Published in final edited form as:

Health Soc Care Community. 2017 March ; 25(2): 378–384. doi:10.1111/hsc.12314.

HIGH SCHOOL INCOMPLETION AND CHILDHOOD MALTREATMENT AMONG STREET-INVOLVED YOUNG PEOPLE IN VANCOUVER, CANADA

Brittany Barker, MPP (Master of Public Policy)^{1,2}, Thomas Kerr, PhD^{1,3}, Huiru Dong, MSc¹, Evan Wood, MD, PhD^{1,3}, and Kora DeBeck, PhD^{1,4}

¹Urban Health Research Initiative, British Columbia Centre for Excellence in HIV/AIDS, 608-1081 Burrard Street, Vancouver, BC V6Z 1Y6, Canada

²Interdisciplinary Studies Graduate Program, Department of Medicine, University of British Columbia, Room 667, 1081 Burrard Street, Vancouver, BC V6Z 1Y6, Canada

³Division of AIDS, Department of Medicine, University of British Columbia, Room 667, 1081 Burrard Street, Vancouver, BC V6Z 1Y6, Canada

⁴School of Public Policy, Simon Fraser University, 515 West Hastings Street, Vancouver, BC V6B 5K3, Canada

Abstract

While the link between educational attainment and future health and wellness is well understood, little investigation has considered the potential impacts of distinct forms of childhood maltreatment on high school completion. In the present study, the relationship between five categories of childhood maltreatment (physical, emotional, and sexual abuse, and physical and emotional neglect) and completion of high school education were examined using the Childhood Trauma Questionnaire (CTQ). From September 2005 to May 2013, data were collected for the At-Risk Youth Study (ARYS), a cohort of street-involved young people who use illicit drugs in Vancouver, Canada. We used logistic regression to examine the relationship between childhood maltreatment and high school completion, while controlling for a range of potential confounding variables. Specifically, five separate models for each category of maltreatment and two combined models were employed to examine the relative associations between, and cumulative impact of, different forms of childhood maltreatment and educational attainment. Among 974 young people, 737 (76%) reported not completing high school. In separate multivariable analyses physical abuse, emotional abuse, physical neglect, and emotional neglect remained positively and independently associated with an incomplete high school education. In a combined multivariable model with all forms of childhood maltreatment considered together, emotional abuse (adjusted odds ratio = 2.08; 95% confidence interval: 1.51–2.86) was the only form of maltreatment that remained significantly associated with an incomplete high school education. The cumulative impact assessment indicated a moderate dose-dependent trend where the greater the number of different forms of childhood maltreatment the greater the risk of not completing a high school education.

These findings point to the need for trauma-informed interventions to improve educational attainment among vulnerable young people, as well as evidence-based prevention programmes, such as the Nurse–Family Partnership, aimed at supporting at-risk families before maltreatment occurs.

Keywords

child abuse; child/adolescent mental health; Childhood Trauma Questionnaire; education; homelessness; substance use

INTRODUCTION

It is well established that an incomplete secondary education negatively affects both individuals and society as a whole. It has been estimated that the average cost to the American economy per individual who does not complete high school is approximately \$240,000 over the life course (Chapman et al. 2011). Individually, the social and health-related harms associated with an incomplete high school education are numerous and include: elevated rates of heart disease, diabetes, obesity, depression and other mental health problems (Winkleby et al. 1992, Smith et al. 1998, Liem et al. 2001, Everson et al. 2002); reliance on social assistance and acute poverty (Beaulieu et al. 2005); high-risk of incarceration (Blomberg et al. 2011, Ewert et al. 2014); and teenage pregnancies (Marcotte 2013). In the past several decades, a growing number of research studies have documented the cognitive and developmental delays associated with childhood maltreatment in relation to education including: lower school readiness, poor school performance and attendance, higher levels of behavioural and social problems (Lansford et al. 2002), lower IQ and reading ability scores (Perez & Widom 1994), and lower rates of high school completion (Lansford et al. 2007). Further, previous studies have begun to unpack the aggregate effect of childhood maltreatment on various health and social outcomes, such as depression and mental health functioning (Wanklyn et al. 2012), parenting (Bailey et al. 2012), adult attachment, psychotic symptomatology (van Dam et al. 2014), substance use, and sexual risk behaviours (Rodgers et al. 2004). However, to our knowledge, we know of no studies that have sought to address the cumulative or differential impact of distinct forms of childhood maltreatment on high school educational attainment among high-risk young people. As childhood maltreatment is a risk factor for many poor outcomes across the life course, and given the negative consequences of not completing high school, it is imperative to assess the cumulative and differential impacts of various forms of childhood maltreatment on educational attainment to better inform future interventions. As such, the present study was undertaken to assess the impact of maltreatment on high school completion using the Childhood Trauma Questionnaire (CTQ) among street-involved (defined as being homeless, unstably housed or using street-based services) young people who use drugs.

METHODS

Data for this cross-sectional study were collected for the At-Risk Youth Study (ARYS) between September 2005 and May 2013 at the baseline study visit. ARYS is a prospective

cohort of street-involved young people who use illicit drugs in Vancouver, Canada that has been previously described elsewhere (Wood et al. 2006); however, in brief, recruitment was undertaken using snowball sampling with extensive outreach efforts in order to maximise the representativeness of this sample. Outreach efforts include posting study invitation notices at street-based services in Vancouver, connecting with frontline staff at street-based services to encourage study referrals to eligible youth, and regular walkabouts by field office staff (who include formerly street-involved young people) to inform young people on the street about the ARYS study and office location. Young people were eligible for participation if they were between the ages of 14 and 26 at time of enrolment, had used illicit 'hard' drugs in the past 30 days (e.g. crack, cocaine, heroin, or crystal methamphetamine) and provided written informed consent. At baseline and subsequent semi-annual follow-up, participants complete a lengthy interviewer-administered questionnaire and the Providence Healthcare/University of British Columbia Research Ethics Board approved this study.

Our main outcome of interest was those who reported not completing high school due to dropping out or expulsion. The main exposure of interest were the five forms of maltreatment as rendered by the Childhood Trauma Questionnaire (CTQ), which uses 25 items to assess five different forms of childhood maltreatment, specifically, physical, sexual, and emotional abuse and physical and emotional neglect (Bernstein & Fink 1998). Using a five-point scale, participants provide ratings for statements such as 'When I was growing up I had to wear dirty clothes' and 'I got hit or beaten so badly that it was noticed by someone like a teacher, neighbor, or doctor'. Each scale yields a total score for that type of maltreatment and there are four levels of maltreatment: none (to minimal), low (to moderate), moderate (to severe), and severe (to extreme). As in previous work, we have collapsed the maltreatment levels into two categories, 'none/low' and 'moderate/severe' (Stoltz et al. 2007, Kerr et al. 2009, Hadland et al. 2012). The CTQ has been shown to be valid and reliable when applied to drug using and adolescent populations (Bernstein et al. 2003). Other variables of interest were chosen based on a known association (Wright et al. 2009, Lansford et al. 2010, Helfrich & McWey 2014, Keuroghlian et al. 2014) or due to their antecedent nature to dropping out of high school and included: gender (female vs. male); ethnicity (white vs. other); sexual orientation (lesbian, gay, bisexual, and transgender vs. heterosexual); first hard drug use before age 18 (< age 18 vs. age 18); guardian or parent that drank heavily or used illicit drugs (yes vs. no); child welfare system exposure (yes vs. no); having a history of homelessness (ever been homeless vs. no); age at first sexual experience (per year older); and engagement in sex work before age 18 (< age 18 vs. age 18).

As a first step, Pearson's correlations were estimated between all pairs of childhood maltreatment variables to show the degree of overlap (Pearson's correlation between a pair of dichotomous variables is equivalent to the phi statistic). Next, we compared the characteristics of those who had and had not completed a high school education. Dichotomous variables were analysed using Pearson's chi-square test and the Mann-Whitney test for continuous variables. Next, we fitted a separate multivariable confounding model for each type of the five forms of maltreatment. This approach was based on previous studies that employed a similar method using the CTQ (Stoltz et al. 2007, Lake et al. 2015), and in an effort to avoid issues of collinearity between the various measures of maltreatment.

To fit each of the five multivariable confounding models, we employed a conservative variable selection approach (Maldonado & Greenland 1993). Specifically, we included all secondary variables, where $P < 0.10$ in bivariable analyses, in each of the multivariable models and used a stepwise approach to fit a reduced final model that considered each type of maltreatment. After comparing the value of the coefficient associated with the main independent variable of interest in each of the full models to the value of the coefficient in each of the reduced models, we dropped the secondary variable associated with the smallest relative change. We continued this iterative process until the minimum change exceeded 5%. Remaining variables were considered confounders in each of the five multivariable analyses. Several authors have previously used this technique successfully (Maldonado & Greenland 1993, Lima & Kopeck 2005, Lima et al. 2007, Marshall et al. 2009). Next, we considered all covariates together, including the five forms of childhood maltreatment into one combined model with the main outcome of interest being reports of high school incompleteness and used a backward model selection procedure to identify the final model with the best overall fit as indicated by the lowest AIC value (Akaike 1974).

Finally, using the same model building protocol and covariates of interest, we built a multivariable model to assess the cumulative impact of multiple forms of childhood maltreatment on high school completion. To do this we created a categorical variable for childhood maltreatment based on the number of different moderate-severe forms of childhood maltreatment that participants reported having experienced in childhood. No maltreatment was defined as the reference category vs. one form, two to three forms, and four to five forms. All statistical analyses were performed using SAS software version 9.3 (SAS, Cary, NC, USA).

RESULTS

Between September 2005 and May 2013, 974 young people were included in this study. The median age was 22 (IQR: 20–24), with 737 (76%) participants who reported not completing high school, including 230 females (31%). Among these young people: 154 (16%) reported experiencing sexual abuse; 272 (28%) reported physical abuse; 475 (49%) reported emotional abuse; 276 (28%) reported physical neglect; and 439 (45%) reported emotional neglect. Additionally, the cumulative frequencies (i.e. young people who experienced multiple forms of abuse) are presented in Table 1. Table 2 shows the degree of overlap between the five abuse variables using Pearson's correlation. All correlations were significant at $P < 0.001$. Four of the five maltreatment categories were positively and moderately to strongly correlated with one another (between 0.45 and 0.67). It should be noted that while sexual abuse was also positively correlated, it was the most weakly associated of all variables.

In bivariable analysis, factors associated with high school incompleteness included physical abuse, emotional abuse, physical neglect, emotional neglect, first hard drug use before age 18, history of child welfare system exposure, history of homelessness, engagement in sex work before age 18, and age at first sexual experience (all $P < 0.10$; Table 3). After intensive adjustment for a range of confounding variables, the five multivariable confounding analyses (Table 4) indicated that four forms of maltreatment remained significantly and independently

associated with not completing a high school education: physical abuse [adjusted odds ratio (AOR) = 1.63; 95% confidence interval (CI): 1.11–2.39]; emotional abuse (AOR = 2.20; 95% CI: 1.61–3.00); physical neglect (AOR = 1.55, 95% CI: 1.06–2.26); and emotional neglect (AOR = 1.69, 95% CI: 1.23–2.32). Sexual abuse was not independently associated with high school incompleteness.

Table 5 shows the multivariable results of the combined model for factors associated with an incomplete secondary education. Emotional abuse was the only form of maltreatment that remained independently and significantly associated with not completing a high school education (AOR = 2.08, 95% CI: 1.51–2.86) when all covariates were considered together in a combined model. Table 6 shows the cumulative effect of multiple forms of childhood maltreatment. At the bivariable level, a dose-dependent trend was observed where the greater the number of forms of maltreatment the greater the odds of not completing high school. A moderate dose-dependent trend was observed in multivariable analysis.

DISCUSSION

In our study involving high-risk young people, we found that four of the five forms of childhood maltreatment remained independently associated with not completing high school after adjusting for a range of sociodemographic and other potential antecedent variables. When all covariates were considered together in a combined model, emotional abuse was the only form of childhood maltreatment that remained independently and positively associated with not completing high school education. Lastly, the analysis of the cumulative effect of multiple forms of childhood maltreatment suggests a dose-dependent trend at the bivariable level, and a moderate dose-dependent trend in multivariable analysis.

Our study is consistent with previous research that has documented a relationship between various forms of childhood maltreatment, poor school performance and overall lower educational achievement (Perez & Widom 1994, Lansford et al. 2002, Jonson-Reid et al. 2004, Gilbert et al. 2009). However, to our knowledge this is the first study to examine the relationship between five forms of childhood maltreatment, as measured by a well-validated questionnaire, and high school incompleteness. Our findings that both distinct and cumulative forms of maltreatment are associated with not completing high school demonstrate the debilitating and long-term impact of various forms of child abuse and neglect throughout the life course.

When the five forms of childhood maltreatment were considered together, emotional abuse was the only form of maltreatment that remained significantly associated with an incomplete high school education. Emotional abuse is defined as chronic psychological maltreatment or non-physical aggression, such as yelling, belittling, or terrorising a child (Spertus et al. 2003, Hornor 2012). This is of particular importance as emotional maltreatment may be the most prevalent, and yet, understudied form of childhood maltreatment (Egeland 2009, Wright et al. 2009, Yates & Wekerle 2009, Hornor 2012). This may be due to the fact that when compared to physical or sexual abuse, emotional maltreatment is more difficult to define and identify, and an erroneous belief persists that residual effects of emotional abuse are not as severe (Egeland 2009, Yates & Wekerle 2009, Hornor 2012). Long-term

maladaptive outcomes associated with emotional abuse include: anxiety, dissociation, depression, suicide, somatic complaints, difficulties with interpersonal relationships and elevated PTSD symptomatology (Spertus et al. 2003, Wright et al. 2009, Horner 2012).

Together with previous research, this study's findings that distinct forms of childhood maltreatment have a deleterious impact on educational attainment demonstrate a critical need for trauma-informed interventions to support vulnerable young people. Trauma-informed care is predicated on establishing a safe environment, building positive and healthy human connections, and managing emotions and impulses in maltreated young people (Bath 2008). The Cognitive Behavioral Intervention for Trauma in Schools is an example of a trauma-informed, evidence-based intervention that has been shown to improve student mental health, psychosocial functioning and school performance (Stein et al. 2003, Wong 2006, Jaycox et al. 2012). Developing and implementing 'trauma-informed systems' that can adequately support the behavioural consequences of maltreated young people throughout the life course is imperative for future research (Sanchez & Kelly 2015).

Interventions to prevent child maltreatment are also required. Multiple randomised control trials have found that the Nurse–Family Partnership is an effective evidence-based intervention that supports at-risk mothers and prevents specific forms of childhood maltreatment, namely physical abuse and neglect (Olds 2006, MacMillan et al. 2009, Olds et al. 2014, 2015). In the Nurse–Family Partnership model a nurse is placed with first-time, low income mothers and provides pre- and postnatal support that tapers off when the child is two years old (MacMillan et al. 2009). The Early Start programme is another example of an evidence-based intervention; one that utilises intensive home-visitations to support vulnerable families and has been shown to result in improved child health and diminished injuries, indicators of child neglect and abuse (Fergusson et al. 2005, MacMillan et al. 2009). Unfortunately, there are currently no known evidence-based interventions to prevent emotional abuse among young people (MacMillan et al. 2009). As such, further research in this area is particularly warranted.

This study has several limitations. First, as with all community-recruited research cohorts, the ARYS cohort is not a random sample and therefore may not generalise to other populations of young people who have experienced childhood maltreatment, particularly those who are not street-involved or do not engage in illicit substance use. Further, our data cannot determine the exact timeline of when maltreatment occurred and therefore may not be able to ascertain the relative and differential impacts that childhood maltreatment has on an individual. Second, data were collected using self-reported interviews and is thus vulnerable to response bias. In particular, we may have underestimated some sensitive experiences, such as childhood maltreatment. However, we feel that the use of a well-established measure of childhood trauma helped mitigate this potential problem (Bernstein et al. 2003). Lastly, although we have taken statistical measures to assess collinearity between the five separate models of childhood maltreatment and high school incompleteness, we acknowledge that these distinct forms of maltreatment often co-exist and therefore may not be adequately controlled for in the present study.

In summary we found that four of the five childhood maltreatment forms – physical abuse, emotional abuse, physical neglect, and emotional neglect – were independently associated with an incomplete high school education, despite adjustment for a range of potential confounding variables. Further, when all forms of maltreatment were considered in a combined model, emotional abuse was the only form of childhood maltreatment that remained independently associated with not completing a secondary education. Study findings point to the need for trauma-informed interventions to support vulnerable young people with a history of maltreatment through their education, as well as, programmes that support at-risk parents to prevent maltreatment before it occurs.

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 Cody Callon, Jennifer Matthews, Deborah Graham, Peter Vann, Steve Kain, Tricia Collingham, Kristie Starr, and Carmen Rock for their research and administrative assistance. Authors also thank the anonymous peer reviewers' whose comments helped to improve the analysis.

Funding

The study was supported by the US National Institutes of Health (R01DA028532, U01DA038886) and the Canadian Institutes of Health Research (MOP-102742). This research was undertaken, in part, thanks to funding from the Canada Research Chairs program through a Tier 1 Canada Research Chair in Inner City Medicine, which supports Dr Evan Wood. Dr Kora DeBeck is supported by a MSFHR/St. Paul's Hospital Foundation-Providence Health Care Career Scholar Award and a Canadian Institutes of Health Research New Investigator Award. Brittany Barker is supported by a Canadian Institutes of Health Research Doctoral Award. Funding sources had no further role in the study design; in the collection, analysis and interpretation of data; in the writing of the report; or in the decision to submit the paper for publication.

References

- Akaike H. A new look at the statistical model identification. *IEEE Transactions on Automatic Control*. 1974; 19:716–723.
- Bailey HN, DeOliveira CA, Wolfe VV, Evans EM, Hartwick C. The impact of childhood maltreatment history on parenting: a comparison of maltreatment types and assessment methods. *Child Abuse & Neglect*. 2012; 36:236–246. [PubMed: 22444714]
- Bath H. The three pillars of trauma-informed care. *Reclaiming Children & Youth*. 2008; 17:17–21.
- Beaulieu N, Duclos JY, Fortin B, Rouleau M. Intergenerational reliance on social assistance: evidence from Canada. *Journal of Population Economics*. 2005; 18:539–562.
- Bernstein, DP., Fink, L. *Childhood Trauma Questionnaire: A Retrospective Self-Report Manual*. The Psychological Corporation; San Antonio, TX: 1998.
- Bernstein DP, Stein JA, Newcomb MD, et al. Development and validation of a brief screening version of the Childhood Trauma Questionnaire. *Child Abuse & Neglect*. 2003; 27:169–190. [PubMed: 12615092]
- Blomberg TG, Bales WD, Mann K, Piquero AR, Berk RA. Incarceration, education and transition from delinquency. *Journal of Criminal Justice*. 2011; 39:355–365.
- Chapman, C., Laird, J., Ifill, N., KewalRamani, A. U. S. D. o. Education. *Trends in High School Dropout and Completion Rates in the United States: 1972–2009*. National Center for Education Statistics; Washington, DC: 2011.
- van Dam DS, Korver-Nieberg N, Velthorst E, et al. Childhood maltreatment, adult attachment and psychotic symptomatology: a study in patients, siblings and controls. *Social Psychiatry and Psychiatric Epidemiology*. 2014; 49:1759–1767. [PubMed: 24934617]
- Egeland B. Taking stock: childhood emotional maltreatment and developmental psychopathology. *Child Abuse & Neglect*. 2009; 33:22–26. [PubMed: 19167068]

- Everson SA, Maty SC, Lynch JW, Kaplan GA. Epidemiologic evidence for the relation between socioeconomic status and depression, obesity, and diabetes. *Journal of Psychosomatic Research*. 2002; 53:891–895. [PubMed: 12377299]
- Ewert S, Sykes BL, Pettit B. The degree of disadvantage: incarceration and inequality in education. *The ANNALS of the American Academy of Political and Social Science*. 2014; 651:24–43.
- Fergusson DM, Grant H, Horwood LJ, Ridder EM. Randomized trial of the early start program of home visitation. *Pediatrics*. 2005; 116:e803–e809. [PubMed: 16322138]
- Gilbert R, Widom CS, Browne K, Fergusson D, Webb E, Janson S. Burden and consequences of child maltreatment in high-income countries. *The Lancet*. 2009; 373:68–81.
- Hadland SE, Marshall BDL, Kerr T, Qi J, Montaner JS, Wood E. Suicide and history of childhood trauma among street youth. *Journal of Affective Disorders*. 2012; 136:377–380. [PubMed: 22153920]
- Helfrich CM, McWey LM. Substance use and delinquency: high-risk behaviors as predictors of teen pregnancy among adolescents involved with the child welfare system. *Journal of Family Issues*. 2014; 35:1322–1338.
- Hornor G. Emotional maltreatment. *Journal of Pediatric Health Care*. 2012; 26:436–442. [PubMed: 23099310]
- Jaycox L, Stein B, Langley A, Wong M, Kataoka S. Cognitive behavioral intervention for trauma in schools. *Journal of Applied School Psychology*. 2012; 28:239.
- Jonson-Reid M, Drake B, Kim J, Porterfield S, Han L. A prospective analysis of the relationship between reported child maltreatment and special education eligibility among poor children. *Child Maltreatment*. 2004; 9:382–394. [PubMed: 15538037]
- Kerr T, Stoltz JA, Marshall BDL, Lai C, Strathdee SA, Wood E. Childhood trauma and injection drug use among high-risk youth. *Journal of Adolescent Health*. 2009; 45:300–302. [PubMed: 19699428]
- Keuroghlian AS, Shtasel D, Bassuk EL. Out on the street: a public health and policy agenda for lesbian, gay, bisexual, and transgender youth who are homeless. *American Journal of Orthopsychiatry*. 2014; 84:66–72. [PubMed: 24826829]
- Lake S, Hayashi K, Milloy MJ, et al. Associations between childhood trauma and non-fatal overdose among people who inject drugs. *Addictive Behaviors*. 2015; 43:83–88. [PubMed: 25588793]
- Lansford JE, Dodge KA, Pettit GS, Bates JE, Crozier J, Kaplow J. A 12-year prospective study of the long-term effects of early child physical maltreatment on psychological, behavioral, and academic problems in adolescence. *Archives of Pediatrics & Adolescent Medicine*. 2002; 156:824–830. [PubMed: 12144375]
- Lansford JE, Miller-Johnson S, Berlin LJ, Dodge KA, Bates JE, Pettit GS. Early physical abuse and later violent delinquency: A prospective longitudinal study. *Child Maltreatment*. 2007; 12:233–245. [PubMed: 17631623]
- Lansford JE, Dodge KA, Pettit GS, Bates JE. Does physical abuse in early childhood predict substance use in adolescence and early adulthood? *Child Maltreatment*. 2010; 15:190–194. [PubMed: 20019026]
- Liem, J., Dillon, C., Gore, S. Mental health consequences associated with dropping out of high school. *Annual Conference of the American Psychological Association*; San Francisco, CA. 2001.
- Lima VD, Kopec JA. Quantifying the effect of health status on health care utilization using a preference-based health measure. *Social Science & Medicine*. 2005; 60:515–524. [PubMed: 15550300]
- Lima V, Geller J, Bangsberg D, et al. The effect of adherence on the association between depressive symptoms and mortality among HIV-infected individuals first initiating HAART. *AIDS*. 2007; 21:1175–1183. [PubMed: 17502728]
- MacMillan HL, Wathen CN, Barlow J, Fergusson DM, Leventhal JM, Taussig HN. Interventions to prevent child maltreatment and associated impairment. *The Lancet*. 2009; 373:250–266.
- Maldonado G, Greenland S. Simulation study of confounder-selection strategies. *American Journal of Epidemiology*. 1993; 138:923–936. [PubMed: 8256780]
- Marcotte DE. High school dropout and teen childbearing. *Economics of Education Review*. 2013; 34:258–268.

- Marshall BDL, Kerr T, Shoveller JA, Patterson TL, Buxton JA, Wood E. Homelessness and unstable housing associated with an increased risk of HIV and STI transmission among street-involved youth. *Health & Place*. 2009; 15:783–790.
- Olds DL. The nurse–family partnership: an evidence-based preventive intervention. *Infant Mental Health Journal*. 2006; 27:5–25.
- Olds DL, Kitzman H, Knudtson MD, Anson E, Smith JA, Cole R. Effect of home visiting by nurses on maternal and child mortality: Results of a 2-decade follow-up of a randomized clinical trial. *JAMA Pediatrics*. 2014; 168:800–806. [PubMed: 25003802]
- Olds DL, Baca P, McClatchey M, et al. Cluster randomized control trial of intervention to increase participant retention and completed home visits in the Nurse–Family Partnership. *Prevention Science*. 2015; 16:778–788. [PubMed: 25999201]
- Perez CM, Widom CS. Childhood victimization and long-term intellectual and academic outcomes. *Child Abuse & Neglect*. 1994; 18:617–633. [PubMed: 7953902]
- Rodgers CS, Lang AJ, Laffaye C, Satz LE, Dresselhaus TR, Stein MB. The impact of individual forms of childhood maltreatment on health behavior. *Child Abuse & Neglect*. 2004; 28:575–586. [PubMed: 15159071]
- Sanchez M, Kelly P. Trauma informed interventions across the life span. *Family & Community Health*. 2015; 38:205.
- Smith G, Hart C, Hole D, et al. Education and occupational social class-which is the more important indicator of mortality risk? *Journal of Epidemiology & Community Health*. 1998; 52:153–160. [PubMed: 9616419]
- Spertus IL, Yehuda R, Wong CM, Halligan S, Seremetis SV. Childhood emotional abuse and neglect as predictors of psychological and physical symptoms in women presenting to a primary care practice. *Child Abuse & Neglect*. 2003; 27:1247–1258. [PubMed: 14637300]
- Stein BD, Jaycox LH, Kataoka SH, et al. A mental health intervention for schoolchildren exposed to violence: a randomized controlled trial. *JAMA*. 2003; 290:603–611. [PubMed: 12902363]
- Stoltz JAM, Shannon K, Kerr T, Zhang R, Montaner JS, Wood E. Associations between childhood maltreatment and sex work in a cohort of drug-using youth. *Social Science & Medicine*. 2007; 65:1214–1221. [PubMed: 17576029]
- Wanklyn SG, Day DM, Hart TA, Girard TA. Cumulative childhood maltreatment and depression among incarcerated youth: impulsivity and hopelessness as potential intervening variables. *Child Maltreatment*. 2012; 17:306–317. [PubMed: 23180865]
- Winkleby M, Jatulis D, Frank E, Fortmann S. Socioeconomic status and health-how education, income, and occupation contribute to risk factors for cardiovascular disease. *American Journal of Public Health*. 1992; 82:816–820. [PubMed: 1585961]
- Wong M. Commentary: Building partnerships between schools and academic partners to achieve a health-related research agenda. *Ethnicity & Disease*. 2006; 16:149–153.
- Wood Stoltz JA, Montaner J, Kerr T. Evaluating methamphetamine use and risks of injection initiation among street youth: the ARYS study. *Harm Reduction Journal*. 2006; 3:18. [PubMed: 16723029]
- Wright MOD, Crawford E, Del Castillo D. Childhood emotional maltreatment and later psychological distress among college students: the mediating role of maladaptive schemas. *Child Abuse & Neglect*. 2009; 33:59–68. [PubMed: 19167067]
- Yates TM, Wekerle C. The long-term consequences of childhood emotional maltreatment on development: (Mal)adaptation in adolescence and young adulthood. *Child Abuse & Neglect*. 2009; 33:19–21. [PubMed: 19171379]

What is known about this topic

- Childhood maltreatment is associated with an elevated risk for a number of health-related harms including: diabetes, heart disease, depression and other mental health problems per person.
- Over the life course, not completing high school is estimated to cost the American economy \$240,000.

What this paper adds

- Physical abuse, physical neglect, emotional abuse, and emotional neglect were found to be associated with an incomplete high school education.
- Assessing the cumulative effect of maltreatment, a moderate dose-dependent trend was observed where the greater the number of different forms of childhood maltreatment, the greater the odds of not completing a high school education.
- These study findings highlight the need for trauma-informed interventions to support educational attainment among maltreated young people and evidence-based prevention programmes.

Table 1

Cumulative frequencies and percentages of street-involved youth who experienced childhood maltreatment (five forms: sexual abuse, physical abuse, emotional abuse, physical neglect, emotional neglect) (n = 974)

Number of maltreatment forms	Frequency	Per cent
0 (reference category)	328	34
1	177	18
2	168	17
3	154	16
4	94	10
5	53	5

Table 2

Pearson's correlation coefficients of association among five abuse variables (n = 974)

	Sexual abuse	Physical abuse	Emotional abuse	Physical neglect
Sexual abuse	–	–	–	–
Physical abuse	0.38	–	–	–
Emotional abuse	0.37	0.67	–	–
Physical neglect	0.29	0.47	0.49	–
Emotional neglect	0.24	0.45	0.59	0.64

Table 3

Descriptive and bivariable analyses (95% confidence interval) of factors associated with high school incompleteness among street-involved youth in Vancouver, Canada (n = 974)

Characteristic	Yes, 737 (76%)	No, 237 (24%)	Odds ratio (95% CI)
<i>Sociodemographic factors</i>			
White			
Yes	498 (68)	162 (68)	1.0 (0.7–1.3)
No	239 (32)	75 (32)	
Gender			
Female	230 (31)	71 (30)	1.1 (0.8–1.5)
Male	507 (69)	166 (70)	
Sexual orientation			
LGBT	114 (15)	31 (13)	1.2 (0.8–1.9)
Heterosexual	623 (85)	206 (87)	
<i>Childhood trauma</i>			
Sexual abuse			
Moderate/severe	125 (17)	29 (12)	1.5 (1.0–2.3)
None/low	612 (83)	208 (88)	
Physical abuse			
Moderate/severe	230 (31)	42 (18)	2.1 (1.5–3.0)
None/low	507 (69)	195 (82)	
Emotional abuse			
Moderate/severe	397 (54)	78 (33)	2.4 (1.8–3.2)
None/low	340 (46)	159 (67)	
Physical neglect			
Moderate/severe	231 (31)	45 (19)	1.9 (1.4–2.8)
None/low	506 (69)	192 (81)	
Emotional neglect			
Moderate/severe	362 (49)	77 (32)	2.0 (1.5–2.7)
None/low	375 (51)	160 (68)	
<i>Risk factors</i>			
Age at first hard drug use			
18 years old	648 (88)	172 (73)	2.8 (1.9–4.0)
>18 years old	89 (12)	65 (27)	
Parent/guardian substance use			
Yes	699 (95)	223 (94)	1.2 (0.6–2.2)
No	38 (5)	14 (6)	
Child welfare system			
Yes	366 (50)	82 (35)	1.9 (1.4–2.5)
No	371 (50)	155 (65)	
History of homelessness ^a			
Yes	681 (92)	191 (81)	2.9 (1.9–4.5)

Characteristic	Yes, 737 (76%)	No, 237 (24%)	Odds ratio (95% CI)
No	56 (8)	46 (19)	
Sex work			
18 years old	76 (10)	11 (5)	2.4 (1.2–4.5)
>18 years old	661 (90)	226 (95)	
Age at first sexual experience, per year			
Median (IQR)	14 (12–15)	14 (13–16)	0.9 (0.9–1.0)

LGBT, lesbian, gay, bisexual or transgender; IR, interquartile range.

^aDenotes activity ever.

Table 4

Adjusted odds ratio (95% confidence interval) of childhood trauma categories associated with high school incompleting in multivariable logistic regression analyses for each confounding model (n = 974)

Characteristic	Final model				
	1	2	3	4	5
Sexual abuse (mod/heavy vs. none/low)	1.2 (0.7–1.8)	–	–	–	–
Physical abuse (mod/heavy vs. none/low)	–	1.6 (1.1–2.4)	–	–	–
Emotional abuse (mod/heavy vs. none/low)	–	–	2.2 (1.6–3.0)	–	–
Physical neglect (mod/heavy vs. none/low)	–	–	–	1.6 (1.1–2.3)	–
Emotional neglect (mod/heavy vs. none/low)	–	–	–	–	1.7 (1.2–2.3)
Age at first hard drug use (< 18 years old vs. > 18)	2.2 (1.5–3.2)	–	–	2.4 (1.6–3.5)	–
Child Welfare System (yes vs. no)	1.6 (1.1–2.1)	1.5 (1.1–2.1)	–	1.5 (1.1–2.1)	1.6 (1.2–2.2)
History of homelessness ^a (yes vs. no)	2.4 (1.5–3.7)	2.4 (1.6–3.8)	2.5 (1.6–3.9)	2.2 (1.4–3.5)	2.4 (1.6–3.7)
Sex work (< 18 years old vs. > 18)	1.6 (0.8–3.2)	1.8 (0.9–3.5)	–	1.7 (0.9–3.2)	–
Age at first sexual experience (per year older)	–	0.9 (0.9–1.0)	–	–	–

^aDenotes activity ever.

Table 5

Combined multivariable model of factors associated with not completing a high school education (n = 974)

Characteristic	Adjusted odds ratio (95% CI)
Emotional abuse	2.1 (1.5–2.9)
Age at first hard drug use (< 18)	2.2 (1.5–3.3)
Child welfare system	1.6 (1.1–2.1)
History of homelessness	2.1 (1.4–3.3)
Age at first sexual experience	0.9 (0.9–1.0)

CI, confidence interval.

Table 6

Bivariable and multivariable associations between cumulative forms of maltreatment and not completing a high school education (n = 974)

Characteristic	Odds ratio (95% CI)	Adjusted odds ratio (95% CI)
One form of maltreatment ^a	2.2 (1.5–3.5)	2.3 (1.5–3.6)
Two to three forms of maltreatment ^a	2.6 (1.8–3.7)	2.2 (1.5–3.2)
Four to five forms of maltreatment ^a	3.5 (2.1–5.9)	2.7 (1.6–4.6)
Age at first hard drug use	2.8 (1.9–4.0)	2.3 (1.6–3.4)
Child welfare system	1.9 (1.4–2.5)	1.4 (1.0–2.0)
History of homelessness	2.9 (1.9–4.5)	2.1 (1.3–3.2)
Age at first sexual experience	0.9 (0.9–1.0)	0.9 (0.9–1.0)

CI, confidence interval.

^aNo maltreatment was the reference category