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Correlates of impulsivity among female sex workers in Mexico

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Abstract

Impulsivity is a trait characteristic that is associated with sexual risk behavior. We examined correlates of impulsivity among 602 female sex workers (FSWs) enrolled in a sexual risk reduction intervention in Mexico (2016–2020). Impulsivity was positively associated with condomless sex with clients. Higher levels of impulsivity were associated with greater use of alcohol and heavy drugs, use of illicit drugs with clients, sexual/physical abuse history, and clinical depression. Global public health policy that supports free substance abuse treatment in combination with psychotherapeutic treatments (e.g., regulation management skills) and behavioral-focused therapy may help to reduce HIV/STI incidence in this vulnerable population.

Keywords

Impulsivity; female sex workers; substance use; sexual risk behavior; depression; physical and sexual abuse; Mexico

HIV/AIDS continues to be a major cause of global morbidity and mortality (Danforth et al., 2017). The largest percentage of deaths occur in low- to middle-income countries (LMIC) among at-risk groups, including female sex workers (FSWs). In 2013, it was estimated that 106,000 HIV-related deaths occurred among FSWs worldwide (Prüss-Ustün et al., 2013). Global health researchers have identified a range of personal, social-structural, and behavioral factors (e.g., risk environments, sexual trauma, poverty, food insecurity,

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Conflict of interest

The authors declare that they have no conflict of interest.

Compliance with Ethical Standards

Ethical standards

All study procedures were approved by ethics committees at the University of California, San Diego, Xochicalco University in Tijuana, and SADEC-FEMAP in Cd. Juarez. All procedures were conducted in accordance with the 1964 Helsinki Declaration and its later amendments. Written informed consent was obtained from all participants prior to undergoing any study procedures.

substance use, policing policy) that are associated with high rates of unprotected sex among FSWs (e.g., Deering et al., 2014; Fielding-Miller et al., 2014; Leddy et al., 2018; Shannon et al., 2015). Less attention has been paid to trait characteristics that may influence HIV/STI transmission behaviors in this population. Impulsivity is one trait characteristic that has been associated with sexual risk behaviors in at-risk populations, including male and female sex workers and persons with psychiatric and/or substance use disorders (Black et al., 2009; Bornovalova et al., 2005a; Clingan et al., 2016; Cortez et al., 2011; Hayaki et al., 2006). Impulsivity is viewed as the tendency to act without planning or forethought as well as engaging in risky or maladaptive behaviors without consideration for the potentially negative or harmful consequences (Eysenck & Eysenck, 1985; Patton et al., 1995; Whiteside & Lynam, 2001). In the present study, we focused on correlates of impulsivity in a sample of FSWs in Mexico -- a LMIC. The identification of factors associated with impulsivity among FSWs in LMIC may help to enhance our understanding of the link between impulsivity and risky health behaviors (e.g., unprotected sex) by answering questions around who experiences elevated levels of impulsivity and under what conditions. This information will be valuable to physicians, nurses, psychologists, social workers, public health advocates, and other professionals who work diligently to improve the physical and mental health and well-being of women in this vulnerable and stigmatized population.

Background

Impulsivity has been associated with a range of factors among persons with psychiatric and substance use disorders. These factors include increased severity of cocaine use and lower drug treatment retention (Moeller et al., 2001), hazardous alcohol consumption and heroin injection (Dissabandara et al., 2014), alcohol dependence (Jakubczyk et al., 2013), sexual encounters under the influence of alcohol and drugs (Charnigo et al., 2013), history of physical and sexual abuse (Krause-Utz et al., 2019), and elevated levels of depressive symptoms (Semple et al., 2005; 2006). Although none of the above studies included FSWs, one study conducted with FSWs in the United States (US) reported that women who traded sex for money or drugs had significantly higher scores on impulsivity compared to women who did not trade sex (Clingan et al., 2016).

To date, little is known about the factors associated with impulsivity among FSWs in LMIC. In this study, we focused on FSWs in two major cities along Mexico’s northern border with the US, where HIV prevalence among FSWs ranges from 6% overall to 12% among those who inject drugs (FSW-WIDs) (Patterson et al., 2008; Strathdee et al., 2013). High prevalence of sexually transmitted infections (STIs) (e.g., Chlamydia, 13%; syphilis, 14%) has also been documented among FSWs in this region (Patterson et al., 2008). Through Mexico’s universal healthcare system, FSWs can access free HIV/STI preventive services, including HIV/STI testing and treatment (PROYECTO de Norma Oficial Mexicana NOM-010-SSA2-2018). However, psychological and psychotherapeutic services are fewer in number, and focus primarily on diagnoses and treatment of common mental health issues, such as depression and anxiety, with little to no attention paid to the role of impulsivity as a factor potentially associated with HIV/STI transmission risk behaviors among FSWs.

The aim of this study was to identify correlates of self-reported impulsivity among FSWs in Tijuana and Ciudad (Cd.) Juarez, Mexico. Three broad categories of factors were examined as correlates of impulsivity: 1) substance use factors; 2) occupational risk environment (e.g., physical and sexual abuse by clients); and 3) psychosocial factors (e.g., emotional support, depressive symptoms). We also conducted a secondary analysis to examine the association between impulsivity and HIV/STI transmission risk behavior (i.e., sexual risk behavior with clients), taking into account the correlates of impulsivity identified in our sample.

Increased knowledge and understanding of the factors associated with impulsivity among FSWs in a LMIC has potential clinical and health policy implications. Specifically, screening FSWs in LMIC for high levels of impulsivity will assist healthcare providers and public health professionals to identify women who may be most at risk for adverse health outcomes (e.g., HIV/STI transmission). The identification of factors associated with impulsivity may also help to inform the content of HIV/STI prevention interventions for FSWs by targeting impulsivity or impulsive tendencies in the context of HIV/STI transmission behaviors, including sexual risk with clients.

Methods

Sample Selection

Six hundred two FSWs were recruited in Tijuana (n = 302) and Cd. Juarez (n = 300) to participate in a randomized controlled trial evaluating a text messaging intervention (i.e., theory- based safer sex and safer injection maintenance texts) delivered over 24 months that was designed to maintain the impact of an efficacious, brief sexual risk reduction intervention (*Mujer Segura) delivered* at baseline (Patterson et al., 2008). Women were eligible for the project, known as *Mujer Saludable Siempre (MSS)* or Healthy Woman Forever, if they met the following criteria: cisgender female, ≥ 18 years of age, self-identify as a FSW, report having traded sex for drugs, money, shelter or other material benefit in last 30 days, report having condom unprotected vaginal or anal sex with a client at least once in the last 30 days, report no previous HIV-positive test result, agree to HIV/STI testing at baseline and follow-up assessments, and own an operational cellular telephone. FSWs who reported no sexual activity with a client or consistent condom use with all clients in the last 30 days, or were planning a pregnancy, or had a psychiatric diagnosis with current psychotic symptoms or suicidal ideation, were excluded from study participation.

Recruitment

Time-location sampling was used as the primary recruitment strategy for the *MSS* project (Patterson et al., 2019). Recruitment was conducted between March 2016 and December 2017 by trained outreach workers in both sites. Recruitment efforts involved canvassing locations and venues where FSWs were known to solicit clients (e.g., bars, street corners). Outreach workers approached women who appeared to be eligible and asked them five screening questions (e.g., sex worker status, age ≥18). Women who screened eligible and were interested in the study were referred for a full screening interview at our offices in Tijuana and Cd. Juarez (Patterson et al., 2019). Upon providing consent, eligible women underwent a two-hour baseline session, which included a 60-minute computer-assisted

personal interview (Nova Software, MD, US), and *Mujer Segura* sexual risk reduction counseling (30–45 min) (Patterson et al., 2008). Participants were reimbursed the equivalent of $30 USD for their baseline session. All study procedures were approved by ethics committees at the University of California, San Diego, Xochicalco University in Tijuana, and SADEC-FEMAP in Cd. Juarez. Written informed consent was obtained from all participants prior to undergoing any study procedures.

Measures

Primary Outcome of Interest: Impulsivity—The Barratt Impulsiveness Scale is a self-reported measure of impulsivity (BIS-11; Patton et al., 1995). The original scale has 30 items that are purported to measure three dimensions of impulsiveness: 1) Attentional impulsiveness; 2) Motor impulsiveness; and 3) Non-planning impulsiveness. The researchers used two dimensions of the BIS-11, each consistent with factor structure specified by Reise et al. (2013). They include: non-planning (self-control subdomain; 6 items), which captures a person's tendency to act without planning or regard for the future (Swann et al., 2005); and motor impulsiveness (motor subdomain, 7 items), which measures the tendency to act quickly or impetuously (Reise et al., 2013; Swann et al., 2005). Items are measured on a 4-point Likert type scale (1 = rarely/never; 2 = occasionally; 3 = often; 4 = almost always/always). Sample items for the motor dimension include: *"I do things without thinking"*; and *"I act on the spur of the moment"*. Sample items for the non-planning dimension include: *"I say things without thinking"*; and *"I plan tasks carefully"* (reverse coded). A total score was computed by summing item responses. Cronbach's alpha for the 13-item scale in the present sample was 0.87. The BIS-11 has been used with a variety of at-risk populations, including bipolar disorder patients (Swann et al., 2001) and substance abuse patients (Moeller et al., 2002).

Secondary Outcome of Interest: Sexual risk behavior with clients—The number of condom unprotected vaginal/anal sex acts with clients in the past month was used to measure sexual risk behavior. To calculate this continuous variable, the total number of times a condom was used was subtracted from the total number of vaginal/anal sex acts with clients in the past 30 days.

Correlates of Interest

Substance Use: Illicit drugs and alcohol—The 10-item Alcohol Use Disorders Identification Test (AUDIT) was used to measure *severity of alcohol use* in the past year (Saunders et al., 1993). Each item was measured on a scale from 0 (never) to 4 (four or more times a week). The AUDIT summary score was used in the analyses. *Use of 'heavy' illicit drugs* in the last 30 days was determined by asking participants to report their use of 12 illicit drugs during the past month (e.g., marijuana, cocaine, heroin, methamphetamine) using a scale ranging from 0 (never) to 6 (every day). A binary variable was created to represent 'heavy' illicit drug use (1 = used methamphetamine, cocaine, heroin or some combination of these 'heavy' drugs; and 0 = did not use any drugs or used only 'light' drugs, such as marijuana or hashish in the past 30 days). *Alcohol use with a client* and *illicit drug use with a client* in the last six months were separate variables each measured by a single item (In the past six months, how often did you use alcohol before or during sex with a

client?; In the past six months, how often did you use a drug, for example marijuana or cocaine, before or during sex with a client?). Response categories (never = 1 to always = 4) were collapsed into a binary outcome for each variable (yes = 1, no = 0).

Occupational Risk Environment: History of client-perpetrated sexual and physical abuse—Sexual abuse by a client (ever) was measured by a single question ("Since you became a sex worker, how many different times have you been forced or coerced into having sex against your will with a client?"). A binary variable, sexual abuse (ever) was computed where (≥ 1 times = 1, never = 0). Physical abuse by a client (ever) was measured by a single question ("Have you ever been physically abused [i.e., hit or assaulted] by a client?") Responses categories were coded yes = 1 and no = 0.

Psychosocial Factors: Clinical depression and emotional support—The Beck Depression Inventory (BDI-II) was used to measure depressive symptoms over the past two weeks (Beck, 1967; 1976). Each of the 21 items has four graded statements that are scored from 0 to 3 to show increasing depression symptoms. A summary score was calculated. Summary scores could range from 0 to 63 (Cronbach's alpha = 0.92). A cut-point of 20 or more on the BDI-II was used to define moderate to severe levels of clinical depression (Beck et al., 1996). Emotional support was measured by a scale developed by Pearlin et al. (1990). The 7-item scale captures the availability of family and friends who are perceived as trustworthy, uplifting, and able to keep a confidence. Response categories ranged from 1 (strongly disagree) to 4 (strongly agree). A mean score was calculated for the analyses.

Confounding variables

A review of the literature revealed three factors that were potentially confounding variables in the correlates of impulsivity analyses (Argyriou et al., 2018; Clingan et al., 2016; Cortez et al., 2011). Age in years and number of years of education were treated as continuous variables. Type of primary sex work venue was coded as a binary variable (street-based = 1, indoor/establishment-based = 0) (Patterson et al., 2019)

Statistical analysis

All analyses were conducted using baseline data. To identify correlates of impulsivity, a series of linear regression analyses were conducted with impulsivity defined as the dependent variable (DV). Because several of the variables of interest are moderately to highly interrelated and our data are cross-sectional, our analytic approach involved the examination of each correlate in relation to impulsivity one at a time. Thus, separate linear regression models were specified for each correlate, including substance use factors (i.e., alcohol use, alcohol/illicit drug use with clients, use of 'heavy' illicit drugs), occupational risk environment (i.e., physical and sexual abuse by clients), and psychosocial factors (i.e., depressive symptoms, emotional support from family and friends). We then ran separate multivariable linear regression models for each correlate, adjusting for three potentially confounding variables, including age, number of years of education, and type of sex work venue. Thereafter, the association between impulsivity and HIV/STI transmission risk behavior was evaluated through a multivariable linear regression with the dependent variable (DV) defined as the number of condom unprotected sex acts with clients in the past

month, which was log 10 transformed due to skewness in the distribution. In addition to age, number of years of education and sex work venue, all potential correlates of impulsivity, were also adjusted for as potential confounders due to their known influence on sexual risk behaviors with clients.

Results

Sample Description

Table 1 provides frequency distributions for categorical variables or means and standard deviation for continuous variables for the full sample. Participants ranged in age from 18 to 70 (Mean = 37.6, SD = 10.3), 85.2% reported an educational level of secondary school or less, 58.1% were never married, 65% self-identified as a street-based sex worker, 77% had an average monthly income greater than $3,500 MX pesos in the last six months, and 34.4% met criteria for clinical depression. Impulsivity scores (summary variable) ranged from 13.0 to 51.0 (Mean = 29.9, SD = 7.4). The number of condom unprotected sex acts with clients in the past month ranged from 1 to 408 (Mean = 36.0, SD = 45.0).

Univariate regressions: Correlates of impulsivity

After adjusting for age, number of years of education, and primary sex work venue, significant positive associations were found between impulsivity and six factors of interest, including use of illicit drugs with clients before or during sex in past six months; use of heavy drugs (e.g., heroin, cocaine, methamphetamine) in the past month; total score on the Alcohol Use Identification Disorders Test; ever forced or coerced into having sex with client; ever physically abused by a client; and moderate to severe clinical depression (Table 2).

Multivariable linear regression: Sexual risk behavior regressed on impulsivity and its correlates

After adjusting for potential confounding factors (age, education, and sex work venue), impulsivity was found to be positively associated with number of unprotected vaginal and anal sex acts with clients in the past month. Four of the correlates of impulsivity identified in the univariate analyses were also associated with unprotected sex with clients. Use of heavy drugs (e.g., cocaine, heroin) in the past month, Alcohol Use Disorders Identification Test score, and sexually abused by client, ever were all positively associated with unprotected vaginal and anal sex. Moderate to severe clinical depression was negatively associated with this outcome (Table 3).

Discussion

In this study, we aimed to identify correlates of self-reported impulsivity among FSWs in two resource-poor cities in the northern border region of Mexico adjacent to the US. In univariate analyses, adjusted for potentially cofounding variables, elevated levels of impulsivity were significantly associated with substance use (e.g., greater use of alcohol, use of illicit drugs with clients before or during sex, and use of heavy drugs, such as cocaine), experiences of client-perpetrated sexual and physical abuse (ever), and moderate to

severe levels of clinical depression. These findings are consistent with previously reported associations between impulsivity and adverse health outcomes in non-FSW populations (e.g., Dissabandara et al., 2014; Hayaki et al., 2006; Lejuez et al., 2005; Wilson & Vassileva, 2016). We also found a strong positive association between impulsivity and sexual risk behaviors with clients, taking into account substance use, occupational risk environment, and psychosocial correlates.

The results of this study point to the potential importance of targeting impulsivity in behavioral interventions designed to reduce sexual risk behaviors among FSWs in Mexico. Globally, programs designed to reduce impulsivity are few in number and those that exist have not undergone rigorous efficacy evaluations, nor have they targeted FSWs in LMIC. Weiss et al. (2014) developed a successful program to reduce impulsivity among women with sexual assault-related posttraumatic stress disorder (PTSD) in New Haven, CT, US. Strategies for decreasing impulsive behavior included cognitive-behavioral therapy (CBT) techniques (i.e., distraction/delay, behavior substitution, pros and cons, consequence modification). The skills that were taught focused mainly on the control of impulse behaviors and emotional regulation with the goal of reducing sexual risk behaviors (Weiss et al., 2014). Other researchers have also documented that strategies to manage or control impulses associated with sexual behavior and/or substance abuse are effective in reducing risk behaviors in target populations, including persons with substance abuse disorders (Hayaki et al., 2012). Also, improving access to drug treatment could potentially reduce impulsivity associated with addiction/withdrawal. Although trait impulsivity is often assumed to be less amenable to modification in adulthood (Hayaki et al., 2006), the studies cited provide preliminary evidence to suggest that control of impulsive urges and behaviors is a reasonable and achievable goal of sexual risk reduction interventions for at-risk populations, including FSWs in LMIC. Accordingly, existing behavioral interventions that have been shown efficacious in reducing sexual and injection risk behaviors among FSWs in LMIC (e.g., Mujer Segura, Mujer Más Segura) (Patterson et al., 2008; Strathdee et al., 2013) could be adapted to incorporate a counseling component designed to reduce impulsivity among FSWs in Mexico and around the globe.

Several studies conducted in high-income countries have documented elevated levels of impulsivity among populations who have experienced trauma and post-traumatic stress disorder (PTSD) (Joseph et al., 1997; Kolter et al., 2001; Weiss et al., 2014). Future studies should be conducted to examine the potential mediating role of impulsivity in the relationship between PTSD symptoms and sexual risk behaviors among FSWs. It is well documented that many FSWs suffer from PTSD symptoms as a consequence of their risk environments and/or childhood experiences, including physical, sexual, and emotional violence (Semple et al., 2015). Although we did not assess PTSD symptoms in the present study, it is plausible that higher levels of impulsivity were associated with PTSD symptoms, which in turn, influenced sexual risk behavior. Indeed, impulsivity has been shown to mediate the relationship between PTSD and a wide range of other risk behaviors and adverse outcomes, including substance abuse, depression, experiences of physical or sexual violence, and suicidal ideation/attempts (Weiss et al., 2014). Further investigation is warranted, particularly among FSWs in LMIC where a “treatment gap” in community mental health care has been identified (Thornicroft, Deb & Henderson, 2016).

Future research should also be focused on developing models to test specific underlying mechanisms that link impulsivity with sexual risk behaviors, substance abuse, experiences of violence, and clinical levels of depression among FSWs. Several researchers have postulated models that conceive of impulsivity as a trait that influences personal vulnerability to adverse health outcomes, including sexual risk and substance abuse, while others have suggested that the pharmacological effects of substances increase levels of impulsivity, which in turn exacerbate sexual risk behavior and other risk behaviors (Lejuez et al., 2005). Specification of the pathways and underlying mechanisms will move the field forward by offering ideas for the design of interventions that aim to reduce the negative impact of impulsivity on health outcomes. Although psychosocial interventions targeting mental health issues are rare in LMIC, interventions focused on addiction behavior have shown promise in reducing distress and improving self-esteem among affected individuals in Mexico, Vietnam, and Malaysia (Rane et al., 2017).

Moreover, previous studies have addressed the cumulative effects of psychiatric comorbidities on levels of impulsivity in at-risk populations (Bornovalova et al., 2005b). It has been reported that individuals with dual diagnoses (e.g., bipolar personality disorder & substance use disorder) have higher levels of impulsivity as compared to persons with one or the other of these disorders (Bornovalova et al., 2005a; Links et al., 1995; Swann et al., 2004; Trull et al., 2004). Although we did not consider the role of dual diagnoses in this study, it is possible that a combination of substance use disorder, clinical depression, and PTSD symptoms, which are all common among FSWs in Mexico and other LMIC (Coetzee et al., 2018; Lancaster et al., 2018; Rael & Davis, 2017), place a subgroup of women at especially heightened risk for elevated levels of impulsivity and vulnerability to HIV/STI infection. In future studies, researchers should seek to establish clinically-relevant levels of impulsivity and investigate the role of cumulative morbidities on impulsivity and health outcomes among FSWs in Mexico and other LMIC.

Limitations

This study recruited a convenience sample of FSWs and as such the findings cannot be generalized to all FSWs in the study sites nor elsewhere in Mexico or around the globe. All study measures were self-reported, which raises the possibility of reporting biases. Also, behavioral impulsivity (laboratory-based assessment) was not measured in this study. Future studies should corroborate self-report assessments of impulsivity, like the BIS-11, with laboratory-based assessments and objective measures of impulsivity (e.g., Continuous Performance Test) (Swann et al., 2005). This study is also limited by the use of cross-sectional data, which precludes our ability to make causal inferences about the temporal sequences between impulsivity and the correlates that were identified (Hayaki et al., 2006). Prospective, longitudinal data are needed to determine causal relationships. Researchers have also documented the multidimensional nature of impulsivity (Black et al., 2009; Kim et al., 2018; Lejuez et al., 2005). Because this study did not examine all three dimensions of impulsivity delineated in the BIS-11, we cannot determine if the excluded dimension or subdomains of dimensions relate differentially to the factors considered in this study. Lastly, we did not assess other traits or personality characteristics (e.g., narcissism, extraversion)

that might combine or interact with impulsivity to influence associations with sexual risk behavior, substance abuse, exposure to violence, and depression.

Conclusions

These findings contribute to HIV/STI prevention/intervention knowledge by identifying correlates of impulsivity and documenting the relationship between impulsivity and HIV/STI transmission behavior, specifically risky sexual behavior, in an understudied population of FSWs in a LMIC. The associations identified in this study are similar to those previously identified among psychiatric disorder patients and persons with substance use disorders in high-income countries (e.g., Hayaki et al., 2006; Lejuez et al., 2005; Wilson & Vassileva, 2016). Overall, the social policy implications of these findings suggest the need for researchers and public health officials to: 1) develop behavioral interventions to reduce sexual risk-taking and substance use with clients among FSWs by teaching impulse control strategies and other self-regulation management skills; and 2) expand mental health programs for FSWs that routinely screen for multiple risk factors, including elevated levels of impulsivity, clinical depression, history of physical and sexual assault by clients, and sexual risk-taking behaviors. Adopting a holistic approach to FSWs' health and well-being that includes standard mental health evaluations (taking into account relevant personality traits, such as impulsivity) and environmental risk assessments has the potential to significantly reduce HIV/STI transmission risk in this vulnerable population of women in LMIC.

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Table 1.

Characteristics of female sex workers in Tijuana and Cd. Juarez, Mexico.

Variable	Total (*N* = 602)
Marital Status	
Never married	58.1% (350)
Married or common-law	26.9 (162)
Divorced or separated	12.0 (72)
Widowed	3.0 (18)
Education	
Some grade school	16.6% (100)
Grade school	28.1 (169)
Some secondary school	12.8 (77)
Secondary school	27.7 (167)
Some high school	8.6 (52)
High school	4.5 (27)
Some university	1.2 (7)
Read/write, no education	0.5 (3)
Average monthly income [a]	
Less than or equal to $3499 MX pesos	23.1% (139)
$3500 or more MX pesos	76.9 (463)
Has one or more children	95.3% (574)
Household Composition	
Lives with child(ren) and spouse/steady partner	12.1% (73)
Lives with child(ren) only	42.9% (258)
Lives with spouse/ steady partner only	12.1% (73)
Does not live with spouse/steady nor child(ren)	32.9% (198)
Lives with spouse or steady	24.3% (146)
AUDIT-10, mean (SD)	8.8 (9.6)
Meets criteria for hazardous alcohol consumption	42.9% (258)
Number of drugs used[b] mean (SD)	1.2 (1.5)
Used heavy drugs in the past month (y/n)	57.1% (344)
Impulsivity, mean (SD)	29.9 (7.4)
Beck depression, mean (SD)	15.8 (11.2)
Meets criteria for moderate to severe clinical depression	34.4% (207)
Number of condom unprotected vaginal/anal sex acts with client, mean (SD)	36 (45)
Sex work venue type	
Street based	64.8% (390)
Indoor/establishment based	35.2% (212)
Mean age (SD)	37.6 (10.3)

[a] In past 6 months

[b] In past month

Table 2.

Linear regression: Correlates of impulsivity among female sex workers in Tijuana and Ciudad Juarez, Mexico.

Factor of Interest	Unadjusted B (95% CI)	t	Adjusted B (95% CI)[d]	t
Used illicit drugs with client before or during sex[a]	3.56 (2.37, 4.75)	5.89***	3.66 (2.49, 4.83)	6.14***
Used heavy drugs (e.g., heroin, cocaine)[c]	4.29 (3.11, 5.46)	7.15***	4.33 (3.15, 5.50)	7.24***
Total score on the Alcohol Use Identification Disorders Test (AUDIT-10)[b]	0.08 (0.02, 0.14)	2.42*	0.08 (0.02, 0.15)	2.64*
Forced or coerced into sex with client, ever	1.76 (0.45, 3.06)	2.64**	1.46 (0.16, 2.76)	2.21*
Physically abused by client, ever	2.37 (1.02, 3.73)	3.43***	2.03 (0.69, 3.37)	2.97**
Meets criteria for moderate to severe depression (BDI-II score ≥ 20)	2.70 (1.40, 4.01)	4.06***	2.32 (1.03, 3.61)	3.53***

B = unstandardized regression coefficient

*p<.05

**p<.01

***p<.001 (2-tailed tests)

[a]In past six months

[b]In past year

[c]In past month

[d]Estimates from separate multiple linear regression models for the total effects of our primary factors of interest on impulsivity adjusting for age, number of years of education, and primary sex work venue (street-based versus indoor/establishment-based).

Table 3.

Unprotected vaginal/anal sex with clients[a] regressed on impulsivity, correlates of impulsivity, and covariates among female sex workers in Tijuana and Ciudad Juarez, Mexico (N=575).[b]

Variable	Adjusted B	(95% CI)	t
Age of FSW	−0.005	(−0.009, 0.000)	−2.12*
Number of years of education	−0.011	(−0.027, 0.005)	−1.37
Sex work venue (street-based vs. indoor/establishment-based)	0.048	(−0.046, 0.143)	1.00
Used drugs with clients before or during sex in past 6 months	0.058	(−0.064, 0.179)	0.932
Used heavy drugs (e.g., cocaine, heroin) in past month? (y/n)	0.185	(0.064, 0.305)	3.01**
Alcohol Use Identification Disorders Test (AUDIT) score	0.009	(0.004, 0.014)	3.70***
Sexually abused by client, ever? (y/n)	0.131	(0.022, 0.240)	2.36*
Physically abused by client (hit or assaulted) ever? (y/n)	−0.033	(0.147, 0.081)	−0.564
Moderate to severe clinical depression (BDI-II ≥20)	−0.117	(−0.213, −0.210)	−2.40*
Impulsivity	0.012	(0.006, 0.018)	3.79***

B = unstandardized regression coefficient

* p<.05

** p<.01

*** p<.001 (2-tailed tests)

[a] log 10 transformed

[b] Twenty-seven cases missing data on one or more correlates or the DV.