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PHYSICAL VIOLENCE AGAINST IMPOVERISHED WOMEN: A LONGITUDINAL ANALYSIS OF RISK AND PROTECTIVE FACTORS

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Violence represents a significant threat to the health of impoverished women. Few studies have examined what characteristics might be associated with increased risk of violence or protection from physical violence directed at such women, although this information is important in informing violence prevention and intervention efforts. This is the first study to our knowledge that has prospectively examined, in representative probability samples of impoverished women, multiple risk and protective factors to understand their relative importance to physical victimization. Study participants were 810 women in Los Angeles County, 402 in shelters and 408 in Section 8 low-income housing, who completed structured interviews at baseline and 6-month follow-up. Significant ($p < .05$) multivariate predictors of physical violence experienced during the 6 months prior to follow-up interview were physical or sexual violence experienced as a child, physical violence experienced during the 6 months prior to baseline interview, having multiple sexual partners, psychological distress, and poor social support. Results of this study highlight the persistence of physical violence in the lives of impoverished women and plausible, prospective risk factors for this violence. Findings also highlight opportunities to reduce women's risk of experiencing violence through enhancing women's social support and mental health.

Introduction and Background

Violence against women is a public health problem in the United States that has received increased attention from researchers and health care providers (Bell et al., 1994; Crowell & Burgess, 1996; U.S. Department of Health and Human Services, 1999). Violence is an especially significant health threat for impoverished women (Bassuk et al., 1996; Goodman, Dutton, & Harris, 1995). Prevalence rates of lifetime physical abuse by a male partner in samples of women receiving welfare have ranged from 28% to 63% (Tolman & Rosen, 2001). Recent work with probability samples of sheltered homeless and low-income housed women in Los Angeles County, California, found that 32% of sheltered and 13% of housed women had experienced physical violence and that 8% of sheltered and 7% of housed women had experienced sexual violence in the past year.

A national council commissioned by Congress under the 1994 Violence Against Women Act called for an increase in knowledge of violence against women with a special emphasis on the needs of traditionally underserved women (Crowell & Burgess, 1996). Further efforts to understand violence against impoverished women are important for developing prevention and intervention strategies appropriate for this population. Few studies have examined what characteristics might be associated with increased risk for or protection from victimization of impoverished women in particular, although this is precisely the kind of information that is needed to inform effective violence prevention and intervention efforts. Prospective studies have been called for to elucidate the causal direc-

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tions between assault and potential risk factors such as mental health problems and substance use (Burnam et al., 1988). Research into risk factors for violence against women continues to be necessary to inform efforts to prevent violence (Saltzman, Green, Marks, & Thacker, 2000).

Previous studies suggest possible risk and protective factors for violence against homeless and other impoverished women. A cross-sectional study identified three characteristics that deserve special consideration as potential risk factors for violence against homeless women and that proved significant in analyses: childhood experiences of abuse, severity of homelessness (i.e., having been homeless a greater number of times and having lived on the street), and subsistence strategies (i.e., receiving income from selling drugs or sex) (Wenzel, Leake, & Gelberg, 2001). That abusive experiences during childhood are associated with later risk for violence is perhaps the strongest and most consistent finding from the body of literature on violence against women. In a large survey of adult women reached through random-digit dialing in Washington state, childhood experiences of physical abuse were associated with recent physical violence by an intimate partner (Bensley, Van Eenwyk, & Wynkoop Simmons, 2003). This association has also been found in studies involving vulnerable women (Gilbert et al., 1997; Wenzel, Leake, and Gelberg, 2001). It has been suggested that childhood abuse may increase risk of later abuse through participation in high-risk activities such as substance use and prostitution (Simons, Whitbeck, & Bales, 1989; Wyatt, Guthrie, & Notgrass, 1992).

Regarding severity of homelessness or residential instability, the limited previous research has shown that women who have spent more time without a home, particularly in unsheltered living situations such as the street, have higher rates of victimization (Geissler et al., 1995; Wenzel, Leake, & Gelberg, 2000). Living in higher crime areas has been associated with victimization in general population studies (Rodgers & Roberts, 1995); subsistence services used by homeless and other impoverished persons (e.g., shelters and meal programs) are often located in higher crime areas. Residential instability and homelessness might therefore place one at direct risk of experiencing violence due to dangerous living conditions; however, it is also reasonable to consider these destabilizing situations as traumatic experiences that might make one more vulnerable to violence in the future. Being homeless has been viewed as a psychological trauma that can compound the impact of previous traumas such as violence (Goodman, Saxe, & Harvey, 1991). Previous research has not viewed homelessness or residential instability as a risk factor for future trauma in the form of physical violence. Because there are fewer opportunities for homeless and other impoverished women to support themselves and satisfy their basic needs through legitimate means, they may engage in subsistence activities, including trading sex for money and panhandling, that place them at risk of being victimized (Baumohl & Miller, 1984; Simons & Whitbeck, 1991; Whitbeck & Simons, 1990; Whitbeck & Simons, 1993). As noted earlier, cross-sectional research with impoverished women has found such activities to be associated with a higher probability of experiencing physical or sexual assault (Wenzel, Koegel, & Gelberg, 2000; Wenzel et al., 2001).

The literature suggests that other characteristics important to examine as risk or protective factors include substance use and abuse, mental health, characteristics of women's partners and partnerships, and social support. Problems with alcohol or illicit drugs may increase exposure to criminal environments and thus increase one's vulnerability to victimization (Alexander, 1996; Bennett, 1995; Sampson & Lauritsen, 1990). Previous cross-sectional studies have found a significant relationship between violence and substance problems among homeless men and women (Padgett & Struening, 1992; Stein & Gelberg, 1995; Wenzel, Leake, & Gelberg, 2000). In a recent cross-sectional study of minority women receiving care in inner-city emergency departments, abused women were more likely than nonabused women to have substance problems (El-Bassel et al., 2003). In one of the few longitudinal studies addressing violence against women, an examination of the association of women's substance problems and assault supports a bidirectional relationship, where drug use increases risk for later assault and assault increases risk of future alcohol abuse and drug use (Kilpatrick et al., 1997). Substance abuse or dependence may increase risk for later assault perhaps because the behaviors and impairment characteristic of the disorder increase one's vulnerability (Burnam et al., 1988; Nurius & Norris, 1996). Substance use may also increase the likelihood of victimization indirectly because of the settings in which substances are used or sold (Crowell & Burgess, 1996).

Although psychological distress and depression can result from assault experiences (Beitchman et al., 1992; Coker et al., 2003), evidence additionally suggests that poor mental health can be a risk factor for violence. Mental health problems may be associated with increased risk for victimization through a reduction in women's vigilance and because of an appearance of greater vulnerability to perpetrators (Burnam et al., 1988; Coverdale & Turbott, 2000; Gearon & Bellack, 1999; North, Smith, & Spitznagel, 1994). In a cross-sectional study of homeless persons specifically, psychiatric hospitalization during the lifetime was associated with physical assault among women (Kushel et al., 2003). Prospective studies examining the relation-

ship between mental health and later victimization among poor women are lacking.

Intimate partners are most commonly the perpetrators of violence against women (Krug et al., 2002), although characteristics of women's partners or partnerships have rarely been examined relative to other potential predictors of violence (Wenzel, Leake, and Gelberg, 2001). The company of men does not necessarily offer homeless women protection from assault in dangerous environments (Breton & Bunston, 1992; Browne & Bassuk, 1997; Fisher et al., 1995), and thus homeless women who are exposed to a greater number of different partners may be at higher risk of physical violence. In-depth interviews with women living in homeless shelters and low-income housing have revealed that episodes of partner violence often involve alcohol or drug use by both partners (Tucker et al., 2003). Among minority women in inner-city emergency departments, the majority reported that their most recent partner was under the influence of alcohol or drugs when the women were last victimized (El-Bassel et al., 2003). That partners' substance use would be associated with violence is consistent with a large literature on this topic (Eberle, 1982; Fals-Stewart, 2003; Kantor & Straus, 1989; Testa, Quigley, & Leonard, 2003).

Social isolation or infrequent contact with a social network is common among women enduring abusive relationships (Dobash & Dobash, 1998; El-Bassel et al., 2000). Violence may cause a woman to decrease and withdraw from her social contacts (Tan et al., 1995). Social support, however, may be important in reducing the risk of victimization. Women may utilize social support networks to help them end abusive relationships (Ulrich, 1998), and instrumental and material support from family or friends can assist women in these efforts (Bowker, 1984). Although women in battering relationships do not routinely view the social support they receive with satisfaction (El-Bassel et al., 2000), in a study of 390 low-income women in Baltimore who experienced physical or sexual violence during adulthood, family and friends were identified as the typical source of help when attempting to leave a violent relationship (O'Campo et al., 2002). Beneficial social relationships may additionally reduce risk of victimization by conferring protection in a harsh environment (Dutton et al., 1994).

Research conducted thus far has yielded important information on possible risk and protective factors for violence against impoverished women. To our knowledge, however, no study has yet examined multiple factors prospectively to understand their relative importance to victimization among impoverished women. Furthermore, very few studies have examined any of these potential risk or protective factors longitudinally in sizable probability samples of impoverished women. A prospective study is especially useful in attempting to resolve the temporal ambiguity surrounding the associations between violence and proposed risk and protective factors, where an association between a characteristic measured at one point in time and violence measured at a later time can be suggestive of a direct or indirect causal influence of that characteristic on violence. Probability sampling enables results to be generalized to the larger population from which a sample was drawn, thus carrying far-reaching implications for violence prevention in our communities. A more comprehensive, prospective investigation of risk and protective factors in representative probability samples of impoverished women would therefore better inform future prevention and intervention efforts to address violence against a highly vulnerable population of women. To understand risk and protective factors for violence, the present study relies on a unique, longitudinal dataset based on structured interviews conducted at two points in time with 810 impoverished women living in shelters and low-income housing.

Methods

Participants

Participants in this study were 810 women who completed both baseline and 6-month structured interviews in a larger study of 898 women in Los Angeles County (460 in shelters, 438 in low-income housing) that was sponsored by the National Institute on Drug Abuse (Wenzel, 1999). Eligible women were between the ages of 18 and 55, spoke and understood English, and did not have significant cognitive impairment. Individual computer-assisted face-to-face structured interviews were conducted by trained female interviewers and lasted approximately 1 to 1.5 hours. Women were paid $15 for their participation. The research protocol was approved by the RAND Institutional Review Board, and a Certificate of Confidentiality was obtained from the U.S. Department of Health and Human Services.

Study design

Sheltered women were sampled from facilities that had a majority of homeless residents, as reported by shelter directors. The shelter sample was drawn from 51 facilities: homeless emergency shelters, transitional living facilities, single room occupancy hotels, board-and-care facilities, rehabilitation facilities, mental health facilities, and HIV/AIDS transitional homes. Domestic violence shelters were excluded. Sheltered women were selected by means of a stratified random sample, with shelters serving as sampling strata. A proportionate-to-size (PPS) stratified random sample would have been overly burdensome on the larger shelters, so small departures were made from PPS and

corrected with design weights. The response rate was 87%.

Low-income housed women were sampled from Section 8 private, project-based HUD-subsidized apartments in the study area. To qualify for Section 8 housing, a person can make no more than 50% of the median income for Los Angeles County. We included all such apartment buildings within the study area that were reported by HUD to consist entirely of Section 8 project-based apartments not specifically designated to house elderly or disabled tenants. Housed women were drawn from 66 HUD Section 8 apartment buildings, with buildings serving as sampling strata. To sample units from a building we adopted the same sampling scheme used for the shelters. Once a unit was sampled from a building, we randomly sampled one woman resident within that unit. The response rate was 76%.

For each sheltered and housed woman who completed a baseline interview, we made a 3-month interim contact and then attempted a follow-up interview approximately 6 months after the baseline. The median length of time between baseline and follow-up interviews was 6.1 months (minimum = 3.3, maximum = 21). The second wave of data collection resulted in a loss of 88 cases due to attrition. The retention rate was 87% among sheltered women (n = 402) and 93% among housed women (n = 408). Additional details on this study's sampling are provided elsewhere (Elliott et al., 2003).

Measures

Physical violence was assessed with a series of behavior-based questions designed to elicit disclosure. Assessment of physical violence was based on the revised Conflict Tactics Scale (Straus, Boney-McCoy, & Sugarman, 1996). Women were asked at baseline and follow-up whether, during the past 6 months, something had been thrown at them that could hurt; had their arm or hair twisted in a hurtful way; had been pushed, shoved, or grabbed in a hurtful way; had been slapped; had been punched or hit with something that could hurt like a fist or object; had been choked; burned, or scalded on purpose; beaten up; kicked; bitten or scratched; slammed against the wall; or had a knife or gun used against them (including as a threat). All items were asked with reference to five groups of perpetrators: primary sexual partners; casual sexual partners; need-based sexual partners; family, friends, and acquaintances; and strangers. Primary partners were defined for the women as steady, like a husband or boyfriend; casual partners were defined as not steady but rather once-in-a-while or just for fun; need-based partners were defined as someone women had sex with because they needed money, food, a place to stay, drugs, or something else. A detailed accounting of rates of occurrence of the different types and perpetrators of physical violence is provided elsewhere (Wenzel et al., under review). Dichotomous variables were created to represent, at baseline and follow-up, whether any physical violence was perpetrated against women during the previous 6 months.

Women were also asked at baseline whether they had experienced any physical or sexual violence before the age of 18. Regarding sexual violence, we asked whether a parent or guardian ever touched their private parts in a sexual way, made them do something sexual to them, or made them have sex with them. Sex was defined for the women as vaginal ("regular," penis in vagina), oral (penis in mouth), or anal (penis in anus, "sex in the behind"). Women were also asked whether a parent or other adult ever did something else to them, like hit, kick, choke, burn, beat them up, use a knife or gun on them, or something like that. We developed these two dichotomous questions based on a synthesis of the past 6-month violence questions and our previous work (Wenzel, Leake, and Gelberg, 2000).

Women's substance use at baseline is represented by a three-level variable indicating whether the woman reported no use of alcohol to intoxication and no use of other drugs, use of either alcohol to intoxication or other drug use, and use of both alcohol to intoxication and other drugs during the past 6 months. Drugs that women were asked about were modified from the World Health Organization Composite International Diagnostic Interview Short-Form (CIDI-SF) (Kessler et al., 1998). Modifications were made to nicknames for drugs during the instrument pretesting phase of this study to make them more relevant to the women in Los Angeles. Women were also asked at baseline whether any of their primary sexual partners had used alcohol or any of the other drugs the women were asked about for the past 6-month time period. (Women were asked in the structured interview only about their primary partners' and not other partners' substance use during the past 6 months.)

Income from survival strategies was defined as that from panhandling; recycling cans or other items for cash; selling things on the street like food stamps, vouchers, bus passes, or merchandise; selling drugs; and selling sexual favors (Wenzel, Leake, and Gelberg, 2001). Frequency distributions supported creating a dichotomous variable to indicate whether women received any income from these sources during the previous month.

Psychological distress was assessed at baseline with the RAND Mental Health Inventory (MHI-5), which asks respondents to indicate how much of the time they experienced each of five symptoms of distress (Berwick et al., 1991; Padgett & Struening, 1992; Rubenstein et al., 1989). Responses are on a 6-point scale that range from "all of the time" to "none of the time." Cronbach's alpha of this scale computed for the

810 women in this study is .82. Mean-item scores were computed and linearly transformed to a 0 to 100 range. We created a dichotomous variable of distress based on previous work in which scores less than 66 have suggested high risk for mental health problems (Rubenstein et al., 1989).

Social support was assessed at baseline by four items from a scale originally developed for the RAND Medical Outcomes Study (Sherbourne & Stewart, 1991). This measure assesses how often at least one person has been available to provide informational, tangible, and emotional support (Sherbourne & Stewart, 1991). Response options range from "never" (a value of 1) to "always" (a value of 5). Cronbach's alpha in this study sample is .86. We measured the total number of different sexual partners (primary, casual, or need-based) women reported at baseline that they had during the previous 6 months. We developed a three-level variable based on these data to represent 0, 1, or 2 or more partners. We assessed participants' age, ethnicity, the number of times in their lifetimes they had stayed in a homeless setting (e.g., a mission, homeless shelter, indoor public place, street, or other outdoor setting) because they had no regular place to stay, and the total number of months they had spent in their lifetimes in a homeless setting (Koegel & Burnam, 1999). We dichotomized the number of times stayed in a homeless setting to represent one time versus no times.

Data analysis

Disproportionate sampling techniques and differential response rates at baseline required the use of design and nonresponse weights to represent the target population from the study sample of respondents. All analyses incorporate these weights and account for the modest design effect that they induce, using the linearization method (Skinner, Holt, & Smith, 1989). Given the low attrition rate at 6-month follow-up and that a pool of baseline variables was not predictive of attrition, additional attrition weights would not have improved estimation and thus were not calculated. All analyses utilizing baseline and follow-up data therefore employ the same combination of design weights and weights correcting for nonresponse at baseline.

To understand the potential influence of hypothesized risk and protective factors on whether a woman experienced physical violence at follow-up, we performed multivariate logistic regression. Candidate predictors for the regression model were those that achieved a bivariate association of $p < .10$ in the total sample. A final model additionally tested interactions of a woman's status as sheltered or housed to determine if the association of a predictor with violence at follow-up differed depending on whether a woman was in the sheltered or housed sample.

Only a small proportion of women completed the follow-up interview more than 12 months after baseline. Time between baseline and follow-up interviews, included as a covariate in regression analyses, was therefore capped at 12 months, and a variable indicating whether or not an interview was completed more than 12 months postbaseline was tested in each model and retained if significant.

Several candidate predictor variables (Table 1) were modified for bivariate or multivariate analyses (e.g., to address small cell sizes for categorical variables, to reduce redundancy among predictors). These modified variables (Tables 2 and 3) include the following: one dummy coded variable to indicate ethnicity, and two dummy coded variables to represent number of women's partners in lieu of an ordinal variable indicating total number of partners. The variables representing violence experienced before the age of 18 and women's and partners' use of alcohol and drugs were each tested for nonlinearity in their association with violence at follow-up. No evidence for nonlinearity was found in sheltered or housed women samples at $p < .05$. The primary partner variable was omitted due to collinearity with the total partner variable; other correlations among predictor variables revealed no evidence of collinearity. Having stayed in a homeless setting during the lifetime was omitted from consideration for regression models because of its strong correlation with number of months spent homeless. The indicators of substance use among women and their partners combined alcohol and use of other drugs. Apart from marijuana, use of illicit drugs such as cocaine, crack, amphetamines, and other nonalcohol substances occurred more rarely, particularly among the housed sample, thus limiting our ability to examine the unique effects of "hard" drug use.

Results

In terms of background characteristics of the sheltered and housed women who completed both the baseline and follow-up interviews (Table 1), the majority of women (61.7%) identified as Black or African-American (not Hispanic) and 23.2% of women identified as Hispanic or Latina. Of all women, 44.8% had previously stayed in a homeless setting in their lifetime (e.g., mission or homeless shelter, indoor public place, the street) because they had no regular place of their own to stay, and the women had spent just under 8 months homeless during their lifetime on average. Just over 30% of the women experienced physical or sexual abuse before the age of 18. Approximately 15% of women experienced physical violence during the 6 months prior to baseline interview and 6 months prior to follow-up interview. Forty percent of the women used either drugs or alcohol or both during the 6 months prior to baseline, and almost 30% of all

Table 1. Characteristics of 810 sheltered and low-income housed women who completed both baseline and 6-month follow-up interviews (weighted analyses)

Characteristics at Baseline[a]	Total Sample (%) (n = 810)[b]
Age (years)	
18–25	23.4
26–35	29.0
36–45	32.3
46–55	15.3
Ethnicity	
White, not Hispanic	9.9
Black, not Hispanic	61.7
Hispanic/Latina	23.2
Native American	1.0
Asian, Pacific Islander	1.8
Mixed or Other	2.4
Homeless history	
Interviewed in shelter (vs. housing)[b]	49.6
Ever stayed in a homeless setting due to having no regular place to stay	44.8
Number of months homeless in lifetime (mean, SD)	7.6 (22.9)
Violence	
Any physical or sexual abuse before age 18	
None	52.9
One	30.6
Both	16.5
Any physical violence past 6 months	15.0
Any physical violence 6 months prior to follow-up	15.6
Partnerships	
Any primary partners past 6 months	66.6
Total number of different partners past 6 months	
None	25.8
One	56.1
Two or more	18.1
Alcohol and drug use	
Any alcohol or drug use during the past 6 months	
None	60.3
One	27.1
Both	12.7
Any alcohol or drug use by a primary partner during the past 6 months	
None	72.4
One	17.6
Both	10.0
Any survival income	
past 30 days	8.8
Any psychological distress	
past month	44.9
Social support	
past 6 months (1–5 scale) (mean, SD)	4.1 (1.1)

[a]All characteristics were assessed at baseline except "Physical violence 6 months prior to follow-up."
[b]Percentage of women in the study sample who were interviewed in shelters (vs. low-income housing) at baseline is unweighted.

Table 2. Bivariate associations of physical violence at follow-up with candidate predictors assessed at baseline for 810 sheltered and low-income housed women who completed both baseline and 6-month follow-up interviews (weighted analyses)

Candidate Predictors (Assessed at Baseline) of Physical Violence Experienced 6 Months Prior to Follow-up	Odds ratio	95% CI
Age (years)	.89	.74, 1.08
Ethnicity		
Black (vs. all others)	.80	.54, 1.18
Homeless history		
Interviewed in shelter (vs. housing) at baseline	2.42*	1.64, 3.57
Number of months homeless in lifetime	1.01*	1.00, 1.01
Violence		
Any physical or sexual abuse before age 18	1.90*	1.48, 2.42
None		
One		
Both		
Any physical violence past 6 months	3.56*	2.27, 5.60
Partnerships		
No partner past 6 months (vs. 1 partner)	.66†	.41, 1.05
2 or more partners past 6 months (vs. 1 partner)	2.75*	1.80, 4.22
Alcohol and drug use		
Any alcohol or drug use during the past 6 months	1.44†	1.12, 1.87
None		
One		
Both		
Any alcohol or drug use by a primary partner during the past 6 months	1.42*	1.09, 1.85
None		
One		
Both		
Any survival income		
Past 30 days	1.26	.67, 2.37
Any psychological distress		
Past month	2.57*	1.73, 3.81
Social support		
past 6 months (1–5 scale)	.71*	.60, .84
Time interval	1.22*	1.10, 1.35
Months between baseline and follow-up interviews		

*$p < .05$.
†$p < .10$.

women had primary partners who did so. Just under 10% of women earned income from survival strategies during the 30-day period prior to their baseline interview. Almost 45% of women were at high risk for mental health problems based on MHI-5 scores. On a scale of 1 to 5 where 5 represents that support is always available, the women's average score was 4.1.

Table 2 presents bivariate associations of physical violence at follow-up with baseline variables evaluated as predictors. Physical violence reported at follow-up interview was positively and significantly ($p <$ .05) associated with being sheltered as opposed to housed at baseline, experiencing a greater number of months of homelessness during the lifetime, experience of violence during childhood, physical violence

Table 3. Results of multivariate logistic regression analysis to explain physical violence at 6-month follow-up among 810 sheltered and low-income housed women who completed both baseline and 6-month follow-up interviews (weighted analyses)

Predictors[a,b]	Odds ratio	95% CI
Number of months between baseline and follow-up interviews[c]	1.21*	1.08, 1.35
Any physical or sexual abuse before age 18	1.42†	1.07, 1.88
Any physical violence in 6 months prior to baseline	2.02*	1.18, 3.44
Months homeless in the lifetime	1.00	.99, 1.01
Interviewed in shelter (vs. housing)	1.24	.78, 1.96
No partner in 6 months prior to baseline (vs. 1 partner)	.69	.39, 1.20
2 or more partners in 6 months prior to baseline (vs. 1 partner)	1.80†	1.09, 2.97
Any alcohol or drug use in 6 months prior to baseline	.99	.72, 1.37
Any alcohol or drug use by a primary partner in 6 months prior to baseline	1.11	.80, 1.53
Any psychological distress in the month before baseline	1.86*	1.20, 2.87
Social support past 6 months (1–5 scale)	.81†	.67, .98

Model statistics: Wald chi-square = 75.3, $p < .001$; concordance statistic = .74.

*$p < .05$.

†$p < .01$.

[a]Selected for inclusion in model if associated with physical violence at follow-up at $p < .10$ in bivariate analyses; all predictor variables were assessed at baseline with the exception of months between baseline and follow-up interviews.

[b]A variable indicating whether an interview was completed more than 12 months postbaseline was tested in the model; it was not significant and therefore was not retained.

[c]Significant at $p < .05$ in interaction with being sheltered vs. housed at the time of baseline interview.

at baseline, having two or more partners (versus only one), alcohol or drug use by the woman and by the primary partner, risk of mental health problems, and a greater number of months between baseline and follow-up interviews. Physical violence at follow-up was negatively related to having no partners (versus one or more) at baseline and to having greater social support.

Results of logistic regression analyses are depicted in Table 3. The model achieved a good concordance level (74%), indicating that it accounted for a substantial amount of variance in experiences of physical violence measured at 6-month follow-up. Greater elapsed time between baseline and follow-up interviews, experience of childhood abuse, and physical violence reported at baseline were significantly associated with physical violence at follow-up. Physical violence at baseline was the strongest of the predictors in multivariate analyses; a woman who experienced physical violence at baseline had twice the odds of experiencing violence at follow-up. Being at risk for mental health problems at baseline also predicted risk for victimization at follow-up, as did having multiple partners as opposed to one partner. Social support at baseline was negatively associated with risk for victimization, such that women with poor support were more likely to experience physical violence at follow-up. Shelter versus housed status, time spent homeless, and substance use by women and partners were not associated with violence in the multivariate model. In tests of the interaction between each predictor and status as sheltered versus housed, only the interaction of shelter status with time between baseline and follow-up interviews was significant, such that being sheltered and having a longer interval between baseline and follow-up interviews was associated with greater risk of victimization at follow-up.

Discussion and Conclusions

The population of women represented in this study is disproportionately burdened by violence. According to the National Violence Against Women Survey (Tjaden & Thoennes, 2000), 3% of women surveyed in the general population reported being physically victimized in the previous year, compared to approximately 15% of this study's participants as reported for two separate, past 6-month periods assessed in baseline and 6-month follow-up interviews. Given that almost half of the women had also been victimized as children, this population faces a persistent risk of victimization.

Although a diverse array of potential risk factors emerged in bivariate analyses, multivariate modeling demonstrated that physical or sexual abuse during childhood, having two or more sexual partners as opposed to just one, experiencing psychological distress/risk for mental health problems prior to baseline interview, and reporting poor social support at baseline predicted the physical victimization of women at follow-up. That these factors emerged as predictors of physical violence against women at follow-up after controlling for baseline violence suggests that they play a role in the prospective risk for and persistence of physical violence in impoverished women's lives. To our knowledge, this is the first study of impoverished women that has been able to address what may be responsible for prospective risk and persistence of physical violence.

That childhood victimization was significant in understanding physical violence prospectively is consistent with the findings of a large body of research (Bensley et al., 2003; Gilbert et al., 1997; Simons et al., 1989; Wenzel, Leake, and Gelberg, 2001; Wyatt et al., 1992). As noted earlier, the association of abusive experiences during childhood with later risk for violence is perhaps the strongest and most consistent

finding from the literature addressing violence against women. With almost half of the women in this study reporting physical or sexual violence during childhood, the implications for prevention and intervention are urgent. Screening and interventions to interrupt the persistent course of violence in women's lives and to address the impact of violence are necessary (Bassuk et al., 1996; El-Bassel et al., 2000; El-Bassel et al., 2003; Wenzel et al., in press).

Having two or more partners at baseline was a risk factor for physical violence at follow-up, suggesting that partners may bear responsibility for perpetrating violence. Intimate partners are most commonly the perpetrators of violence against women (Krug et al., 2002). In a previous study that investigated perpetrators of violence against sheltered and housed women during a previous 6-month period (Wenzel et al., under review), we found that much of the physical violence experienced by women was perpetrated by a partner. This fact, and that abuse by husbands and partners ranks as the leading cause of injury to women of reproductive age (Garske, 1996), indicates that violence prevention and intervention efforts for indigent women should include a focus on intimate partner violence. Others have highlighted a need for more services for indigent women that focus on enhancing their safety (e.g., through safe, stable housing) and on supporting and promoting financial independence from abusive partners (O'Campo et al., 2002; Tucker et al., under review; Wenzel et al., in press).

An alternative explanation is that having multiple partners, as opposed to having just one partner, reflects more dating activity, which might indirectly increase risk for violence. Such women may frequent areas where exposure to violence from nonpartner sources is greater. Previous work shows that sheltered women in particular face the threat of violence from individuals in addition to partners, suggesting that violence against indigent women is a public health problem requiring broad-based interventions that address conflict in a variety of different interpersonal relationships (Wenzel et al., under review). Having multiple partners as opposed to just one may also reflect a higher-risk lifestyle.

The significance of poor mental health at baseline in predicting physical violence at follow-up contributes to a limited literature suggesting that mental health is a risk factor (Burnam et al., 1988; Coverdale & Turbott, 2000; Gearon & Bellack, 1999; North et al., 1994). Further, the prospective analyses in this study implicate poor mental health as important to the persistence of violence in indigent women's lives. Almost half of the women experienced psychological distress during the month before their baseline interview. We did not obtain extensive information on the mental health of study participants (e.g., psychiatric diagnoses); however, previous research has indicated that mental health problems are more common among indigent women, primarily because of numerous stressors that are associated with poverty (Bassuk et al., 1998; Bell et al., 1994). Mental health is therefore an area of concern within this population, yet impoverished and homeless women are less likely to receive appropriate care for mental health problems than other women (Miranda et al., 2003; Miranda & Green, 1999; Robertson & Winkleby, 1996). Findings of the current study point to the importance of providing appropriate mental health care for the purpose of enhancing women's safety. Good mental health may be a protective factor against revictimization.

It is important to note again that psychological distress can result from assaultive experiences (Beitchman et al., 1992; Coker et al., 2003), highlighting that the relationship between mental health and victimization is likely bidirectional. Although this detracts neither from the importance of our study's findings in understanding prospective risk for victimization nor in supporting causal inferences, it does point to a limitation in that the period of time under investigation in this study represents but a brief period in the complex and multifaceted lives of this population of indigent women.

Women with less social support were at greater risk of experiencing violence at follow-up. Social support has been shown to be important for health and quality of life (Friedland, Renwick, & McColl, 1996; Gielen et al., 2001) and, based on this study's findings, greater social support appeared to protect against experiencing further violence. Previous research has shown that social support may be important in reducing the risk of experiencing violence by helping women end abusive relationships (Bowker, 1984; O'Campo et al., 2002; Ulrich, 1998) and conferring protection or serving as a buffer against ongoing abuse (Dutton et al., 1994). A recent study of women in university clinic settings indicates that social and emotional support may enhance psychological well-being among women who have experienced physical violence from their partners, and that informal support including expressions of caring and encouragement from family, friends, and clinicians is beneficial (Coker et al., 2003). Although some research involving indigent women has found that social support received is not uniformly viewed with satisfaction (El-Bassel et al., 2000), enhancing indigent women's social support nevertheless deserves further study and holds promise as a protective factor against experiencing physical violence.

Finally, the time between completion of the baseline and follow-up interviews, included as a control variable, was a significant predictor of experiencing violence at follow-up. One possible explanation for this finding is that women who experienced more violence in their lives were harder to locate and thus interview at follow-up, perhaps due to residential instability or

inability or unwillingness to provide specific and extensive locator information at baseline. However, it is likely that instability might have increased risk of victimization. Although interviewers used a timeline with respondents, it is possible that women with longer intervals between interviews might have been referring during their follow-up interview to events that occurred prior to baseline, or otherwise to a period of time spanning longer than 6 months. This might have been especially likely if their prior experiences of violence were severe or traumatic.

That substance use was not a significant risk factor for violence at follow-up in multivariate analyses was unexpected given that the majority of previous research has supported an association. It is possible that combining alcohol and drug use in one indicator variable "diluted" potential unique effects of either drugs or alcohol on future violence. A cross-sectional study conducted with homeless women, however, did not find multivariate associations between physical violence and alcohol abuse and drug abuse evaluated separately in the model (Wenzel, Leake, and Gelberg, 2001). Previous research has differed from the present study in that it has not examined the association between substance use and violence prospectively, multivariately, and specifically among impoverished women.

As already noted, a limitation of the study is the relatively short period of time in women's lives that was examined prospectively. Dampening that limitation, however, is the fact that this is the first study to our knowledge to investigate prospective risk for violence among sheltered and low-income housed women. An additional limitation is that our conceptualization of risk focused largely on characteristics of the women and their experiences, with the exception of substance use of their partners. Although an evaluation of risk and protective factors for physical violence against indigent women would ideally include a more expansive investigation including physical and social environments, this study nevertheless represents an important step in understanding and furthering efforts to address a critical public health problem affecting indigent women.

This study highlights the persistence of physical violence in indigent women's lives and identifies plausible, prospective risk factors for violence. Study findings also highlight opportunities to reduce risk of experiencing violence through enhancing women's social support and mental health. These two characteristics are amenable to change and could be targeted with interventions. For example, the shelter setting may be especially appropriate for a group-based intervention to enhance social support and for providing ancillary services such as mental health counseling. Further, because findings of this study can be generalized to the larger population from which women were drawn, results therefore carry far-reaching implications for violence prevention and intervention in our communities.

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