

Published in final edited form as:

AIDS Care. 2011 June ; 23(6): 714–721. doi:10.1080/09540121.2010.525618.

High prevalence of childhood emotional, physical and sexual trauma among a Canadian cohort of HIV-seropositive illicit drug users

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Abstract

Background—The psychosocial impacts of various types of childhood maltreatment on vulnerable illicit drug-using populations remains unclear. We examined the prevalence and correlates of antecedent emotional, physical and sexual abuse among a community-recruited cohort of adult HIV-seropositive illicit drug users.

Methods—We estimated the prevalence of childhood abuse at baseline using data from the Childhood Trauma Questionnaire, a 28-item validated instrument used to retrospectively assess childhood maltreatment. Logistic regression was used to estimate relationships between sub-types of childhood maltreatment with various social-demographic, drug-using and clinical characteristics.

Results—Overall, 233 HIV-positive injection drug users (IDU) were included in the analysis, including 83 (35.6%) women. Of these, moderate or severe emotional childhood abuse was reported by 51.9% of participants; emotional neglect by 36.9%; physical abuse by 51.1%; physical neglect by 46.8%; and sexual abuse by 41.6%. In multivariate analyses, emotional, physical and sexual abuse were independently associated with greater odds of recent incarceration. Emotional abuse and neglect were independently associated with a score of ≥ 16 on the Centre for Epidemiologic Studies Depression Scale (CES-D). There was no association between any form of childhood maltreatment and clinical HIV variables, including viral load, CD4 count and history of antiretroviral therapy use.

Conclusion—These findings underscore the negative impact of childhood maltreatment on social functioning and mental health in later life. Given the substantial prevalence of childhood maltreatment among this population, there is a need for evidence-based resources to address the deleterious effect it has on the health and social functioning of HIV-positive IDU.

Keywords

childhood trauma; drug users; HIV; social determinants of health

INTRODUCTION

Antecedent childhood abuse is associated with a variety of adverse consequences on adult health and functioning (Briere & Jordan, 2009; Cook, Dickens, & Thapa, 2005; Myers, 2002; van der Kolk, Roth, Pelcovitz, Sunday, & Spinazzola, 2005). Such early childhood stressors and trauma have often been described as an important precursor to substance abuse (Miller, 1999). In particular, several studies have shown that rates of injection drug use are higher among both men (Holmes, 1997; Zierler et al., 1991) and women (Braitstein et al., 2003; Medrano, Hatch, Zule, & Desmond, 2003; Ompad et al., 2005) with a history of sexual abuse. The prevalence of sexual violence and sexual abuse within a cohort of injection drug users (IDU) was 36% and 21%, respectively (Braitstein et al., 2003). Childhood sexual abuse has been postulated to play a mediating role in adult depression, substance abuse, and other risky behaviors (Allen & Tarnowski, 1989; Cunningham, Stiffman, Doré, & Earls, 1994; Stiffman, 1989).

Individuals who use injection drugs suffer from elevated burdens of preventable morbidity and mortality from causes including accidental overdose and HIV infection (Coffin et al., 2003; Tyndall et al., 2003). Holmes reported 20% of men in an HIV seropositive cohort had a history of sexual abuse with the majority being victimized before the age of 11 years (Holmes, 1997). Therefore understanding the impact of childhood maltreatment on participation in high risk activities, such as using injection drugs, is critical to the development of social services geared towards decreasing morbidity amongst this population.

The majority of studies that have evaluated the prevalence of childhood maltreatment among IDU have been primarily limited to sexual abuse. However, it is becoming clearer that many abused victims experience sexual abuse in conjunction with other forms of abuse and maltreatment, including physical and emotional abuse, and physical and emotional neglect (S R Dube et al., 2001; Shanta R Dube, Anda, Felitti, Edwards, & Williamson, 2002; Finkelhor, Ormrod, & Turner, 2007; Hillis, Anda, Felitti, & Marchbanks, 2001). Child neglect has been defined by the National Center of Child Abuse and Neglect as failure to provide for a child's basic physical, emotional, educational, or medical needs (Brayden, Altemeier, Tucker, Dietrich, & Vietze, 1992; Ludwig, 1981). It is the most prevalent form of child abuse accounting for half of the cases reported to child protection services in developing countries (Dubowitz, Giardino, & Gustavson, 2000; Gilbert et al., 2009). Childhood emotional abuse, as defined by the National Center of Child Abuse and Neglect, is abuse that results in impaired psychological growth and development. It involves a pattern of damaging interactions between parents and children that convey to the child that he or she is flawed or unwanted (Kairys & Johnson, 2002). Childhood maltreatment consists of a variety of different types of abuse resulting in a complex, interdependent relationship leading to a range of adverse psychological outcomes. Much less is known about the direct associations of the various types of childhood maltreatment and their subsequent adult symptomatology. Similarly, the possible impacts of childhood maltreatment on HIV-related clinical outcomes among IDU has yet to be determined. Therefore, the objective of this study is to describe the prevalence of the various types of childhood maltreatment (sexual, physical and emotional abuse, and physical and emotional neglect) and to evaluate the links between childhood maltreatment and later health and functioning within a community-recruited prospective cohort of HIV-seropositive IDU.

METHODS

The AIDS Care Cohort to evaluate Exposure to Survival Services (ACCESS) is a prospective observational cohort of HIV-seropositive illicit drug users (IDU) in Vancouver,

Canada. The cohort has been described in detail previously (Strathdee et al., 1998; Wood et al., 2004; Wood et al., 2008), and was populated through snowball sampling and extensive street outreach methods in the city's Downtown Eastside (DTES). The DTES is post-industrial area in the city's downtown core marked by high levels of poverty and homelessness, an open drug market, and an ongoing outbreak of HIV infection (Tyndall et al., 2003). Individuals were eligible for ACCESS if they were aged 18 years or older, HIV seropositive and had used illicit drugs other than cannabinoids in the month prior to the recruitment interview and provided written informed consent. At baseline and every six-month follow-up, participants answer a standardized interviewer-administered questionnaire and provide blood samples for serologic analysis.

As previously described (Strathdee et al., 1998; Wood et al., 2004; Wood et al., 2008), the local setting is somewhat unique in that there is a province wide centralized antiretroviral dispensation program and HIV/AIDS laboratory, which enables a complete prospective profile of all patient CD4 cell count determinations and plasma HIV-1 RNA levels, as well as a complete prospective profile of antiretroviral therapy use among cohort participants. This includes the specific antiretroviral agents prescribed including dose, as well as a validated measure of patient adherence derived from prescription refill compliance (Wood et al., 2008; Wood et al., 2003). The universal healthcare system and centralized antiretroviral dispensary provides free HIV/AIDS care and antiretroviral therapy to all HIV-infected individuals in the province and enables the examination of HIV-related outcomes in a setting where financial barriers to health care and HIV treatment are largely eliminated. The study has been approved by the Providence Health Care/University of British Columbia Research Ethics Board. Plasma HIV-1 RNA was measured using the Roche Amplicor Monitor assay (Roche Molecular Systems, Mississauga, Canada).

The present study included all individuals who were recruited and completed a baseline interview between December 2005 and April 2008. In the present study, the outcome of interest was experiencing childhood abuse and neglect, as measured by responses to the Childhood Trauma Questionnaire (CTQ), a 28-item validated instrument used to retrospectively assess emotional abuse, emotional neglect, physical abuse, physical neglect and sexual abuse. The CTQ provides a score of the severity of childhood abuse and neglect suffered in those five sub-scales. The questionnaire and its scoring has been validated with illicit drug-using populations and shown to provide excellent convergent and discriminant validity with measures of antecedent trauma (Bernstein et al., 2003; Fink, Bernstein, Handelsman, Foote, & Lovejoy, 1995). Consistent with previous analyses using the CTQ (Paivio & Cramer, 2004; Yehuda, Halligan, & Grossman, 2001), we analyzed five dependent variables based on the scores from the five CTQ sub-scales. Participants provided ratings from a five-point score for statements such as: "When I was growing up, I was punished with a belt, a board, a cord, or some other hard object." These scores were converted into a trauma level for each sub-scale: none, low, moderate or severe. For this analysis, we dichotomized the score on each sub-scale into moderate or severe versus all others, based on previous studies among drug-using populations (Braitstein et al., 2003; Medrano, Hatch, Zule, & Desmond, 2002).

As a first step, we examined univariate associations between each dependent variable and a set of socio-demographic, behavioural and clinical explanatory variables. These included: Ethnicity (Aboriginal vs. other); gender (female vs. male); residence in the DTES (yes vs. no); homelessness (yes vs. no); daily heroin injection (yes vs. no); daily cocaine injection (yes vs. no); daily crack cocaine use (yes vs. no); daily crystal methamphetamine use (yes vs. no); public drug use (yes vs. no); methadone maintenance therapy (yes vs. no); recent incarceration (yes vs. no); reporting being unable to access alcohol or drug treatment (yes vs. no); score on the Center for Epidemiologic Studies Depression Scale (CES-D) (≥ 16

versus < 16); participation in the sex trade (yes vs. no); history of mental illness diagnosis (yes vs. no); history of suicide attempt (yes vs. no); history of experiencing barriers to healthcare (yes vs. no); history of antiretroviral therapy (yes vs. no); plasma HIV-1 RNA level (per unit increase); and CD4+ cell count per mm³ (per 100 unit increase). All the behavioural variables except for homelessness and methadone maintenance therapy referred to the six-month period prior to the interview. As in previous analyses, we defined frequent drug use as at least daily use.

Upon examination of the univariate associations, we fit five separate multivariate logistic regression models with each CTQ sub-scale as the dependent variable using model building approach defined *a priori* to include all explanatory variables with a result of $p < 0.05$. All statistical analyses were performed by SAS version 8.0 (SAS, Cary, North Carolina, United States) and all p-values are two-sided.

RESULTS

Between December 2005 and April 2008, 491 individuals were recruited into the ACCESS cohort. Of these, 233 (47.5%) completed the baseline interview including the CTQ section, underwent a nurse examination and had complete clinical profiles including CD4+ cell count, plasma viral load and antiretroviral dispensation history in the Drug Treatment Programme database. Of these 233 participants, 83 (35.6%) were female and 91 (39.1%) reported Aboriginal ethnicity. The prevalence of moderate or severe scores on each sub-scale was: emotional abuse (121, 51.9%); emotional neglect (86, 36.9%); physical abuse (119, 51.1%); physical neglect (109, 46.8%); sexual abuse (97, 41.6%). Thirty-three participants (14.2%) scored moderate or severe on all subscales; 57 (24.5%) score moderate or severe on none of the subscales.

The univariate relationships between moderate or severe scores on each sub-scale and sociodemographic, drug-use and clinical explanatory variables are presented in Table 1. As shown, suffering childhood emotional abuse was associated with higher odds of frequent crack use (Odds Ratio [OR] = 1.79, 95% Confidence Interval: 1.04 – 3.07); recent incarceration (OR = 2.63, 95% CI: 1.27 – 5.45); ≥ 16 on CES-D scale (OR = 2.68, 95% CI: 1.55 – 4.64); a history of mental illness diagnosis (OR = 1.82, 95% CI: 1.07 – 3.07); and a history of suicide attempts (OR = 2.09, 95% CI: 1.20 – 3.64). Emotional neglect was associated with greater odds of methadone maintenance therapy (OR = 1.87, 95% CI: 1.09 – 3.20); ≥ 16 on the CES-D scale (OR = 3.70, 95% CI: 1.98 – 6.87); and a history of suicide attempts (OR = 2.15, 95% CI: 1.23 – 3.74). Physical abuse was associated with greater odds of reporting incarceration (OR=2.10, 95% CI: 1.04–4.24); above 16 score on the CES-D scale (OR=1.87, 95% CI: 1.09–3.20) and a history of suicide attempts (OR=1.87, 95% CI: 1.04–3.07). Physical neglect was associated with a greater odds of living in the DTES (OR = 1.98, 95% CI: 1.13 – 3.49); and participating in the sex trade (OR = 2.16, 95% CI: 1.03 – 4.53). Sexual abuse was associated with greater odds of female gender (OR = 2.23, 95% CI: 1.29 – 3.86); recent incarceration (OR = 2.95, 95% CI: 1.47 – 5.95); ≥ 16 score on the CES-D scale (OR = 2.05, 95% CI: 1.17 – 3.58); participating in the sex trade (OR = 2.78, 95% CI: 1.32 – 5.84); a history of mental illness diagnosis (OR = 2.23, 95% CI: 1.31 – 3.80) and a history of suicide attempts (OR = 2.50, 95% CI: 1.43 – 4.35). Sexual abuse was associated with a lower odds of homelessness (OR = 0.36, 95% CI: 0.15 – 0.88).

The results of the multivariate models including all explanatory variables with p -values < 0.05 in univariate analyses are presented in Table 2. Moderate or severe emotional abuse scores were independently associated with greater odds of recent incarceration (Adjusted Odds Ratio [AOR] = 2.34, 95% CI: 1.08 – 5.04) and ≥ 16 on the CES-D scale (AOR = 2.10, 95% CI: 1.17 – 3.76). Emotional neglect was independently associated with a greater odds

of scoring ≥ 16 on the CES-D scale (AOR = 3.16, 95% CI: 1.66 – 6.00). Physical abuse was independently associated with a greater odds of recent incarceration (AOR = 2.13, 95% CI: 1.03 – 4.42). Physical neglect was independently associated with a greater odds of DTES residence (AOR = 1.82, 95% CI: 1.03 – 3.24). Sexual abuse was independently associated with a greater odds of recent incarceration (AOR = 3.71, 95% CI: 1.68 – 8.21) and a history of suicide attempts (AOR = 2.36, 95% CI: 1.25 – 4.43) and independently associated with a lower odds of homelessness (AOR = 0.30, 95% CI: 0.11 – 0.81).

DISCUSSION

In this study of antecedent childhood abuse in a community-recruited sample of HIV-seropositive IDU, we observed a substantial prevalence of childhood maltreatment, with 51.9% reporting emotional abuse, 36.9% emotional neglect, 51.1% physical abuse, 46.8% physical neglect and 41.6% sexual abuse. Overall, 14.2% of the study population reported suffering from all five types of childhood maltreatment. Although higher than the general population, these rates are similar to those reported in similar studies among both adult and youth drug-using populations (Medrano et al., 2002; Stoltz et al., 2007). This study was unique in its ability to analyze each domain of abuse separately in a cohort of adult IDU using a validated instrument.

In the multivariate models assessing the links between each sub-scale of abuse and various socio-demographic, behavioural and clinical characteristics, we observed strong links between emotional, physical and sexual abuse and a greater risk of recent incarceration. Although the association between child abuse and incarceration has been widely studied (Clarke, Stein, Sobota, Marisi, & Hanna, 1999; Hosser, Raddatz, & Windzio, 2007; Sarchiapone, Carli, Cuomo, Marchetti, & Roy, 2009), we are unaware of any previous studies that have dissected the impact of various types of childhood abuse including emotional abuse and neglect (Felson & Lane, 2009). It has been suggested that childhood emotional abuse can interfere with youth's development of the coping skills needed to deal with high-risk behaviours, and this in turn increases vulnerability to working in the sex trade (Stoltz et al., 2007). It has also been suggested that early childhood neglect is associated with higher rates of delinquent and criminal behaviour potentially resulting in higher rates of incarceration (Kotch et al., 2008). With this in mind, early intervention and support services for emotionally abused and neglected children and youth should be a cornerstone of treatment for at-risk youth. A multi-disciplinary community based team approach should be taken involving case managers, teachers, social workers, pediatricians and child mental health specialist to provide holistic care for neglected children. Owing to its link with incarceration, emotional abuse should also be more actively managed in high-risk adult populations through publically funded individual psychotherapy and group therapy. Previous studies have shown incarceration to be associated with negative health outcomes such as increased risk of HIV infection. In order to break the cycle of childhood trauma, high risk behaviour, incarceration and morbidity, childhood emotional abuse and neglect needs to be aggressively addressed in the community. As well, the perpetuating cycle of childhood abuse and neglect should be interrupted by instituting parenting and mentorship programs in high-risk communities.

Similar to the association with incarceration, study participants who suffered from emotional abuse had a higher risk of scoring above 16 on the CES-D scale, representing clinical depression. Childhood maltreatment has been associated with adult depression in a number of previous studies (Danese et al., 2009; Doyle, 2001; Driessen, Schroeder, Widmann, von Schönfeld, & Schneider, 2006; Neigh, Gillespie, & Nemeroff, 2009). Of interest in this study is the association of both emotional abuse and emotional neglect with significantly increased number of participants reporting depressive symptoms on the CES-D scale. When

assessing childhood maltreatment in a high-risk population such as HIV-seropositive IDU, it is important to consider not only abuse, but emotional neglect as well. It has been suggested that the promotion of healthy psychosocial experiences for children is a potentially cost-effective target for the prevention of a variety of illnesses, including depression (Danese et al., 2009). Similarly, adults who have suffered from childhood emotional abuse and neglect should have access to community resources to mitigate the effects of the maltreatment, and potentially decrease rates of depression and incarceration.

One unique aspect of the ACCESS cohort is the inclusion of clinical data such as CD4+ cell counts and HIV-1 plasma viral load. The dataset also includes information regarding antiretroviral therapy (ART), and whether or not participants are ART-naïve or ART-exposed. Using a multivariate analysis, we looked for associations between various forms of childhood maltreatment and HIV disease status and access to ART. Unlike depression and incarceration, we did not observe an association between childhood maltreatment and disease severity in these analyses. This lack of association is not surprising considering our study was based on cross-sectional data.

The present study is limited not only by its cross-sectional nature but also by the fact that ACCESS is not a random sample. As IDU are a hidden population lacking comprehensive censuses on which to base random methods of recruitment, we used community-based methods including snowball sampling to minimize this bias. Also, less than half of the participants originally recruited to the ACCESS cohort completed the baseline interview including the CTQ section because of the sensitive nature of its content; thus, our prevalence estimates likely underestimate the true level of antecedent childhood abuse in this cohort. Although many of the measures are based on participant self-report, we used validated scales wherever possible, including the CTQ to measure childhood maltreatment and the CES-D to assess clinical depression. Regardless, recall bias may contribute to the correlation of childhood neglect and depression as study participants who experience depression may be more likely to recall negative events such as childhood abuse.

This study confirms the high prevalence of childhood abuse experienced by HIV-seropositive illicit drug users. Further, it expands on this theme by assessing the prevalence of various sub-types of childhood abuse. Considering the negative impact various types of childhood maltreatment have on adult health outcomes, future research and policy development should focus on isolating these relationships and developing resources to mitigate their effect.

Acknowledgments

The authors thank the study participants for their contribution to the research as well as current and past researchers and staff. We would specifically like to thank Deborah Graham, Tricia Collingham, Caitlin Johnston, Steve Kain and Calvin Lai for their research and administrative assistance. The study was supported by the US National Institutes of Health (R01DA021525) and the Canadian Institutes of Health Research (MOP-79297, RAA-79918). Thomas Kerr is supported by the Michael Smith Foundation for Health Research and the Canadian Institutes of Health Research. M-J Milloy holds a Banting and Best Doctoral Research Award from the Canadian Institutes of Health Research.

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TABLE 1

Univariate relationships between moderate or severe scores on CTQ sub-scales and sociodemographic, drug-using and clinical variables at baseline, ACCESS

Characteristics	EMOTIONAL ABUSE (Moderate/severe vs. non-low) OR¹ (95% CI²)	EMOTIONAL NEGLECT (Moderate/severe vs. non-low) OR¹ (95% CI²)	PHYSICAL ABUSE (Moderate/severe vs. non-low) OR¹ (95% CI²)	PHYSICAL NEGLECT (Moderate/severe vs. non-low) OR¹ (95% CI²)	SEXUAL ABUSE (Moderate/severe vs. non-low) OR¹ (95% CI²)
Ethnicity (Aboriginal vs other)	0.79 (0.47 – 1.34)	1.03 (0.60 – 1.78)	1.39 (0.82 – 2.35)	1.38 (0.81 – 2.34)	1.46 (0.86 – 2.49)
Gender (Female vs male)	1.56 (0.91 – 2.69)	1.66 (0.96 – 2.88)	1.31 (0.77 – 2.25)	1.37 (0.80 – 2.34)	2.23 (1.29 – 3.86)
DTEs residence (Yes vs no)	0.89 (0.51 – 1.54)	1.54 (0.86 – 2.77)	0.99 (0.57 – 1.70)	1.98 (1.13 – 3.49)	1.73 (0.98 – 3.06)
Homelessness (Yes vs no)	0.99 (0.46 – 2.10)	0.79 (0.35 – 1.77)	1.19 (0.56 – 2.54)	1.45 (0.68 – 3.10)	0.36 (0.15 – 0.88)
Frequent heroin use ³ (Yes vs no)	0.96 (0.50 – 1.84)	1.04 (0.53 – 2.05)	1.12 (0.58 – 2.15)	1.38 (0.72 – 2.66)	0.82 (0.42 – 1.60)
Frequent cocaine use ³ (Yes vs no)	1.02 (0.42 – 2.50)	0.84 (0.33 – 2.17)	0.86 (0.35 – 2.11)	0.84 (0.34 – 2.08)	1.31 (0.53 – 3.21)
Frequent crack use ³ (Yes vs no)	1.79 (1.04 – 3.07)	1.16 (0.67 – 2.01)	1.21 (0.71 – 2.06)	1.59 (0.93 – 2.72)	1.43 (0.84 – 2.45)
Frequent CM use ³ (Yes vs no)	1.66 (0.47 – 5.82)	2.13 (0.63 – 7.20)	2.67 (0.69 – 10.31)	2.06 (0.59 – 7.23)	2.57 (0.73 – 9.02)
Public drug use ³ (Yes vs no)	1.33 (0.57 – 3.14)	1.03 (0.43 – 2.46)	1.39 (0.59 – 3.26)	2.04 (0.85 – 4.87)	0.67 (0.28 – 1.64)
Current MMT (Yes vs no)	1.42 (0.85 – 2.39)	1.87 (1.09 – 3.20)	1.14 (0.68 – 1.92)	0.89 (0.53 – 1.49)	1.60 (0.94 – 2.71)
Recent incarceration ³ (Yes vs no)	2.63 (1.27 – 5.45)	1.12 (0.56 – 2.23)	2.10 (1.04 – 4.24)	1.78 (0.90 – 3.52)	2.95 (1.47 – 5.95)
Denied ATX ³ (Yes vs no)	0.73 (0.19 – 2.80)	2.21 (0.58 – 8.45)	0.76 (0.20 – 2.90)	1.44 (0.38 – 5.51)	0.39 (0.08 – 1.91)
CES-D score (≥16 vs <16)	2.68 (1.55 – 4.64)	3.70 (1.98 – 6.87)	1.87 (1.10 – 3.20)	1.53 (0.89 – 2.61)	2.05 (1.17 – 3.58)
Sextrade participation ³ (Yes vs no)	1.69 (0.81 – 3.55)	1.34 (0.65 – 2.78)	1.76 (0.84 – 3.69)	2.16 (1.03 – 4.53)	2.78 (1.32 – 5.84)
Mental illness diagnosis ⁴ (Y vs n)	1.82 (1.07 – 3.07)	0.93 (0.54 – 1.58)	1.68 (1.00 – 2.83)	1.14 (0.68 – 1.91)	2.23 (1.31 – 3.80)
Suicide attempt ⁴ (Yes vs no)	2.09 (1.20 – 3.64)	2.15 (1.23 – 3.74)	1.87 (1.08 – 3.25)	1.53 (0.89 – 2.64)	2.50 (1.43 – 4.35)
Healthcare barriers ⁴ (Yes vs no)	1.41 (0.83 – 2.40)	1.12 (0.65 – 1.92)	1.73 (1.01 – 2.95)	1.38 (0.81 – 2.34)	1.57 (0.92 – 2.68)
Antiretroviral therapy ⁴ (Yes vs no)	1.11 (0.63 – 1.97)	1.83 (0.98 – 3.41)	1.06 (0.60 – 1.88)	0.84 (0.47 – 1.48)	1.36 (0.76 – 2.45)
pVL (per log ₁₀ increase)	1.00 (0.82 – 1.23)	0.92 (0.74 – 1.13)	0.93 (0.76 – 1.14)	0.92 (0.75 – 1.12)	0.87 (0.71 – 1.07)
cd4 (per 100 cells/mm ³ increase)	0.92 (0.82 – 1.03)	0.95 (0.84 – 1.07)	1.05 (0.93 – 1.17)	1.07 (0.95 – 1.20)	0.90 (0.80 – 1.02)

¹ Odds Ratio;

² 95% Confidence Interval;

³ Refers to six month period prior to interview;

⁴ Refers to any time in the past

TABLE 2

Multivariate relationships between moderate or severe scores on CTQ sub-scales and sociodemographic, drug-using and clinical variables at baseline, ACCESS

Characteristics	EMOTIONAL ABUSE (Moderate/severe vs. non-low) OR ¹ (95% CI ²)	EMOTIONAL NEGLECT (Moderate/severe vs. non-low) OR ¹ (95% CI ²)	PHYSICAL ABUSE (Moderate/severe vs. non-low) OR ¹ (95% CI ²)	PHYSICAL NEGLECT (Moderate/severe vs. non-low) OR ¹ (95% CI ²)	SEXUAL ABUSE (Moderate/severe vs. non-low) OR ¹ (95% CI ²)
Ethnicity (Aboriginal vs other)					1.58 (0.82 – 3.03)
Gender (Female vs male)					1.44 (0.76 – 2.71)
DTES residence (Yes vs no)				1.82 (1.03 – 3.24)	0.30 (0.11 – 0.81)
Homelessness (Yes vs no)					
Frequent heroin use ³ (Yes vs no)					
Frequent cocaine use ³ (Yes vs no)					
Frequent crack use ³ (Yes vs no)	1.71 (0.97 – 3.04)				
Frequent CM use ³ (Yes vs no)					
Public drug use ³ (Yes vs no)					
Current MMT (Yes vs no)		1.67 (0.94 – 2.95)			
Recent incarceration ³ (Yes vs no)	2.34 (1.08 – 5.04)		2.13 (1.03 – 4.42)		3.71 (1.68 – 8.21)
Denied ATX ³ (Yes vs no)					
CES-D score (≥16 vs <16)	2.10 (1.17 – 3.76)	3.16 (1.66 – 6.00)	1.43 (0.80 – 2.54)		1.34 (0.71 – 2.51)
Sextrade participation ³ (Yes vs no)				1.88 (0.88 – 4.00)	1.89 (0.76 – 4.67)
Mental illness diagnosis ⁴ (Y vs n)			1.36 (0.77 – 2.39)		1.50 (0.81 – 2.78)
Suicide ⁴ (Yes vs no)	1.65 (0.90 – 3.02)	1.64 (0.91 – 2.97)			2.36 (1.25 – 4.43)
Healthcare barriers ⁴ (Yes vs no)			1.57 (0.90 – 2.72)		
Antiretroviral therapy ⁴ (Yes vs no)		1.61 (0.84 – 3.11)			
pVL (per unit increase)					
cd4 (per unit increase)					

¹ Odds Ratio;

²95% Confidence Interval;

³Refers to six month period prior to interview;

⁴Refers to any time in the past