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Authors

Tsai, Alexander C
Weiser, Sheri D
Dilworth, Samantha E
et al.

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Original Contribution

Violent Victimization, Mental Health, and Service Utilization Outcomes in a Cohort of Homeless and Unstably Housed Women Living With or at Risk of Becoming Infected With HIV

Alexander C. Tsai*, Sheri D. Weiser, Samantha E. Dilworth, Martha Shumway, and Elise D. Riley

* Correspondence to Dr. Alexander C. Tsai, Center for Global Health, Massachusetts General Hospital, 100 Cambridge Street, 15th Floor, Boston, MA 02114 (e-mail: actsai@partners.org).

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Most studies about the association between exposure to violence and higher psychological vulnerability have been cross-sectional in nature. Using longitudinal data from the Shelter, Health, and Drug Outcomes Among Women Study on 300 homeless or unstably housed women infected with or at risk of becoming infected with human immunodeficiency virus who were living in San Francisco, California, in 2008–2012, we examined the relationship between recent violent victimization and mental health status, mental health–related emergency department visits, and psychiatric hospitalization. We used generalized estimating equations to account for potentially confounding time-invariant and time-varying variables, including comorbid psychiatric conditions and lifetime history of child abuse. A total of 207 (69%) women experienced childhood abuse. The median number of psychiatric diagnoses per woman at baseline was 8 (interquartile range, 5–11). Recent exposure to violence was associated with lower mental health status ($b = -1.85$, 95% confidence interval: $-3.02, -0.68$) and higher risks of mental health–related emergency department visits (adjusted risk ratio = 2.96, 95% confidence interval: 1.51, 5.78) and psychiatric hospitalizations (adjusted risk ratio = 2.32, 95% confidence interval: 1.10, 4.91). We did not find strong evidence of a reciprocal relationship. Among homeless or unstably housed women with severe preexisting comorbid psychiatric conditions, recent violence has adverse mental health consequences. Reducing ongoing violence may improve mental health in this population.

depressive disorder; HIV; partner violence; quality of life; rape

Abbreviations: ED, emergency department; HIV, human immunodeficiency virus; MCS-12, Mental Component Summary.

Violence against women remains unacceptably common worldwide (1–5), especially among homeless and unstably housed persons (6, 7). Numerous cross-sectional studies have found an association between violent victimization and adverse reproductive (2, 8), health (9), and mental health–related (10–15) outcomes. However, few studies have used longitudinal data with repeated measurements of both violence and mental health–related outcomes (16, 17), which represents a critical omission in this literature.

Even fewer studies have been designed to determine the extent to which the association might be bidirectional (16, 18). This is an important gap in the literature because mental health problems might be a risk factor for subsequent

violence and abuse, as described conceptually by Foa et al. (19). For example, women with significant psychological distress might selectively affiliate (i.e., either unintentionally or subconsciously) with partners at greater risk of perpetrating violence (20), or the severity of their symptoms might compromise their ability to leave abusive relationships (21). Given the elevated prevalence of both violent victimization (12, 22, 23) and psychiatric disorders (24–26) among women living with or at risk of becoming infected with human immunodeficiency virus (HIV), we conducted the present study to better understand the mental health consequences of violent victimization in this vulnerable population. Specifically, we hypothesized that violent victimization would be

temporally associated with subsequent adverse mental health outcomes.

METHODS

Study population

We analyzed data from the Shelter, Health, and Drug Outcomes Among Women (SHADOW) Study, an observational cohort study of homeless and unstably housed women living in San Francisco, California. A mobile outreach team used probability sampling to recruit a cohort that reflected San Francisco's larger population of homeless and unstably housed women (27). Eligibility was limited to people who were biologically female, who were 18 years of age or older, and who had a history of housing instability (defined as having slept in a public place, in a shelter, or with other people because there was no other place to sleep ("couch surfed")). Screening procedures also included HIV antibody testing followed by a confirmatory Western blot (OraSure Technologies, Inc., Bethlehem, Pennsylvania). We oversampled HIV-positive women by having targeted recruitment on additional days in the same venues.

All participants provided written informed consent. On enrollment, participants were seen in a private space at a community-based field site for structured interviews. Each participant was interviewed at enrollment and every 6 months for up to 3 years. Questions about violent victimization were administered via audio computer-assisted self-interviewing, whereas all other questions were administered by interviewers. Participants were reimbursed \$15 for every interview completed. Ethical approval for all study procedures was obtained from the Committee on Human Research, University of California at San Francisco.

Measures

The primary outcomes of interest were mental health status, mental health–related emergency department (ED) visits, and psychiatric hospitalization. We measured mental health status using the Medical Outcomes Study 12-Item Short-Form Health Survey (28, 29) Mental Component Summary (MCS-12) score (28, 30–32). Mental health–related ED use was measured as a binary variable equal to unity if the participant reported any ED visits "related to a mental or emotional problem" in the 6 months before the interview. Psychiatric hospitalization was measured as a binary variable equal to unity if the participant reported any overnight hospitalization "related to a mental or emotional problem" in the 6 months before the interview.

Comorbid psychiatric conditions were assessed at baseline using a computerized version of the US National Institute of Mental Health Diagnostic Interview Schedule (33–35). The Diagnostic Interview Schedule can be used to assess the presence of up to 39 current mental disorders (Table 1) using diagnostic criteria established in the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (36). The frequent co-occurrence of mental disorders poses a formidable challenge for measurement (37). Therefore, following the procedures outlined by Filmer and Pritchett (38), we used principal

components analysis to determine the weights for an index of the psychiatric diagnoses. The index of psychiatric comorbidity was defined as the first principal component extracted from the principal components analysis. For ease of exposition, we sorted study participants into quintiles on the basis of their index values, with women in the highest quintile having the highest degree of psychiatric comorbidity, and included this in the regression models as a categorical variable.

The primary explanatory variable of interest was exposure to emotional, physical, or sexual violence in the 6 months before the interview. To encourage greater disclosure about experiences of violence and abuse (39, 40), we used a modified version of the Conflict Tactics Scale (41, 42) and asked participants questions about 13 specific acts of emotional, physical, and sexual partner violence (Web Table 1, available at <http://aje.oxfordjournals.org/>). Participants were also asked whether during childhood they had ever experienced any of the 13 acts of emotional, physical, or sexual abuse by "any relative, guardian, or other adult."

We adjusted our estimates of the mental health effects of violent victimization for potentially confounding demographic, psychosocial, and clinical variables, as well as for baseline mental health status. Baseline (time-fixed) variables included in the regression models were age, race, educational level, marital status, and HIV serostatus. There were 5 incident cases of HIV infection observed during the study period; given the small number of incident cases, HIV serostatus was treated as a time-fixed variable. We additionally adjusted for history of abuse as a child (43) and the index of psychiatric comorbidity described above, 2 key potential confounders that have been relatively ignored in prior work (16, 44). We also included several time-varying variables (45): a binary indicator of housing instability, defined as any nights spent on the street or in a shelter in the 6 months before the study visit; any unmet subsistence needs, defined as insufficient access to food, clothing, a restroom, a place to wash, or a place to sleep (46); perceived instrumental social support, measured by asking participants whether they knew someone who could provide them with money or a place to sleep (22); number of confidantes, defined as close women friends the participant could entrust with personal matters; and number of chronic conditions. The index of chronic conditions was based on questions about whether participants had, in the 6 months before the study visit, experienced symptoms or seen a health care provider for one of 5 different chronic conditions: heart disease, high blood pressure, diabetes, emphysema, or asthma.

The conduct of all interviews was consistent with ethical and safety recommendations promulgated by the World Health Organization (47). Namely, all research assistants were trained on how to administer surveys for gathering sensitive information, and they provided assurances of confidentiality. The survey was framed generally as an investigation into the health and life experiences of women with unstable housing, not as a study about violence and abuse against women. Research assistants provided informal referrals to local counseling resources as needed and whenever requested. Standardized protocols to obtain emergency services in cases of acute psychological distress were in place, but during the study period there was only 1 case in which these emergency services were used.

Table 1. Baseline Characteristics of Homeless or Unstably Housed Women Living With or at Risk of Becoming Infected With HIV in San Francisco, California ($n=300$), Shelter, Health, and Drug Outcomes Among Women Study, 2008–2010

Variable	Median (IQR)	No.	%
Mental health status (MCS-12 score) ^a	39 (33–50)		
Any mental health–related ED visit in the previous 6 months ^b		25	8
Any psychiatric hospitalization in the previous 6 months ^b		25	8
Any physical, sexual, or emotional violence in the previous 6 months		175	58
Age, years	48 (42–53)		
Race			
White		90	30
Black		130	43
Other		80	27
Educational level			
Less than high school		104	35
Completed high school		100	33
More than high school		96	32
Married		46	15
HIV-positive serostatus		152	51
Any nights homeless in the previous 6 months		147	49
Any unmet subsistence needs (food, clothing, housing, or hygiene needs) in the previous 6 months		148	49
Perceived instrumental support (money or a place to sleep when needed)		237	79

Table continues

Statistical analysis

Because of the repeated-measures study design with up to 7 observations per participant over 3 years, we used the method of generalized estimating equations (48, 49) to model the marginal expectation of mental health status as a function of violent victimization within the previous 6 months and the covariates listed above. We adopted the generalized estimating equations assumption of missingness completely at random. We also disaggregated the primary explanatory variable into its separate components of emotional, physical, and sexual violence and then fitted a fourth multivariable regression model that included all 3 variables simultaneously. The gaussian distribution was assumed for the MCS-12 score, with an identity link function between the outcome variable and linear predictor. For the binary utilization outcomes, the Poisson distribution was assumed with a log link so that the exponentiated regression coefficients could be interpreted as risk ratios (50, 51). For all models, we selected an exchangeable working correlation structure. To guard against potential misspecification, we used robust estimates of variance (52, 53). All tests of statistical significance were 2-sided.

To assess the extent to which there might be a reciprocal association between violent victimization and mental health

Table 1. Continued

Variable	Median (IQR)	No.	%
No. of confidantes			
0		52	17
1		81	27
≥ 2		167	56
No. of chronic medical conditions ^c	1 (0–2)		
Physical, sexual, or emotional abuse during childhood ^d		207	69
No. of DSM-IV psychiatric diagnoses ^{e,f}	8 (5–11)		

Abbreviations: DSM-IV, *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*; ED, emergency department; HIV, human immunodeficiency virus; IQR, interquartile range; MCS-12, Medical Outcomes Study 12-Item Short Form Health Survey Mental Component Summary.

^a Six missing values.

^b One missing value.

^c Heart disease, high blood pressure, diabetes, emphysema, or asthma.

^d Two missing values.

^e Nine missing values.

^f There were 39 possible diagnoses: anxiety disorders (panic attack, specific phobia, social phobia, agoraphobia, generalized anxiety disorder, and posttraumatic stress disorder), mood disorders (major depressive episode, dysthymia, hypomanic episode, and manic episode), psychotic disorders (schizophrenia and schizophreniform disorder), substance use disorders (withdrawal, abuse, and/or dependence associated with alcohol, amphetamines, cocaine, opiates, and sedatives; abuse and/or dependence associated with hallucinogens, inhalants, marijuana, and phencyclidine; and dependence associated with any other substances), somatization disorder, pain disorder, and dementia.

problems, we re-fitted similar generalized estimating equation regression models to predict violent victimization as a function of 6-month-lagged mental health status or mental health care use. These regression models were adjusted for baseline history of victimization during adulthood but otherwise followed the same specifications as described above.

RESULTS

Characteristics of the sample

A total of 148 HIV-negative and 152 HIV-positive women were recruited into the study between June 2008 and November 2010. Summary statistics are described in Table 1. At baseline, the median MCS-12 score was 39 (interquartile range, 33–50), indicating a level of mental health lower than that of the US general population and comparable to that reported in studies of persons with advanced HIV disease (54, 55). A total of 191 women (64%) were diagnosed with major depressive disorder, 149 women (50%) were diagnosed with posttraumatic stress disorder, and 246 women (82%) were diagnosed with a substance use disorder. In total, the median number of diagnoses identified per study participant was 8 (interquartile range, 5–11), according to criteria from the

Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition.

Twenty-one women (7%) reported a history of any emotional, physical, or sexual violence during childhood only; 46 women (15%) reported a history of violence during adulthood but not during childhood; and 186 women (62%) reported a history of violence during both childhood and adulthood. One hundred seventy-five women (58%) reported that they had been victimized in the 6 months before baseline. There was substantial overlap in the different types of violence reported (Figure 1). Of the 82 women who reported physical violence, only 4 (5%) reported physical violence alone, and of the 27 women who reported sexual violence, only 2 (7%) reported sexual violence alone. In contrast, of the 168 women who reported emotional violence, 85 (51%) reported emotional violence alone.

After enrollment, study participants were followed for a median of 2.9 years, with a total of 684 person-years of follow-up. The last remaining study participants were interviewed in April 2012. Sixty-five women were ultimately unenrolled from the study: 17 (6%) died, whereas 48 (16%) moved from the area, were lost to follow-up, withdrew consent, or were terminated (e.g., because of assaultive/threatening behavior or inability to give informed consent because of cognitive impairment). Women who were unenrolled from the study had similar baseline rates of child abuse (69% vs. 70%; $\chi^2 = 0.02$, $P = 0.89$), victimization during adulthood before study entry (75% vs. 79%; $\chi^2 = 0.38$, $P = 0.54$), and baseline MCS-12 scores (40.4 vs. 40.6; $t = 0.13$, $P = 0.90$) compared with the women who were retained until the study's conclusion.

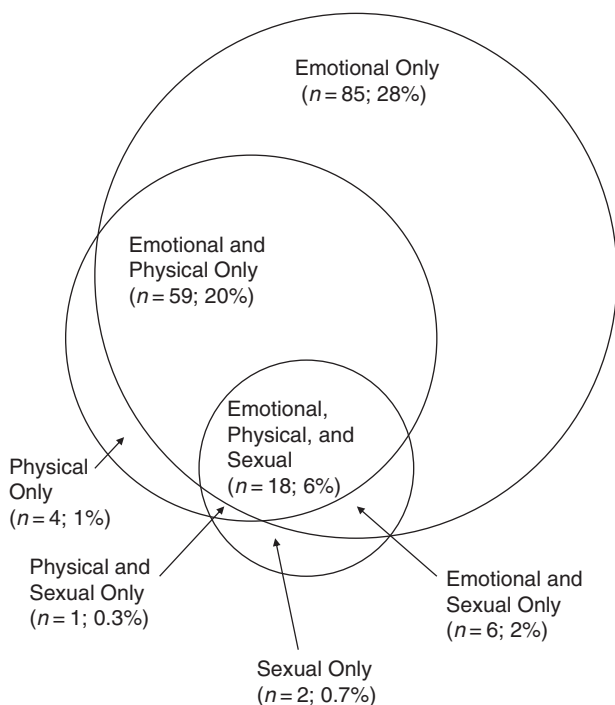


Figure 1. Overlap in exposures to physical, sexual, and emotional violence in the 6 months before baseline among homeless and unstably housed women living in San Francisco, California ($n = 300$), Shelter, Health, and Drug Outcomes Among Women Study, 2008–2010.

Victimization and subsequent mental health–related outcomes

During the follow-up period, 231 women (77%) reported violent victimization at any time point, including 31 of 43 women (72%) who had reported no history of abuse (either during adulthood or during childhood) before study entry. Results from bivariate analyses are presented in Web Table 2. After multivariable adjustment, victimization was associated with lower subsequent mental health status ($b = -1.85$, 95% CI: -3.02 , -0.68), as well as higher risks of mental health–related ED visits (adjusted risk ratio = 2.96, 95% CI: 1.51, 5.78) and psychiatric hospitalization (adjusted risk ratio = 2.32, 95% CI: 1.10, 4.91) (Table 2). When the exposure was disaggregated into the 3 different types of violence mutually adjusted for each other, only physical violence ($b = -2.47$, 95% CI: -4.13 , -0.82) and emotional violence ($b = -1.48$, 95% CI: -2.66 , -0.29) had statistically significant associations with mental health status. Similarly, only emotional violence was associated with higher risks of mental health–related ED visits (adjusted risk ratio = 2.24, 95% CI: 1.14, 4.41). Emotional violence was also associated with a higher risk of psychiatric hospitalization, but the estimate was not statistically significant (adjusted risk ratio = 1.96, 95% CI: 0.86, 4.49). Across all outcomes, alternate specifications of psychiatric comorbidity did not yield qualitatively different findings (Web Table 3).

Mental health and subsequent victimization

We reversed the temporal ordering of the exposures and outcomes and then re-fitted similar generalized estimating equation regression models to predict victimization as a function of 6-month-lagged mental health status or mental health care use (after adjustment for covariates and baseline history of victimization). Strong evidence of a reciprocal association was not found, because these estimates were not statistically significant (Table 3).

DISCUSSION

In the present longitudinal study of 300 homeless and unstably housed women living with or at risk for HIV followed over 3 years in San Francisco, we found that violent victimization was highly prevalent and was associated with adverse changes in subsequent mental health status and mental health care utilization. The estimated associations were robust to statistical adjustment for psychiatric comorbidity and history of child abuse, which is noteworthy given the high level of preexisting psychiatric comorbidity and abuse in this vulnerable population. Our findings therefore indicate that, even for women struggling with adverse conditions and social forces that conspire to undermine their overall wellbeing, additional exposure to recent violent victimization continues to have important mental health consequences. Furthermore, the mental health consequences of physical and emotional violence were generally comparable to each other and greater than that of sexual violence. We did not find strong evidence of a reciprocal relationship. These findings have important implications for policy and program development for vulnerable women in the United States.

Table 2. Multivariable-Adjusted Associations Between Violence in the Previous 6 Months and Mental Health-Related Outcomes Among Homeless or Unstably Housed Women Living With or at Risk of Becoming Infected With HIV in San Francisco, California (*n* = 300), Shelter, Health, and Drug Outcomes Among Women Study, 2008–2010

Variable	MCS-12 Score		Mental Health-Related ED Visit		Psychiatric Hospitalization	
	<i>b</i>	95% CI	ARR	95% CI	ARR	95% CI
Any physical, sexual, or emotional violence in the previous 6 months	-1.85	-3.02, -0.68	2.96	1.51, 5.78	2.32	1.10, 4.91
Baseline mental health status (MCS-12 score)	0.55	0.48, 0.62				
Mental health-related ED visit in the 6 months before baseline interview			2.74	1.29, 5.81		
Psychiatric hospitalization in the 6 months before baseline interview					4.39	1.77, 10.8
Age (per 5 years)	0.24	-0.29, 0.76	1.02	0.85, 1.21	1.09	0.84, 1.41
Race						
White	Referent		Referent		Referent	
Black	2.47	0.48, 4.45	0.64	0.30, 1.35	0.43	0.20, 0.92
Other	2.35	0.15–4.55	1.14	0.56, 2.33	0.92	0.40, 2.14
Educational level						
Less than high school	Referent		Referent		Referent	
Completed high school	1.13	-0.76, 3.03	0.61	0.26, 1.44	1.38	0.54, 3.51
More than high school	0.18	-1.70, 2.07	0.83	0.41, 1.66	0.75	0.31, 1.78
Married	2.16	0.12, 4.21	0.59	0.25, 1.40	0.87	0.32, 2.42
HIV-positive serostatus	-0.35	-1.89, 1.20	0.90	0.50, 1.61	0.98	0.47, 2.07
Any nights homeless in the previous 6 months	-0.65	-2.12, 0.83	1.56	0.92, 2.62	2.26	1.16, 4.41
Any unmet subsistence needs (food, clothing, housing, or hygiene needs) in the previous 6 months	-1.18	-2.46, 0.10	1.62	0.89, 2.96	2.44	1.13, 5.28
Perceived instrumental support (money or a place to sleep when needed)	2.63	1.00, 4.25	0.72	0.38, 1.38	1.11	0.47, 2.61
No. of confidantes						
0	Referent		Referent		Referent	
1	0.15	-1.59, 1.90	0.97	0.49, 1.89	1.17	0.43, 3.16
≥2	1.68	-0.02, 3.38	0.72	0.38, 1.39	0.86	0.33, 2.24
No. of chronic medical conditions ^a	-0.87	-1.37, -0.38	1.03	0.83, 1.29	0.98	0.75, 1.26
Physical, sexual, or emotional abuse during childhood	0.77	-0.98, 2.53	0.85	0.42, 1.70	1.13	0.42, 3.01
Duration of follow-up (per month)	0.02	-0.02, 0.06	1.00	0.98, 1.02	1.01	0.98, 1.04
Psychiatric comorbidity index						
Quintile 1 (lowest burden)	Referent		Referent		Referent	
Quintile 2	1.50	-1.13, 4.13	0.96	0.31, 3.02	1.65	0.41, 6.71
Quintile 3	-3.02	-5.76, -0.28	1.50	0.54, 4.19	1.57	0.42, 5.87
Quintile 4	-2.84	-5.35, -0.33	1.10	0.36, 3.37	1.55	0.36, 6.71
Quintile 5 (highest burden)	-2.69	-5.32, -0.05	0.84	0.30, 2.35	1.24	0.29, 5.28

Abbreviations: ARR, adjusted risk ratio; *b*, estimated regression coefficient; CI, confidence interval; ED, emergency department; HIV, human immunodeficiency virus; MCS-12, Medical Outcomes Study 12-Item Short Form Health Survey Mental Component Summary.

^a Heart disease, high blood pressure, diabetes, emphysema, or asthma.

The high rate of violent victimization observed in our sample was consistent with that found in prior work (22, 23, 56). Several findings were particularly notable. First, as has been

reported previously among homeless and unstably housed women (12), we found that victimization was extremely common. By the end of the study, more than three-quarters of

Table 3. Multivariable-Adjusted Associations Between Current Mental Health Status or Mental Health Care Utilization in the Previous 6 Months and Subsequent Risk of Victimization Among Homeless or Unstably Housed Women Living With or at Risk of Becoming Infected With HIV in San Francisco, California ($n = 300$), Shelter, Health, and Drug Outcomes Among Women Study, 2008–2010

Variable	Any Physical, Sexual, or Emotional Violence in the Subsequent 6 Months	
	ARR	95% CI
Current mental health status (MCS-12 score) ^a	0.96	0.91, 1.01
Mental health–related ED visit in the previous 6 months ^a	0.93	0.76, 1.13
Psychiatric hospitalization in the previous 6 months ^a	1.03	0.83, 1.28

Abbreviations: ARR, adjusted risk ratio; CI, confidence interval; ED, emergency department; MCS-12, Medical Outcomes Study 12-Item Short Form Health Survey Mental Component Summary.

^a All regression models adjusted for baseline history of victimization during adulthood, as well as the explanatory variables listed in Table 2.

study participants reported having been victimized at some point during the 3-year follow-up period. Second, revictimization was also common. More than two-thirds of participants reported a history of any emotional, physical, or sexual abuse during childhood; among those who did not, one-half had been victimized during adulthood before study entry. One finding that diverged from findings of previous work (57) was the lack of a significant association between HIV status and mental health, likely because of the study design, which limited the population to homeless and unstably housed women, and the well-known fact that factors associated with homelessness, including violence and mental illness, increase the risk of HIV infection (24, 58). Taken together, these findings point toward a need for effective violence prevention strategies in this vulnerable population regardless of HIV status, especially secondary prevention strategies for survivors of violence.

The observed association between violent victimization and poor mental health–related outcomes is well known and has been described in several systematic reviews and meta-analyses (10, 11, 16, 18). However, our analysis of data from a cohort with a high level of psychiatric comorbidity makes 2 important contributions to this literature. First, we adjusted our estimates for detailed data on participants' current psychiatric comorbidity burdens and their lifetime histories of child abuse, which might have confounded the associations estimated in previous analyses. Our use of principal components analysis to adjust for participants' complex psychiatric comorbidity burdens solves an important conundrum in this literature (37). The first principal component is intuitively understood as the linear combination that captures that largest amount of information that is common to all of the 39 diagnostic variables listed in Table 1. Women with higher values of the psychiatric comorbidity index have a greater overall level of psychiatric comorbidity than do women with lower values of the index, but otherwise the absolute value of the index does not have meaning.

Second, we measured exposure to not only physical and sexual violence but also emotional violence. In the recent systematic review and meta-analysis of longitudinal studies by Devries et al. (16), emotional violence was not included. This is an important gap in the literature, given that physical and sexual violence are frequently embedded within an overall pattern of controlling behavior (59). It is also an important gap in light of the finding that emotional violence was associated with twice the risk of future mental health–related ED visits. Similar to Dunkle et al. (60), we found extensive overlap between the different types of violence while also noting that one-half of women who reported emotional violence reported emotional violence alone. The estimated regression coefficients suggested that the mental health consequences of emotional and physical violence were generally comparable to each other and were greater than those of sexual violence. These findings are consistent with those from previous studies that suggested that emotional abuse might have debilitating mental health consequences that are at least comparable to those of physical or sexual abuse (61–63).

Notably, our findings suggest that the association runs in one direction only, from violent victimization to subsequent declines in mental health status and increased risks for mental health care use. It is important to recognize that, even though we—along with other researchers who have contributed to this literature (64, 65)—were able to ensure a temporal ordering between victimization and subsequent mental health–related outcomes, an unobserved variable preceding both exposure and outcome (such as neighborhood disorder and disadvantage (66–69)) could have confounded the estimated associations. However, it is important to note that the repeated-measures design of our study was able to capture short-term fluctuations in the exposures and outcomes. We believe it unlikely that community-level measures of disorder and disadvantage would have undergone similar fluctuations in the short term. In the appropriate absence of experimentation, quasi-experimental methods would be needed to more definitively conclude the extent to which the estimated associations are causal.

Limitations

Interpretation of our findings is subject to 3 important limitations. First, a striking feature of our data is the apparently large number of total psychiatric diagnoses attached to the median study participant. More than four-fifths of the women in our study were diagnosed with 3 or more current mental disorders according to the criteria of the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*, which exceeds the rates observed in the US general population by a large margin (70). The Diagnostic Interview Schedule has been criticized for overdetecting less severe symptoms and trivial disorders of unclear clinical significance (71). However, it is important to emphasize that participants in our study were not offered services or incentives that would have encouraged overreporting. Moreover, this population is known to have a high level of psychiatric comorbidity (56, 72). A second limitation is that our regression models assumed that the entire effect of victimization on subsequent mental health status and mental health care use was contained in

the exposure measurement at a given time point. Although relatively short, this 6-month lag is consistent with that from prior work in the fields of psychiatry and psychology on stressful life events and the timing of depressive onsets (73, 74). Our models did not capture effects of cumulative exposures (e.g., those that might be expected to occur in the setting of revictimization). Third, our measures of health care utilization were based on self-reported data. However, it has been shown in previous studies that persons who are homeless can provide accurate self-reports of health care utilization (75, 76).

Conclusions

With these caveats in mind, our findings indicate that interventions to reduce violence against women should be pursued not only because of the moral imperative to do so, but also because they can potentially have substantive benefits for physical and mental health. For example, we found that exposure to violent victimization was associated with a nearly 2-point difference in the MCS-12 score. Although a relatively small effect size relative to the baseline standard deviation, this is comparable to the mean increase in MCS-12 score that has been observed during the first year of HIV treatment among patients with advanced disease (77). Furthermore, victimization was associated with a 2- to 3-fold higher risk of mental health care utilization, which translates to a 19–24 percentage point increase in the outcomes compared with the baseline rates. The magnitude of these estimates suggests that, for women living with HIV, violence prevention might have substantial benefits for overall health as well, given the known bidirectional linkages between depression and HIV outcomes (78–82).

Screening programs have not been shown to be effective in preventing violence against women or improving mental health status (83–85), but case-finding approaches have been suggested as an alternative (86, 87). Ultimately, screening might only exert substantive benefits in settings in which providers also have the capacity to refer their clients to a broad array of services, such as case management, legal advocacy, and/or parenting and childcare support (88). It is possible that housing interventions for homeless or marginally housed women might both improve mental health (89) and reduce exposure to violence, but to our knowledge, this hypothesis has not been directly tested (90). Patterson et al. (91) showed that a Housing First intervention improved quality of life among homeless adults with mental illnesses, including subjective feelings of personal safety and other aspects of well-being; however, more specific measures of violence and/or mental health were not available. Clearly, more effective health care sector and public health responses to reduce violence against impoverished women are needed.

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Author affiliations: Chester M. Pierce, MD, Division of Global Psychiatry, Massachusetts General Hospital, Boston, Massachusetts (Alexander C. Tsai); Harvard Medical School,

Boston, Massachusetts (Alexander C. Tsai); Center for Global Health, Massachusetts General Hospital, Boston, Massachusetts (Alexander C. Tsai); Mbarara University of Science and Technology, Mbarara, Uganda (Alexander C. Tsai); Department of Medicine, University of California at San Francisco, San Francisco, California (Sheri D. Weiser, Samantha E. Dilworth, Elise D. Riley); and Department of Psychiatry, University of California at San Francisco, San Francisco, California (Martha Shumway).

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