	2	<0.01
18–25	21.6	2.3	9.6	0.3			
26–34	38.1	4.3	29.1	0.8			
35–49	40.3	4.2	61.4	0.9			
Education					2.60	2	0.08
<High school	23.2	3.2	16.6	0.7			
High school	28.9	3.3	33.5	0.9			
Any college	47.9	4.2	49.9	1.0			
Employment					5.28	1	<0.05
Unemployed	13.7	2.7	7.3	0.4			
Employed	86.3	2.7	92.8	0.4			
Enabling factors							
Marital status					22.12	1	<0.01
Separated/divorced/never married	39.4	3.8	19.5	0.8			
Married	60.6	3.8	80.5	0.8			
Annual household income					16.07	3	<0.01
<\$20,000	19.3	3.1	10.2	0.5			
\$20–39,000	28.5	3.3	21.6	0.8			
\$40–74,000	30.4	3.8	36.6	0.9			
≥\$75,000	21.9	3.9	31.6	0.9			
Health insurance					15.53	2	<0.01

Characteristic	IPV perpetrators (N = 323)		Nonperpetrators (N = 5,950)		χ^2	df	p
	% ^a	SE	% ^a	SE			
None	27.2	3.4	15.6	0.6			
Government subsidized	6.0	1.6	3.4	0.3			
Private/other	66.9	3.6	81.1	0.7			
Social support					5.27	2	<0.01
0–1 friend	14.8	2.6	11.0	0.6			
2–3 friends	40.9	4.0	30.6	0.9			
4+ friends	44.3	4.2	58.5	0.9			
Need factors							
Binge drinking	49.0	3.8	39.0	0.9	6.28	1	<0.05
Heavy alcohol use	17.8	2.9	11.5	0.6	4.56	1	<0.05
Alcohol abuse/dependence	28.7	3.4	11.4	0.5	20.69	1	<0.01
Any illicit drug use	46.5	4.1	18.1	0.7	35.22	1	<0.01
Drug abuse/dependence	15.3	2.9	3.2	0.3	15.19	1	<0.01
Substance abuse treatment	2.7	1.0	0.7	0.2	3.82	1	0.05
Serious mental illness ^b	16.8	2.8	5.0	0.4	16.22	1	<0.01

SE standard error

^aPercentages are weighted

^bSerious mental illness is defined by the K6 scale [31,40]

Table 2

Multivariable model of likelihood of perceived unmet need for mental health treatment among males

Variable	Model 1			Model 2			Model 3		
	Predisposing factors (N = 6,254)			Enabling factors (N = 6,254)			Need factors (N = 6,254)		
	AOR ^a	95% CI	p	AOR ^a	95% CI	p	AOR ^a	95% CI	p
IPV perpetration			<0.01			<0.01			<0.01
Yes	3.85	2.37–6.28		3.22	1.97–5.27		2.00	1.13–3.55	
No (reference)	1.00			1.00			1.00		
Race and ethnicity			0.35			<0.05			0.16
Non-Hispanic black	0.66	0.28–1.53		0.54	0.24–1.21		0.62	0.26–1.51	
Hispanic	0.68	0.35–1.31		0.47	0.24–0.92		0.55	0.28–1.08	
Non-Hispanic white (reference)	1.00			1.00			1.00		
Age (years)			0.96			0.21			0.12
18–25	0.99	0.64–1.53		0.66	0.39–1.11		0.56	0.32–0.97	
26–34	1.05	0.69–1.59		0.95	0.62–1.47		0.79	0.50–1.27	
35–49 (reference)	1.00			1.00			1.00		
Education			0.45			0.38			0.27
≤High school	1.17	0.78–1.74		0.83	0.54–1.26		0.79	0.51–1.21	
>High school (reference)	1.00			1.00			1.00		
Employment			<0.01			0.21			0.33
Unemployed	2.48	1.48–4.14		1.48	0.80–2.72		1.38	0.73–2.61	
Employed (reference)	1.00			1.00			1.00		
Marital status			...			0.11			0.86
Separated/divorced/never married	...	...		1.54	0.91–2.61		1.05	0.60–1.84	
Married (reference)	...	...		1.00			1.00		
Annual household income			...			0.39			0.57
<\$40,000	...	...		1.23	0.77–1.97		1.15	0.71–1.86	
≥\$40,000 (reference)	...	...		1.00			1.00		
Health insurance			...			<0.01			<0.01
None	...	...		2.52	1.42–4.44		2.22	1.27–3.88	

Variable	Model 1				Model 2				Model 3			
	Predisposing factors (N = 6,254)				Enabling factors (N = 6,254)				Need factors (N = 6,254)			
	AOR ^a	95% CI	p		AOR ^a	95% CI	p		AOR ^a	95% CI	p	
Government subsidized	...	...			2.29	1.00–5.26			1.13	0.43–2.92		
Private or other (reference)	...	...			1.00				1.00			
Social support			...				<0.05					<0.05
0–1 friend	...	...			2.23	1.21–4.12			2.05	1.12–3.75		
2–3 friends	...	...			1.49	0.97–2.29			1.47	0.93–2.32		
4+ friends (reference)	...	...			1.00				1.00			
Alcohol abuse or dependence			...				...					<0.01
Yes	...	...			...	...			2.96	1.79–4.90		
No (reference)	...	...			...	...			1.00			
Drug abuse or dependence			...				...					<0.05
Yes	...	...			...	...			1.79	1.01–3.17		
No (reference)	...	...			...	...			1.00			
Substance abuse treatment			...				...					<0.05
Yes	...	...			...	...			3.09	1.18–8.09		
No (reference)	...	...			...	...			1.00			
Serious mental illness ^b							...					<0.01
Yes	...	...			...	...			8.46	5.53–12.94		
No (reference)	...	...			...	...			1.00			

IPV intimate partner violence

^a Odds ratios were adjusted (AOR) for all variables with values listed. Variables with ellipses (...) in cells were not included in the model

^b Serious mental illness as defined by the K6 scale [31,40]