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Cumulative Violence and PTSD Symptom Severity among Urban Street-Based Female Sex Workers

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Abstract

Female sex workers (FSW) are a marginalized and vulnerable population at high risk of gender-based violence within and outside of their occupation. However, FSW remain underrepresented in the trauma and mental health literature. The aims of this study were to: (1) Characterize exposure to violence among street-based FSW, including violence type, patterns over the life course, and key perpetrator groups; (2) Examine the multivariate associations between PTSD symptom severity and two constructs (revictimization across life stages and cumulative violence). Data were drawn from the SAPPHIRE study, an observational community-based cohort of street-based FSW recruited through targeted sampling across Baltimore, Maryland, USA in 2016–2017. PTSD symptom severity was measured using the PTSD Checklist for *Diagnostic and Statistical Manual of Mental Disorders–Fifth Edition* (PCL-5). At baseline, 61% of FSW screened positive for PTSD symptoms. The mean PCL-5 score was 38.6. We documented extensive histories of sexual and physical violence (lifetime: 81.8%; childhood and adult revictimization: 15.0% for sexual and 37.7% for physical). The vast majority of perpetrators were male and included paying clients, police officers, family members, and intimate partners. Exposure to childhood and adult sexual violence were independently associated with higher PTSD severity ($p<0.05$), with marginal associations observed for physical violence. Data supported a cumulative violence model of PTSD severity ($p<0.05$). Binge drinking also appeared to be a contributing factor ($p<0.05$). The levels of PTSD observed among our sample were comparable to that reported among treatment-seeking war veterans. Our findings underscore the urgent need for tailored trauma-informed interventions and

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policies to address violence among urban street-based FSW, a population experiencing extremely high levels of violence, PTSD and substance use.

Keywords

sex work; trauma; mental health

Introduction

Violence against women and girls remains a pressing public health issue globally. More than one in three women have been exposed to sexual or physical violence in their lifetime, mostly perpetrated by male intimate partners (World Health Organization, 2013b). Exposure to violence often starts early; among U.S. women, 42% have been exposed to sexual violence during childhood (Black et al., 2011). One in four U.S. women have experienced intimate partner violence (IPV), some as minors, and about half develop symptoms of posttraumatic stress disorder (PTSD) (Black et al., 2011). Population-level studies show that women are more likely to be exposed to sexual violence and are twice as likely to develop PTSD compared to men (Breslau et al., 1998; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). Sex differences in physiological and cognitive responses to stress, as well as social gender roles (e.g. reliance on passive coping styles) may explain the higher observed burden of PTSD among women (Olff, Langeland, Draijer, & Gersons, 2007).

Female sex workers (FSW) are a population defined by the United Nations as women "who receive money or goods in exchange for sexual services." Sex work may be formal or informal, voluntary or coerced (Joint United Nations Programme on HIV/AIDS, 2012); the latter meets U.S. definition of sex trafficking alongside entering sex work as a minor. Violence is pervasive in the lives of these women. Globally, between 40–90% of FSW have been exposed to sexual or physical violence in their lifetime (Deering et al., 2014). While many of the deleterious socio-cultural factors affecting all women play a role in increasing FSW vulnerability to gender-based violence (Connell & Pearse, 2014; Heise & Kotsadam, 2015), sex work poses unique occupational challenges to health and safety. In most settings, sex work remains illegal and highly stigmatized, which render FSW vulnerable to violence and coercion, and pose major barriers when seeking health and social services, legal protection and justice following victimization (Decker et al., 2015). For example, FSW frequently report being robbed, beaten up or thrown out of moving cars by clients while working (Lim et al., 2015; Shannon et al., 2009; Wirtz et al., 2015). Gender-based power dynamics, social expectations and stigma towards women in sex work are also strong forces that reverberate in FSW interactions with paying clients and police officers, who are often exclusively male, and frequently perpetrate sexual coercion, bribery and violence against FSW (Erausquin, Reed, & Blankenship, 2011; Footer et al., 2019; Rhodes, Simic, Baros, Platt, & Zikic, 2008; Shannon et al., 2009; Wirtz et al., 2015). Many FSW are also exposed to childhood abuse and IPV prior to entering sex work (Deering et al., 2014; Surratt, Kurtz, Weaver, & Inciardi, 2005). Unsurprisingly, the prevalence of mental health issues among FSW are high, with PTSD symptom prevalence often greater than 50% where studied, although studies are rare (Farley et al., 2004; Roxburgh, Degenhardt, & Copeland, 2006).

A common reason for entering and remaining in sex work among street-based FSW is the need to financially support an active drug addiction, as reviewed previously (Vanwesenbeeck, 2001). Others have suggested that sex work can precede specific forms of substance use, such as injection drug use (Morris et al., 2013) and negative coping, including drug use to chemically dissociate from the hardships of sex work (Romero-Daza, Weeks, & Singer, 2003). Violence, mental health and substance use can serve as mutually reinforcing conditions; survivors with a history of trauma may use drugs/alcohol as an avoidant coping mechanism, which in turn may increase the risk of future victimization (Kilpatrick, Acierno, Resnick, Saunders, & Best, 1997; Krause, Kaltman, Goodman, & Dutton, 2008; Ullman, Relyea, Peter-Hagene, & Vasquez, 2013). While drug use may dampen PTSD symptoms in the short term, drug withdrawal may elevate PTSD symptoms and prolonged drug use may increase the risk of chronic PTSD (Jacobsen, Southwick, & Kosten, 2001).

Only a small subset of trauma-exposed individuals develop PTSD (Breslau, 2002). To better understand the etiology of PTSD stemming from interpersonal violence, a cumulative model of abuse has been proposed by Scott-Storey whereby all lifetime exposures are taken into consideration when modeling their relationship to PTSD (Scott-Storey, 2011). National studies have shown that recurrent violence is associated with higher odds of PTSD in the past 6 months (Walsh et al., 2012) however studies examining accumulated forms of abuse across the life course, especially those that incorporate other types of life stress and co-morbidities, are less common (Finkelhor, Ormrod, & Turner, 2007; Scott-Storey, 2011). Examining the impact of interpersonal violence on PTSD severity alongside “chronic strain” factors (i.e. daily or recurring life stress associated with financial, housing, workplace and interpersonal difficulties) that have been demonstrated to be important in the etiology of depression and substance use, may enhance our understanding of PTSD among women (Scott-Storey, 2011; Thoits, 2010; Turner, Wheaton, & Lloyd, 1995). One previous study on the correlates of incident violence among FSW revealed homelessness, inability to access drug treatment, and police encounters to be significant (Shannon et al., 2009).

Given the high burden of violence among FSW, the aims of this study were to characterize the dimensions of lifetime exposure to violence (i.e. type, lifetime patterns and perpetrators) and to examine the independent relationships between PTSD severity, revictimization across life stages and cumulative violence, both in the context of co-occurring chronic strain and substance use among urban street-based FSW.

Methods

Participants

Data for this cross-sectional analysis were drawn from the baseline visit of the Sex Workers and Police Promoting Health in Risky Environments (SAPPHIRE) study, a prospective cohort study of street-based FSW recruited through targeted sampling in Baltimore City, Maryland, USA (Allen et al., 2019; Sherman et al., 2019). Baseline data were collected in 2016 through 2017. Eligibility criteria were: not identifying as male/man; aged ≥ 15 years; sold or traded oral, vaginal or anal sex “for money or things like food, drugs or favors”; picked up clients on the street or at public places ≥ 3 times in the past 3 months, and willing to undergo HIV and sexually transmitted infection testing. The baseline

visit consisted of a 50-minute computer assisted personal interview (CAPI) with a trained interviewer. At the end of the survey, the interviewer offered referrals to local health and social service organizations as appropriate. Respondents were compensated with a pre-paid $70 USD VISA gift card for completing the baseline visit. The study was approved by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board and holds a Certificate of Confidentiality.

Measures

i. PTSD symptoms—PTSD symptoms were measured using the PTSD Checklist for Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition (PCL-5), a 20-item self-reported scale that asks about symptoms in the past month, with responses for each symptom coded using a 5-point Likert scale (not at all, a little bit, moderately, quite a bit, extremely); overall score can range from 0 to 80 (Weathers et al., 2013). Total PCL-5 scores indicating "PTSD symptom severity" were computed. The mean, standard deviation (SD), median and interquartile range (IQR) were calculated. Internal consistency of the PCL-5 was high in this sample (Cronbach's Alpha=0.96).

ii Sexual and physical violence, revictimization and cumulative violence—A series of questions on lifetime sexual and physical violence experiences during childhood (<18 years) and adulthood (≥18 years) were asked. Violence items were adapted from the Revised Conflict Tactics Scale (Straus, Hamby, Boney-McCoy, & Sugarman, 1996), a widely used scale designed for capturing IPV that has been used in previous sex work research (Brantley, Kerrigan, German, Lim, & Sherman, 2017). Childhood sexual violence (CSV) was defined as ever being pressured or forced sexual intercourse or sexual touching. Childhood physical violence (CPV) was defined as ever being hit, punched, slapped or otherwise physically hurt by someone causing marks or injury. Respondents who had experienced violence during childhood were also asked to select their relation to the perpetrator(s) from a list of options. Those who selected the "other" option were asked to specify their relationship to the perpetrator.

Adulthood exposures to violence were measured separately for four types of perpetrators found to be most common in the literature (Decker et al., 2015; Deering et al., 2014): (1) intimate partners; (2) sex work clients; (3) police officers; and (4) pimps/managers (if applicable). Adult sexual violence (ASV) was defined as ever being physically forced to have sexual intercourse by a given type of perpetrator, and adult physical violence (APV) was defined as ever being hit, punched, slapped or otherwise physically hurt, or ever being threatened or hurt with a weapon, by a given type of perpetrator. We also created four variables for each category of violence indicating if two or more perpetrator types were selected.

A binary variable ("any lifetime violence"; yes/no) was constructed using responses to CSV, CPV, ASV and APV. Further, binary variables representing sexual and physical violence exposures by life stage were constructed (e.g. sexual violence during childhood only, sexual violence during adulthood only, sexual violence during childhood and adulthood; yes/no).

Sexual revictimization across life stages was defined as responding yes to CSV and ASV. Physical revictimization was defined comparably. Cumulative violence was constructed using the sum of the number of lifetime violence types (i.e. from CSV, CPV, ASV, APV), resulting in a possible range of 0 to 4; this variable was based on prior operationalizations of cumulative violence among FSW (Peitzmeier et al., 2019), female college students (Briere, Kaltman, & Green, 2008) and women (Follette, Polusny, Bechtle, & Naugle, 1996)

iii. Chronic strain—The survey included items on three types of chronic strain: homelessness (self-reported), financial insecurity (defined as having no monthly savings), and food insecurity (defined as going to sleep at night hungry due to not having enough food); we included any experience in the past 3 months. We also included currently having a criminal record for personal drug possession or engaging in sex work as an indicator of chronic strain. The number of chronic strain items endorsed was used to construct a cumulative strain score (0–4).

iv. Drug use—Other survey measures were developed from previous work (Brantley, Footer, Lim, Kerrigan, & Sherman, 2017; Brantley, Kerrigan, et al., 2017; Decker et al., 2017). Frequency of substance use in the past 12 months was measured using pre-defined drug type categories, which included *daily* as the most frequent use option. Binary (yes/no) variables for daily opioid use and daily cocaine use were constructed given high rates of drug use expected in this population based on prior work (Vanwesenbeeck, 2001) as well as the popularity of speedball use (concomitant use of heroin and cocaine) among drug-using women in Baltimore (Park, Weir, Allen, Chaulk, & Sherman, 2018). Opioids were defined as heroin use (injected/snorted/smoked) or misuse of “prescription pain killers such as Percocet, Morphine, OxyContin, Codeine, Fentanyl but not over the counter pills.” Cocaine included use of smoking crack cocaine or snorting/injecting powder cocaine.

v. Binge drinking—The Alcohol Use Disorders Identification Test (AUDIT-C) is a validated brief three-item screening scale developed by the World Health Organization for assessing alcohol disorders (Bush, Kivlahan, McDonell, Fihn, & Bradley, 1998). Scores range from 0 to 16. An “at least weekly binge drinking” binary variable was constructed from the item “How often did you have four or more drinks on one occasion in the past year?” by collapsing the daily and almost daily response options.

Data analysis

This analysis only included baseline data from FSW who were assigned as female at birth (i.e. cisgender women) in the SAPPHIRE cohort, and who completed the PCL-5 scale and violence measures (N=220). The dependent variable was PTSD severity (PCL-5 score), modeled as a continuous outcome. Age-adjusted linear regressions were used to model associations between PTSD severity and a range of covariates specified *a priori* (i.e., all four violence indicators, cumulative violence, chronic strain factors and substance use). Lowess plots were used to visually inspect the linearity of the relationships. Variance clustering was applied to account for recruitment zone. Linear combinations of the levels of cumulative violence were computed to test for statistically significant differences between each level.

Two multivariate linear regression models of PTSD severity were examined. The "revictimization across life stages model", included all four types of violence as independent covariates as well as interaction terms for CSV × ASV, and CPV × APV. The "cumulative violence" model included the total number of lifetime violence types (ranging from 0 to 4) as a covariate, which was modeled categorically since the relationship was not linear during exploratory data analysis as expected. We tested several models by adding all possible combinations of the three chronic strain variables (homelessness, financial insecurity and food insecurity; and the total number), as well as substance use variables (opioid use, stimulant use, binge drinking). Models were age-adjusted and accounted for variance clustering for recruitment zone. The lowest value of the Akaike information criterion was used to select the final model. The distribution of PTSD severity was visualized using a violin plot, which overlays the Kernel density of the sample distribution over a traditional boxplot (vioplot package in Stata). All analyses were conducted in Stata/SE 14.2 (College Station, Texas).

Results

Demographics and drug use

The mean age of FSW (n=220) was 35.7 years (SD=8.9) with age ranging from 18–61 years. Women were mostly Non-Hispanic White (68.2%), with others being Non-Hispanic Black (21.8%), Hispanic (3.2%) or multiracial/other races (6.8%). Half of the sample (51%) did not complete high school, 89.1% were financially insecure, 74.1% were food insecure, and 61.8% were homeless. Daily drug use was common (opioids: 73.2%; stimulants: 63.2%; both: 50.9%), and 8.6% engaged in binge drinking more than once a week (data not shown).

Violence and PTSD symptoms

The baseline prevalence of lifetime violence was high at 81.8% (see Table 1 & Figure 1). The majority of FSW exhibited high levels of PTSD; 61.4% screened positive for PTSD symptoms (PCL-5≥33), mean PCL-5 score was 39 (SD=22), and the median PCL-5 was 41 (interquartile range [IQR]=21–57). Many women had been revictimized as a child and adult (sexually: 15.0%; physically: 37.7%). Perpetrators of CSV (Table 2) were almost exclusively male; many were family including their father/step-father (22.1%) or other male relatives (33.8%). One in five (19.2%) reported multiple perpetrator types. CPV was most commonly perpetrated by a father/step-father (49.5%), followed by a mother/step-mother (27.4%) or an intimate partner (26.3%), and 26.3% of the women had multiple perpetrators during childhood.

A small proportion (7.7%) entered sex work as a victim of force, coercion, threats pressure or trickery, and one in five (21.4%) entered as a minor (age < 18). Most (65.0%) engaged in sex work daily and virtually all recent clients were male (99.1%). Clients (82.4%) and intimate partners (42.9%) perpetrated the vast majority of ASV (Table 2). The proportion of APV perpetrated by clients and intimate partners were similarly high (65.1% and 69.3% respectively) however police-perpetrated APV was also substantial (35.5%).

Age-adjusted associations

Results of age-adjusted linear regression models of the association between violence and PTSD severity were as follows: CSV (β=14.43, 95% CI: 9.56, 19.31), ASV (β=14.04, 95% CI: 5.02, 23.06), CPV (β=12.35, 95% CI: 0.26–24.44) and APV (β=11.02, 95% CI: 1.74–20.29) were all associated with PTSD severity when modeled separately (data not shown). Compared to no reported lifetime violence, exposure to one (β=6.02, 95% CI: 1.82, 10.21), two (β=16.96, 95% CI: 8.75, 25.16), three (β=18.32, 95% CI: 12.91, 23.73) or four (β=31.65, 95% CI: 24.48, 38.81) types of violence substantially increased PTSD severity; differences between two versus one (β=10.94, 95% CI: 3.68–18.21) and 4 versus 3 (13.33, 95% CI: 9.22–17.43) types were also significant (data not shown). Low education (β=-8.77, 95% CI: −14.7, −2.85) and food insecurity (β=6.73, 95% CI: 0.85, 12.62) were two chronic strain factors associated with PTSD severity at the $p<0.05$ level. Homelessness (β=5.62, 95% CI: −0.53, 11.78) and financial insecurity (β=7.03, 95% CI: −0.77, 14.84) were marginally associated ($p<0.1$). Having a criminal record (β=-0.16, 95% CI: −3.77, 3.44) and cumulative strain (β=0.84, 95% CI: −0.80–2.48) were not significantly associated with PTSD severity. Daily opioid use (β=2.05, 95% CI: −7.24, 11.34) and daily stimulant use (β=0.82, 95% CI: −4.4, 6.04) were not significantly associated with PTSD severity while daily/almost daily binge drinking (β=10.8, 95% CI: −2.02, 23.62) was marginally ($p<0.1$) associated.

Age-adjusted multivariate associations

No significant age-adjusted multivariate regression associations between revictimization across life stages and PTSD severity emerged (Table 3, **Model A**). Multivariate modeling revealed support for a cumulative violence model (Table 3, **Model B**). Compared to FSW with no lifetime exposure to violence, FSW with one (β=6.83, 95% CI: 2.63, 11.02), two (β=17.98, 95% CI: 9.81, 26.16), three (β=18.81, 95% CI: 12.52, 25.1), or four (β=31.89, 95% CI: 22.00, 41.79) violence types exhibited significantly higher PTSD severity. Binge drinking was also associated with PTSD severity in this model (β=13.04, 95% CI: 3.98, 22.09). Chronic strain factors were not significantly associated with PTSD severity in the presence of other covariates and subsequently removed from the final model. The dose-response relationship between cumulative violence and PTSD severity is depicted in Figure 2.

Discussion

Street-based FSW are one of the most marginalized and vulnerable groups among society, and a population disproportionately impacted by trauma. This study, which was conducted in an urban US setting, documented extremely high rates of sexual and physical violence and PTSD symptoms. The average PTSD score among these women was comparable to treatment-seeking war veterans (Wortmann et al., 2016). Multivariate analyses supported a cumulative violence model; the lifetime number of violence categories held a dose-response relationship with PTSD severity with the largest increases in severity observed between 1 to 2 types and 3 to 4 types of violence. Binge drinking was independently associated with higher PTSD severity whereas chronic strain indicators were not significantly associated in adjusted models. This study is one of the first to document the relationships between

accumulated violence, substance use and PTSD severity among street-based FSW, a uniquely vulnerable population of women worldwide.

Violence and PTSD Severity

Levels of sexual and physical revictimization across life stages were exceedingly high at 15% and 38% respectively. Interestingly, lifetime revictimization did not hold significant associations with PTSD symptom severity, after adjusting for the independent effects of violence. While this may appear to contradict some findings in the revictimization literature, the revictimization measure used in this study notably differed from previous studies that define revictimization simply as repeated events rather than exposure over life stages, or do not restrict events solely to violent encounters (Scott-Storey, 2011; Walsh et al., 2012).

However, we observed a clear dose-response relationship between cumulative violence and PTSD symptom severity, which complements findings in other populations that a dose-response relationship exists with greater lifetime frequency of abuse (Scott-Storey, 2011). This was clearly indicated by the lower levels of PTSD symptoms among women in our study who had experienced none or one violence type (median PCL-5 scores: 21 and 25) compared to women who were exposed to 2, 3 or 4 categories of violence in their lifetime (median PCL-5 scores: 43, 44 and 61 respectively). The findings supported a cumulative violence model of the effects of interpersonal violence (Scott-Storey, 2011).

Sexual violence has been given more attention in the FSW literature with physical violence often combined into a global binary sexual/physical violence indicator during analysis (Scott-Storey, 2011; Surratt et al., 2005; Ulibarri et al., 2009). Our study highlights four considerations when understanding the impact of trauma among this vulnerable population: levels of sexual and physical violence among street-based FSW are likely high throughout the life course; the burden of interpersonal violence is not solely due to engagement in sex work; physical violence is a more common occurrence during both life stages; there are key differences in the types of perpetrators across life stage and violence type. These findings affirm to researchers as well as healthcare and other service providers who encounter FSW seeking services to screen for and respond to sexual and physical violence occurring in childhood and adulthood, both within and outside the context of sex work.

Substance Use

Almost all FSW in our study were daily substance users, which is a common reason for entering sex work among street-based FSW (Vanwesenbeeck, 2001). Compared to daily opioid or stimulant use, which affected the majority of FSW in our study, daily binge drinking was less prevalent, affecting one in ten FSW, but strongly associated with PTSD severity. Unlike other substance use disorders, alcohol use disorders are characterized by memory impairment, which may be a factor that could help explain this finding particularly among FSW who are using alcohol to “self-medicate” i.e., suppress trauma intrusion symptoms (American Psychiatric Association, 2013). Access to alcohol use disorder treatment among this small yet high-risk population are warranted (Ullman et al., 2013). While evidence shows that reductions in PTSD severity can be achieved with reductions in substance use frequency (Hien et al., 2009; Manhapra, Stefanovics, & Rosenheck, 2015),

care must be taken when treating women who are actively using substances to cope with PTSD symptoms; alcohol or drug withdrawal may trigger PTSD and drug relapse (Jacobsen et al., 2001). By treating substance use disorder and PTSD concurrently, rather than consecutively, the two conditions can be managed safely and effectively (Roberts et al., 2015)

Chronic strain and the Sex Work Context

Sex work has been described as a high demand and low control occupation; these types of jobs are linked to chronic strain and poorer mental health outcomes (Spector, 2002; Wingood & DiClemente, 2000). Street-based sex work is particularly demanding and risky due to risks present in the work environment (e.g. violent and coercive behaviors of clients and police officers), which are shaped by broader social and structural forces (e.g. sex work criminalization and stigma). The health needs of street-based FSW are great, though resources that are tailored to meet the needs of this population are scarce due to socio-political factors, particularly in the U.S. context (Decker, Beyrer, & Sherman, 2014). Despite being a multi-billion-dollar industry, sex work is not recognized as a legal occupation in many countries including the U.S., except in some parts of Nevada. A negative consequence of criminalization policy environments is that FSW are often not afforded any legal protections, even when sexually or physically assaulted (Decker et al., 2015). Decriminalizing sex work will likely improve FSW access to care, protection and justice (Decker et al., 2015; UNAIDS, 2012).

Although the chronic strain variables (homelessness, financial insecurity and food insecurity) were not independently associated with PTSD severity, the high levels observed posed a challenge to modeling associations. Their role requires further research given their prominence and persistence in the lives of FSW. For example, food insecurity held a bivariate association with PTSD as observed previously (Hadley et al., 2008) and can be traumatic depending on severity (e.g. food deprivation could be used as a form of control).

Limitations

There are limitations to consider when interpreting these findings. PTSD severity has been linked to violence severity, frequency, perception of life threat during the assault, self-blame and delayed disclosure of the assault, which are important unmeasured factors (Brewin, Andrews, & Valentine, 2000; Ullman, Filipas, Townsend, & Starzynski, 2007). We observed relatively high residual PTSD in the “no violence” group; while violence exposures from the most common perpetrators established in the literature were measured (i.e., clients, police, pimps and intimate partners), there were other perpetrators of adult violence who were not included. Unmeasured confounding due to other forms of trauma (e.g. witnessing violence, car accidents) may have also confounded the associations with PTSD, though it is known that among all sources of trauma, sexual and physical violence results in the highest risk of PTSD (Breslau et al., 1998). The operationalization of cumulative violence using a summed score has its merits but does not account for severity, duration, and frequency of victimization within each time frame assessed, which are known to elevate the risk of PTSD (Scott-Storey, 2011). Given the high rates of substance use in this population, future studies should include a validated scale to measure drug use to examine the prevalence of

substance use disorders among FSW. The data may be subject to social desirability bias. The cross-sectional nature of the study limits establishment of temporality of the relationships; longitudinal studies would certainly help to overcome this limitation and bolster the small body of literature on this topic.

Conclusions

This study is one of the first to examine the role of cumulative violence in the etiology of PTSD among FSW, a population with exceedingly high burden of violence throughout the life course and PTSD levels comparable to treatment-seeking military veterans. The broader social and structural context surrounding sex work and gender-based violence remain major barriers to delivering appropriate healthcare, safety and justice. Trauma-informed mental health interventions and violence prevention strategies that are non-stigmatizing and tailored to the needs of FSW (e.g., that account for non-traditional work hours and respect their agency) are urgently required (World Health Organization, 2013a). Substance use is a major issue among this population that need to be addressed concurrently. Active engagement of current and former FSW in these responses will be critical in shaping these interventions.

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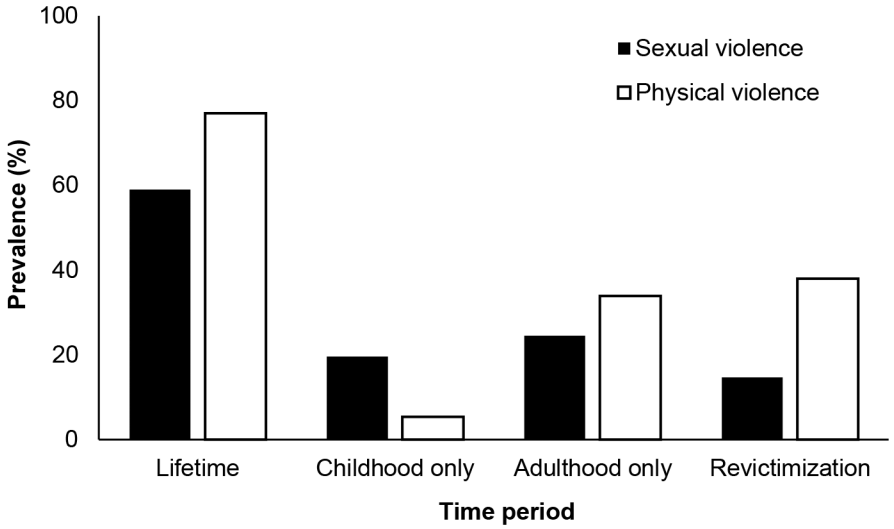

Figure 1.

Lifetime Exposure to Sexual Violence, Physical Violence, and Revictimization across life stages among Street-Based Female Sex Workers (n = 220) in Baltimore, Maryland

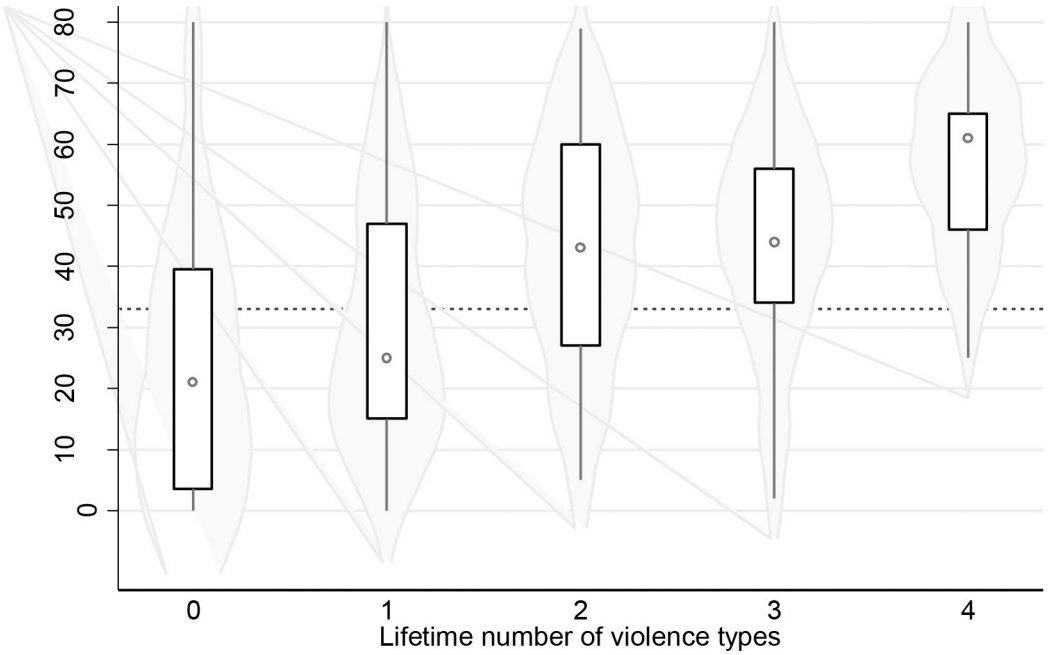

Figure 2.

Violin Plot of the Dose-Response Relationship between Cumulative Violence and PTSD Symptom Severity among Street-Based Female Sex Workers (n = 220) in Baltimore, Maryland

Note. Dashed line indicates the cut-off score for a positive PTSD screen (≥33).

*$p < .05$. **$p < .01$. ***$p < .001$.

Table 1

Prevalence of Violence and PTSD among Street-Based Female Sex Workers (n = 220) in Baltimore, Maryland

Variable	n	%
Violence		
Lifetime	180	81.8
Childhood sexual violence[1]	77	35.0
Adulthood sexual violence[2]	87	39.6
Sexual revictimization across life stages	33	15.0
Childhood physical violence[3]	94	42.7
Adulthood physical violence[4]	159	72.3
Physical revictimization across life stages	83	37.7
Lifetime number of violence types (0–4), Mean (SD)	1.9	(1.3)
PTSD		
Screened positive (PCL-5≥33)	135	61.4
PCL-5 score, Mean (SD)	38.7	(21.9)

Note. Denominators vary due to data missingness

[1]Pressured or forced to have sexual contact including sexual touching or sexual intercourse before age of 18.

[2]Forced to have sexual intercourse by clients, pimps/managers, intimate partners or police officers

[3]Hit, punched, slapped or otherwise physically hurt before age of 18.

[4]Hit, punched, slapped or otherwise physically hurt or threatened with a weapon by clients, pimps/managers, intimate partners or police officers

Table 2

Lifetime Perpetrators of Sexual and Physical Violence against Street-Based Female Sex Workers in Baltimore, Maryland

	Childhood sexual violence[1] (n = 77)		Childhood physical violence[2] (n = 97)	
Variable	**n**	**%**	**n**	**%**
Family				
Father/step-father	17	22.1	47	49.5
Mother/step-mother	0	0.0	26	27.4
Sibling	4	5.2	8	8.4
Male relative	26	33.8	9	9.5
Female relative	2	2.6	7	7.4
Intimate partner	7	9.1	25	26.3
Client	1	1.3	2	2.1
Someone else	18	23.4	10	10.5
Don't know	8	10.4	0	0.0
≥2 perpetrator types reported[^]	14	19.2	25	26.3
	Adulthood sexual violence[3,5] (n = 91)		**Adulthood physical violence[4,5] (n = 166)**	
Variable	**n**	**%**	**n**	**%**
Intimate partner	39	42.9	113	69.3
Client	75	82.4	108	65.5
Police officer	10	11.0	59	35.5
Pimps/manager	1	1.1	2	1.2
≥2 perpetrator types reported[^]	30	33.0	90	54.2

Note. Multiple perpetrators could be reported

[1] Pressured or forced to have sexual contact including sexual touching or sexual intercourse before age of 18.

[2] Hit, punched, slapped or otherwise physically hurt before age of 18.

[3] Forced to have sexual intercourse.

[4] Hit, punched, slapped or otherwise physically hurt or threatened with a weapon.

[5] The measure of adulthood violence did not include other types of perpetrators such as family or strangers.

[^] denominator excludes those who refused to answer

Table 3

Multivariate Associations between PTSD Symptom Severity and Revictimization and Cumulative Violence among Street-Based Female Sex Workers (n = 220) in Baltimore, Maryland

	Median PCL-5 by violence indicator		Revictimization across life stages (Model A)	Cumulative violence (Model B)
	Yes	No	β (95% CI)	β (95% CI)
Childhood sexual violence	48	32	11.33 (5.84, 16.82) **	
Adulthood sexual violence	50	32	11.08 (1.10, 21.06) *	
Revict: Sexual × Sexual	57	37	0.12 (-9.73, 9.96)	
Childhood physical violence	46	36	9.30 (-0.51, 19.10)	
Adulthood physical violence	44	27	7.10 (-1.71, 15.91)	
Revict: Physical × Physical	47	36	−7.94 (−20.76, 4.87)	
>Weekly binge drinking	53	40	12.13 (3.18, 21.08) *	13.04 (3.98, 22.09) *
Cumulative violence [1]				
0	21			ref (1.0)
1	25			6.83 (2.63, 11.02) **
2	43			17.98 (9.81, 26.16) **
3	44			18.81 (12.52, 25.1) ***
4	61			31.89 (22.00, 41.79) ***

Note. Age-adjusted multivariate linear regression with robust variance to account for clustering by recruitment zone. Revictimization model includes two interaction terms (sexual and physical revictimization).

[1] lifetime number of violence types endorsed

* $p < .05$.

** $p < .01$.

*** $p < .001$.