Published in final edited form as:

Child Abuse Negl. 2020 January ; 99: 104256. doi:10.1016/j.chiabu.2019.104256.

Patterns of adverse childhood experiences and subsequent risk of interpersonal violence perpetration among men in Dar es Salaam, Tanzania

Susannah Zietz^{a,*}, Lusajo Kajula^b, H. Luz McNaughton Reyes^c, Beth Moracco^c, Meghan Shanahan^d, Sandra Martin^d, Suzanne Maman^c

^aDuke Center for Child and Family Policy, Erwin Square Mill Building, 202 West Main Street, Bay C, Durham, NC, United States

^bUNICEF Office of Research-Innocenti, Florence, Italy

^cDepartment of Health Behavior, University of North Carolina at Chapel Hill Gillings School of Global Public Health, Chapel Hill, NC, USA

^dDepartment of Maternal and Child Health, University of North Carolina at Chapel Hill Gillings School of Global Public Health, Chapel Hill, NC, USA

Abstract

Background: Adverse childhood experiences (ACEs), including abuse and neglect, are consistently found to be predictors of perpetration of intimate partner violence (IPV) and peer violence (PV) in adulthood. Children are often exposed to patterns of ongoing and/or multiple-type polyvictimization throughout the life course.

Objectives: To identify and characterize patterns of ACEs among men in Dar es Salaam, Tanzania and to examine the relationship between these patterns and perpetration of intimate partner violence (IPV) and peer violence (PV) in adulthood.

Methods: We used latent class analysis to identify respondents with similar patterns of ACEs. The analysis was conducted with a sample of 987 men.

Results: We uncovered five distinct classes of men with specific patterns of ACEs. One consisted of nonvictims and four included various forms of polyvictimization. Men in the polyvictimization classes that included non-violent family dysfunction had significantly higher odds of perpetrating psychological IPV compared to the other three classes (AORs 2.33 and 3.04 compared to nonvictims). Men in the polyvictimization classes that included any sexual violence and/or non-violent family dysfunction had significantly higher odds of perpetrating PV compared to the other two classes (AORs 3.54, 6.10, and 7.42 compared to nonvictims).

Conclusions: These findings suggest that distinct patterns of exposure to ACEs among this population are differentially related to perpetration of IPV and PV in adulthood. These findings highlight the importance of child development interventions in low-and middle-income countries,

*Corresponding author. susannah.zietz@duke.edu (S. Zietz).

both for the primary prevention of child adversity and for mitigation of the cognitive and emotional effects of ACEs.

Keywords

Adverse childhood experiences; Intimate partner violence; Peer violence

1. Introduction

Interpersonal violence is a pervasive health and human rights problem and is among the leading causes of death and disability in many low-and middle-income countries around the world (Bastiaens & Bastiaens, 2006; Butchart, Mikton, Dahlberg, & Krug, 2015; Jewkes, 2002). Exposure to intimate partner violence (IPV; also known as domestic violence) and peer violence (PV; also known as youth violence) is associated with adverse physical, emotional, cognitive, and behavioral effects throughout the life course (Bacchus, Ranganathan, Watts, & Devries, 2018; Devries et al., 2013; Pill, Day, & Mildred, 2017). There has been a call from the Centers for Disease and Control and Prevention (CDC) to identify shared risk and protective factors of various forms of violence and to explore violence victimization and perpetration across the lifespan (Wilkins, Tsao, Hertz, Davis, & Kleven, 2014).

Childhood exposure to adversity, such as abuse and neglect, exposure to violence, or non-violent family dysfunction (e.g. loss of a parent or caregiver, household member in jail, alcoholic household member, etc.) is consistently found to be a moderate to strong predictor of IPV and PV perpetration and victimization in adolescence (Dardis, Dixon, Edwards, & Turchik, 2015; Jennings et al., 2017) and adulthood (Fulu et al., 2013; Gil-Gonzalez, Vives-Cases, Ruiz, Carrasco-Portino, & Alvarez-Dardet, 2008; Jewkes, 2002; Krug, Mercy, Dahlberg, & Zwi, 2002; Roberts, Gilman, Fitzmaurice, Decker, & Koenen, 2010; Wilkins et al., 2014). Exposure to adverse childhood experiences (ACEs) are not limited to single potentially traumatizing events, but include a pattern of experiencing ongoing and/or multiple-types of violence (polyvictimization) throughout the life course (Finkelhor, Ormrod, & Turner, 2007). Once children become polyvictims (victims of multiple types of violence), their risk for additional victimization across the life course remains elevated (Finkelhor et al., 2007).

Several theories explain how exposure to childhood adversities increase risk of interpersonal violence perpetration in adulthood. The prevailing proposed mechanism is stress response dysregulation, also referred to as “stress sensitization,” whereby cumulative exposure to adversity during the sensitive developmental period of childhood causes dysregulation in the stress response system and heightened reactivity to stress, including heightened emotional reactivity to stressors in adulthood (e.g. overreacting to minor stressors, difficulty calming down), which may increase one’s risk of perpetration of violence (Roberts, McLaughlin, Conron, & Koenen, 2011).

Cumulative risk is typically measured through creating a summed score of childhood adversity, assuming that all indicators have the same weight. In contrast, O’Hara et al. (2015) argue that the evidence points to an interactive model of risk, where “certain risk

factors are multiplicative or predominant relative to specific developmental or behavioral outcomes” (p. 2). Within this framework, distinct patterns of types of risk, rather than additive cumulative risk, have partially distinct effects on emotional, cognitive, and neurobiological development and are more relevant in examining specific developmental behavioral outcomes such as perpetration of interpersonal violence. However, research using this framework remains limited, especially with measures that include other indicators of childhood adversity outside of physical, emotional, and/or sexual abuse and neglect (O’Hara et al., 2015; Debowska, Willmott, Boduszek, & Jones, 2017).

Person-centered methodological approaches have been recently used to examine the heterogeneity of exposure to childhood adversity and quantitatively model the interactive effects of different exposures to child adversity. These techniques, such as latent class analysis, are useful heuristics to suggest latent patterns of childhood experiences that can then be applied as predictors of psychosocial and behavioral outcomes (Lanza & Rhoades, 2013). A recent systematic review of person-centered analyses of child adversity found 16 articles published in peer-reviewed journals (Debowska et al., 2017). However, there were inconsistent findings on the number and types of patterns, which could have been due to differences in samples utilized, cultural variations, and types of childhood adversity included in the models. However, the review found that all studies had one nonvictims class and at least one class that included polyvictims. Additionally, the polyvictimized sub-groups had more adverse outcomes, including externalizing behaviors such as aggression, violent offending, and recidivism (Debowska et al., 2017). However, there is a dearth of research on the association between exposure to different patterns of adverse experiences in childhood IPV and PV in adulthood in low-and middle-income countries.

While there has been a recent increase in literature on IPV perpetration in low-and middle-income countries, there are very few studies that have explored PV perpetration in these contexts, particularly in populations other than bullying among school children. We define PV as an act against someone who is not an intimate partner or immediate family member that is perpetrated with the intention of harm. This can include physical, verbal, social, and sexual violence. However, in this study, we focus on physical peer violence since it is generally the most prevalent form (Skrzypiec, Wyr, & Didaskalou, 2019; Turner, Finkelhor, Hamby, Shattuck, & Ormrod, 2011).

There are limited estimates of the prevalence of PV in low-and middle-income countries outside of school surveys, medically attended injuries, and crime rates (particularly homicide rates and delinquency) from government administrative data, and virtually no articles on risk factors for PV among those above 18 years of age (Krug et al., 2002). However, Fineran, Bennett, and Sacco, (2003) found that students in Johannesburg perpetrated significantly more physical violence than students in Chicago. The authors hypothesized that it may be because, peer violence in normalized within the context of the high poverty township outside of Johannesburg. However, this can only be understood within the specific historical context of political systems of oppression and violence in South Africa.

A recent systematic review found that there is a paucity of person-centered studies on the association between childhood adversity and adult health and behavioral outcomes in non-western societies (including low-and middle-income countries), indicating a need to build a better understanding of patterns of child adversity globally (Debowska et al., 2017). The current evidence suggests that both ACEs and interpersonal violence are significant public health problems in Tanzania. According to a UNICEF survey, prior to 18 years of age, approximately 30 % of women and 13 % of men ages 13–24 reported experiencing sexual violence and three-quarters of both men and women in this population experienced physical violence (UNICEF & CDC, 2011).

There are no published estimates of IPV perpetration in Tanzania other than from the parent study to this research, which found that in Dar es Salaam, 27.6 % of men, ages 15 and older, reported perpetration of any form of IPV in the past 12 months (Mulawa et al., 2018). In another study among boys 13–15 years in Dar es Salaam, researchers found that 45 % of male students reported participating in a physical fight one or more times during the past 12 months (Fleming & Jacobsen, 2010). Additionally, to our best knowledge, this is the first study to examine ACEs among men in Urban Tanzania. This is particularly important because our study is in communities with the highest levels of poverty in Dar es Salaam, which is a closely related to the experience of ACEs (Tomer, 2014).

1.1. The current study

The primary aims of the current study are to (a) assess the prevalence of ACEs in adult men in Dar es Salaam Tanzania, (b) identify and characterize the patterns/combinations of ACEs experienced among these men, (c) examine how the different patterns/combinations of ACEs experienced among these men predict perpetration of IPV and PV in adulthood. We used the person-centered analytic model of latent class analysis (LCA) to identify meaningful subgroups of men who are characterized by the patterns/combinations of their reported experiences of ACEs.

Evaluating the nature of the latent classes was largely exploratory. However, based on the empirical evidence from studies using person-centered methods, we hypothesized that classes that experienced polyvictimization, particularly non-violent family dysfunction plus frequent physical, emotional, sexual abuse, or witnessing violence in the household would have higher odds of IPV and PV perpetration compared with men who experienced no ACEs or only experienced non-violent family dysfunction.

2. Method

2.1. Design and procedures

We conducted secondary analyses using data collected in the context of a cluster randomized control trial that examined the efficacy of a multilevel intervention to reduce sexually transmitted infections (STIs) and IPV among networks of men in Tanzania (PI: Suzanne Maman, 1R01MH098690).

In previous work, using a venue-based sampling methodology, the study team identified venues called “camps” that house social networks of an average 22 members between the

ages of 15–40. A cross between a club and a gang, social network members spend time at their camps every day, often for several hours. Members paid dues to belong, and all camps maintained written membership records. Nearly all men reported belonging to only one camp. Men in camps described providing social support to one another, including contributing money when there was an illness or death in the family, engaging in small business enterprises together, and talking to one another about personal problems (Yamanis, Maman, Mbwapbo, Earp, & Kajula, 2010). There were also numerous risk behaviors reported among the men in camps. Over 60 % of men reported unprotected sex within the past 30 days, almost 40 % reported sexual partner concurrency, and nearly 20 % reported perpetrating violence against a partner over the past year (Yamanis et al., 2010).

The study team identified camps for inclusion in the study in four wards (equivalent to U.S. census tracts) of Dar es Salaam using an adaptation of the Priorities for Local AIDS Control Efforts (PLACE) methodology. Interviews with community informants and camp verification interviews were conducted to identify camps for recruitment (Weir et al., 2003). To be eligible, camps had to have between 20 and 79 members, and had to have been in existence for at least one year. Camps were excluded if a weapon had been used by a member in a fight in the past six months or if the research assistant felt unsafe while verifying eligibility. Camps that had participated in pilot studies for this intervention were also excluded. 294 operational camps were identified, 172 were eligible, and 60 of them were randomly selected for inclusion in the trial.

All members of the camps selected into the trial were preliminarily eligible for inclusion in the study. Camps that consented to participate were randomized to a control condition or to receive a combination microfinance and peer health leadership intervention over a period of two years. To be eligible for participation, at baseline, participants had to (1) be a registered camp member for at least 3 months, (2) plan on residing in Dar es Salaam for the next 30 months, (3) be 15 years or older, (4) visit the camp at least once per week, and (5) be willing to provide contact information for themselves and two family members or friends. A total of 1500 men were found eligible, consented to participate, and completed a baseline survey.

Of 1948 camp members approached for participation, 1249 men completed the baseline survey, a computer-assisted personal interview (CAPI), were randomized, and received the intervention or control. These analyses use data from behavioral assessments that were administered in 2016 (30-months post-intervention). These data were used for this analysis because it was the only assessment in which ACEs were measured. The final endline sample was 1029 men (82 % of all participating men) within 59 camps. In analyses examining predictors of drop-out, having ever perpetrated IPV at baseline was associated with a *lower* odds of being lost-to-follow-up (AOR 0.66; 95 % CI: 0.45–0.98). No other sociodemographic or outcome variables predicted loss to follow-up and predictors of drop-out did not differ for treatment and control groups, suggesting that attrition was not selective. For additional details on recruitment, randomization, intervention, and data collection, see (Kajula et al., 2015).

The current analysis was conducted with a sample of 987 men who had at least one intimate partner within the past 12 months. For endline sample characteristics, see Table 1. The

average age was 29 years (SD: 7.14; range 18–62). Over 50 % of the sample had a primary school education or less. Based on a wealth index of household assets, 36 % of the men were considered to have the lowest low socioeconomic status (SES), 42 % medium SES, and 22 % highest SES. Thirty-four percent perpetrated any IPV in the past 12 months. Nearly half (47 %) experienced IPV victimization in the past 12 months. In the past 12 months, 30 % of the men perpetrated any PV and 37 % of the men were victims of PV.

We conducted analyses on an analytic sample of the 973 men who were not missing data on IPV or PV outcomes. A total of 14 men (1.42 % of the 987 men who reported a sexual partner in the past 12 months) were missing on the outcome variables. Missing data on the outcome variables was significantly associated with having a household member in jail, parental separation or divorce, parent or guardian death, and experience of physical abuse.

This study was approved by both the Institutional Review Board at the University of North Carolina and the Muhimbili University of Health and Allied Sciences (MUHAS).

2.2. Measures

2.2.1. ACES—To assess ACEs, we used the Adverse Childhood Experiences International Questionnaire (ACE_IQ). It was developed for use in low- and middle-income countries. For the abuse items, response categories were “never,” “once” “a few times,” “many times”. Due to survey time constraints, we were not able to include 15 items on emotional neglect, physical neglect, bullying, community violence, and collective violence. We decided to focus on family context and abuse since they were closest to the items used in the original ACEs scale.

Ten indicators were created from 16 items for use in defining the latent classes of ACEs. Each of the non-violent family dysfunction variables were kept separate (a) alcohol/drug use of a household member, (b) household member who was depressed, mentally ill, or suicidal, (c) household member was ever sent to jail or prison, (d) parents ever separated or divorced, (e), mother, father, or guardian died. The remaining variables were combined into (f) physical abuse, (g) emotional abuse, (h) witness of violence in the household, (i) unwanted attempted and/or enacted touch or fondling, and (j) unwanted attempted and/or enacted oral, anal, or vaginal intercourse. Because item distributions of the summed combined variables were highly skewed and zero-inflated, physical abuse, emotional abuse, witness of violence in the household, and unwanted attempted and/or enacted touch or fondling were coded as ordinal variables, where “once” or “a few times” for all the items were coded as a 1 (referred to as “occasional”) and “many times” on at least one of the items was coded as a 2 (referred to as “frequent”). Due to limited variation in responses to the questions on unwanted attempted and/or enacted oral or anal intercourse (over 50 % of those who experienced unwanted attempted and/or enacted oral or anal intercourse replied that they experienced it “a few times”), the combined variable was dichotomized where “1” was ever experience of either of the two indicators

2.2.2. Perpetration of IPV—To assess IPV perpetration, the study used an adapted version of the WHO Violence Against Women instrument, which was developed for international use (Garcia-Moreno, Jansen, Ellsberg, Heise, & Watts, 2006). This tool

measures psychological, physical, and sexual IPV perpetration ($\alpha = 0.75$ in study sample). The psychological violence items ($n = 4$) include instances of insulting, belittling or humiliating, scaring or intimidating, or threatening to hurt an intimate partner. Physical violence items ($n = 6$) include instances of slapping, pushing, hitting, kicking, choking, and threatening an intimate partner with a weapon. Sexual violence items ($n = 3$) included physically forcing an intimate partner to have sex, using threats to force sex, and perpetrating sexual acts deemed degrading (by the participant). The introductory script to the perpetration questions asked the participant to think about whether or not he had done any of the following to his current partner, or any other partner. Also, the script clarified that partner means “someone you feel close or intimate with” and that “partner can mean a sexual partner, but does not have to be”. For those who said “yes” to ever having perpetrated a specific type of violence, they were asked to report how many times they had perpetrated each act in the last 12 months. Response options ranged from “never” to “ten or more times.” Because items were highly skewed and zero-inflated, scores on each form of IPV were summed and dichotomized to create binary indicators that denoted whether the men had or had not perpetrated each form of IPV (physical, psychological and sexual) in the past 12 months.

2.2.3. Perpetration of PV—To assess PV, a measure was adapted from one that had been previously used in the Safe Dates Study (Foshee et al., 2016; $\alpha = 0.89$ in study sample). Participants were asked: “I want you to tell me how many times in the past 12 months you have done any of the following things to a peer. By peer, I mean anyone the same age as you that you are not dating.” The list of items that followed included: pushed, grabbed, shoved, or kicked someone,” “slapped or scratched someone,” “physically twisted the arm or bent back the fingers of someone,” “hit someone with your fist or with something else hard,” “beat someone up,” and “assaulted someone with a knife or a gun.” Response categories ranged from “none” to “ten or more times” in the past 12 months. Since items were highly skewed and zero-inflated, scores on each item of PV were summed and dichotomized to create binary indicators that denoted whether the men had or had not perpetrated any form of PV in the past 12 months.

2.2.4. Covariates—We controlled for age given that the length of time between exposure and measurement of the outcome differs by age. We also controlled for the status of intervention versus control in the parent study, because the treatment condition, which consisted of access to microfinance loans and peer health leadership training, was designed to affect risk factors associated with violence.

2.3. Analytic strategy

We used latent class analysis to identify respondents with similar patterns of responses to the seven ACEs indicators. We first identified the optimal number of classes for the sample by comparing models with increasing number of classes across different statistical indices of fit, including Akaike information criterion, the Bayesian information criterion (BIC), and the sample size adjusted Bayesian information criterion (ssBIC). The best-fitting and most parsimonious models are those that minimize the AIC and BIC (Nylund, Asparouhov, & Muthén, 2007). We controlled for clustering within camps by computing standard errors

using a sandwich estimator. Because we controlled for camp clustering we were precluded from using a likelihood ratio test (LRT) fit measures, also forms of the test (including the bootstrapped LRT) are unable to account for clustering in the data (Muthén & Muthén, 2012). We also evaluated classification quality, as indicated by entropy scores (score approaching 1 indicates clear delineation of cases), and considered the substantive interpretation of the class composition (Collins & Lanza, 2010). Full information maximum likelihood procedures were used to address missing data on the latent class indicators, which was minimal. The maximum percent missing on any one indicator was 0.91 %. A small number of cases ($n = 14$, 1.4 %) were missing data on outcomes and were thus dropped from the auxiliary analysis (described below).

After selecting the optimal unconditional latent class model, we examined the association between class membership and each of the outcomes of interest. A three-step approach was used to model the associations between the latent classes and the outcomes, while accounting for measurement error due to uncertainty of class classification (Asparouhov & Muthén, 2014). Though the BCH method has been found to be robust to a non-normal distribution, the outcomes were treated as binary (perpetrated vs. did not perpetrate), because of the skewedness of the data towards nonviolence. There is currently no evidence on how BCH operates with zero-inflated data (Asparouhov & Muthén, 2014).

3. Results

3.1. Prevalence of ACEs

Ninety-nine percent of the men experienced at least one ACE. The prevalence of indicators of non-violent family dysfunction was high with 51 % having had a household member who misused alcohol or drugs, 25 % had a household member with mental illness, 36 % had a household member who was in jail, 42 % had parents who were divorced, and 52 % were orphans (had at least one parent or a guardian die). There was also a high prevalence of child abuse, with 68 % of participants having experienced any physical abuse, 71 % having experienced any emotional abuse, 83 % having witnessed any violence against a household member, 48 % having experienced any unwanted attempted and/or actual touch or fondling, and 18 % having experienced any unwanted attempted and/or enacted oral, anal, or vaginal intercourse.

3.2. Latent classes of ACEs and sensitivity analyses

First, we identified the optimal number of classes across different indices of statistical fit. For the eight iterative class models, the AIC and ssBIC never rose. However, the BIC was lowest for the five-class model, suggesting that this model provided the best fit to the data (see Table 2). When estimating the models without adjusting for clustering, the LRT points to the four-class solution. However, the five-class solution was used based on a combination of the BIC fit statistic, parsimony, and face validity (Nylund et al., 2007).

We ran a number of sensitivity analyses based on different coding schemes of the ACEs indicators. For interpretability and presentation, we compared a number of models with a different number of indicators and response categories (e.g. collapsing all of the physical

violence items, dichotomizing responses etc.). We chose the most parsimonious coding scheme that had results that were qualitatively similar to the model with all of the ACEs indicators and response categories.

3.3. Characterization of latent classes of ACEs

The parameter estimates for the five-class model are shown in Table 3, and depicted graphically in Fig. 1. A probability of greater than 0.5 was considered high and included in bold. There was a *Nonvictims* class (prevalence = 33 %) in which members had low probability of endorsing any ACE indicator, except for having a mother, father, or guardian die. The following three classes (Classes 2, 3, & 4) all had high probabilities (0.50) of occasional physical and emotional abuse. The second class was labeled *Occasional Physical and Emotional* (prevalence = 27 %) since it included occasional physical and emotional abuse. The third class was labeled *Family Dysfunction & Occasional Physical and Emotional* (prevalence = 16 %) since it had high probabilities of endorsing all of the family dysfunction variables and of occasional physical and emotional abuse. The fourth class was referred to as *Sexual Victimization and Occasional Physical and Emotional* (prevalence = 13 %) since it included high probabilities of occasional physical and emotional abuse, and witness of violence, plus frequent experience of unwanted attempted and/or enacted touch or fondling, and ever experience of unwanted attempted and/or enacted intercourse before the age of 18. The fifth class was called *Severe Multiform ACEs* (Prevalence = 11 %) and included frequent physical, emotional, witness, and unwanted attempted and/or enacted touch or fondling, plus most of the family dysfunction variables, except a household member who abused alcohol or drugs.

3.4. Associations between class membership and perpetration of interpersonal violence

3.4.1. Class membership and IPV—Table 4 presents findings from the analysis of the association of ACEs latent class membership on each of the violence outcomes. Members of the *Family Dysfunction and Occasional Physical and Emotional class* and the *Severe Multiform ACEs* class had significantly higher odds of reporting psychological IPV perpetration than members of each of the other classes. Compared to the *Nonvictims* class, members of the *Family Dysfunction and Occasional Physical and Emotional class* had 2.33 times the odds of perpetrating psychological IPV (95 % CI: 1.39, 3.92) and the *Severe Multiform ACEs* class had 3.04 times the odds of perpetrating psychological IPV (95 % CI: 1.61, 5.71). Additionally, compared to the *Family Dysfunction and Occasional Physical and Emotional class*, the *Severe Multiform ACEs* class did not have significantly different odds of perpetrating psychological IPV (AOR 1.31 95 % CI: 0.67, 2.54). However, contrary to expectations class membership was not associated with either physical or sexual IPV perpetration.

3.4.2. Class membership and PV—Compared to the first two classes, members of the *Family Dysfunction and Occasional Physical and Emotional*, *Sexual Victimization and Occasional Physical and Emotional*, and *Severe Multiform ACEs* classes had significantly higher odds of perpetrating PV. Compared to the *Nonvictims* class, the *Family Dysfunction and Occasional Physical and Emotional class* had 3.54 times the odds (95 % CI: 2.03, 6.15), the *Sexual Victimization and Occasional Physical and Emotional class* had 6.10 times the

odds (95 % CI: 2.53, 14.71), and the Severe Multiform ACEs class had 7.42 times the odds (95 % CI: 3.36, 16.37) of perpetrating PV. Compared to the Occasional Physical and Emotional, the Family Dysfunction and Occasional Physical and Emotional class had 3.18 times the odds (95 % CI: 1.64, 6.14), the Sexual Victimization and Occasional Physical and Emotional class had 5.48 times the odds (95 % CI: 2.40, 14.73), and the Severe Multiform ACEs class had 6.64 times the odds (95 % CI: 2.72, 16.33) of perpetrating PV. However, in running multiple comparisons with all of the classes as the reference class (see Table 3), there was no significant difference in the odds of perpetrating PV in the Family Dysfunction and Occasional Physical and Emotional, Sexual Victimization and Occasional Physical and Emotional, and Severe Multiform ACEs classes.

4. Discussion

In these analyses, we sought to build on existing research related to the patterns of childhood adversity by assessing the prevalence of ACEs among adult men in Dar es Salaam, identifying patterns of exposure to ACEs among this population, and examining the relationships between these patterns and perpetration of interpersonal violence in adulthood.

4.1. Prevalence of ACEs

Compared to other studies in the region, our study population reported higher rates of emotional abuse and sexual abuse. Notably, 50 % of men in our study reported experience of any form of sexual violence (attempted or enacted), compared to 13 % of males in a nationally representative survey of females and males age 13–24 in Tanzania (UNICEF & CDC, 2011). Additionally, 71 % of men in our study reported emotional violence, compared to 27 % of participants in the UNICEF study. This discrepancy in reporting may be due to the fact that 50 % of the UNICEF population was under the age of 18, while the average age in our sample was 29 years (SD 7.14), ranging from 18 to 62. It is possible that the youth in the UNICEF study had not yet accumulated the equivalent number of experiences. However, retrospective reports of physical, emotional, and sexual abuse, and witnessing IPV against a household member in our study are also markedly higher than other global studies reporting retrospective experiences (Almuneef, ElChoueiry, Saleheen, & Al-Eissa, 2017; Cluver, Orkin, Boyes, & Sherr, 2015; Fulu et al., 2013; Tran, Dunne, Vo, & Luu, 2015).

It is possible that our sample of urban men living in poverty have experienced substantially more adverse experiences in childhood. While we do not have data on other risk factors in childhood, adult sexual risk behaviors in the study population are also higher than in the general population. For instance, compared to men from Dar es Salaam or Urban Mainland Tanzania in the Demographic and Health Survey (DHS), the men in our study had a higher prevalence of having two or more sexual partners in the past 12 months (42 % vs. 21 %), having concurrent sexual partners (34 % vs. 13 %), and having ever paid for sex (18 % vs. 10 %; NBS, 2016).

It is unclear as to whether the study population experienced more violence than other, similar populations, or whether there were other reasons that the men reported more abuse before the age of 18. However, other studies using substantiated reports of major adverse

experiences in childhood have found that there is underreporting of ACEs in surveys (Hardt & Rutter, 2004). Thus, our findings are not likely due to false reports.

It may be that our sample, including the highest poverty ward of Dar es Salaam, were from families that had higher levels of poverty-related parenting stress linked to increased ACEs. Another possibility is that our participants were less likely to underreport compared to other studies, because there is a high level of perceived normativeness of violence in these social networks or perhaps because our interviewers were well trained to make men feel comfortable accurately reporting sensitive, stigmatized behaviors (Mulawa, Kajula, & Maman, 2018). Additional research is necessary to understand the high reporting of ACEs among this population.

4.2. Characterizations of classes

Using the person-centered analysis method of LCA, we uncovered five distinct classes of men with specific patterns of ACEs. In addition to one class of nonvictims, we found three classes that experienced occasional physical and emotional abuse.

4.2.1. Nonvictims—The most prevalent class (33 %) we found was the *Nonvictims* class (Class 1). A recent systematic review of articles using person-centered methods to characterize patterns of child abuse and neglect found that that 12 of the 16 studies found latent classes characterized by low endorsement on all maltreatment types (Debowska et al., 2017). In nine of these studies, this was the most numerous class, with membership ranging from 58 to 86 %. Our *Nonvictims* class was smaller than other studies using a person-centered approach. This could be because the study has higher reporting of ACEs than other studies. However, it could also be due to conceptual variation in measurement of childhood adversity. However, It is notable that the three other studies which report small non-victim classes were conducted among high risk populations such as adolescents in India (28.9 %; Charak & Koot, 2015), Polish adult male prisoners (43.3 %; Debowska & Boduszek, 2017), and adults who engage in non-suicidal self-injury (35.57 %; Vaughn, Salas-Wright, Underwood, & Gochez-Kerr, 2015).

4.2.2. Polyvictims—Our study found four different classes that are characterized by different patterns of polyvictimization. Thirteen studies in the review mentioned above found at least one class characterized by polyvictimization (Debowska et al., 2017). These classes were usually the least prevalent group (2.1 %–26.5 %) and were in studies among participants with a known history of child maltreatment or in other high-risk populations (Debowska et al., 2017). These classes point towards varying patterns of childhood victimization among men in this setting.

4.3. Prevalence of IPV and PV

The prevalence of IPV perpetration in our study sample was similar to the findings from other studies in the region. Aside from the parent study, there are no other published estimates of IPV perpetration in Tanzania. The estimates from the 2015–2016 DHS Domestic Violence Module found that among women, 22 % of experienced physical violence victimization and 9 % experienced sexual violence victimization in the past 12

months (NBS, 2016). Additionally, the 2005 World Health Organization Multi-Country Study on Women's Health and Domestic Violence Against Women that found that in a sample of ever married women age 15–49 in a Tanzanian city, 41.3 % reported ever experiencing physical or sexual violence, or both, by an intimate partner (Garcia-Moreno et al., 2006).

This study sample had a lower prevalence of peer violence compared to other studies in Tanzania. Thirty percent of our sample perpetrated peer violence in the past 12 months, compared to 45 % of male students ages 13–15 in a study in Dar es Salaam (Fleming & Jacobsen, 2010). However, it is difficult to compare these estimates because all of the studies of peer violence in the region are among adolescents, while ours were among adult men. It is possible that there may be less PV among men in these camps because these are functional groups of men who choose to belong to these camps, and thus the ties that bind the men may be more supportive in general.

4.4. Relationships between classes and interpersonal violence outcomes

4.4.1. Latent classes and IPV perpetration—The two polyvictimization classes that included physical and emotional abuse, combined with non-violent family dysfunction variables had higher odds of perpetrating psychological IPV compared to the three classes that did not include non-violent family dysfunction. The classes with the higher odds of perpetrating psychological IPV were the *Family Dysfunction and Occasional Physical and Emotional* and the *Severe Multiform ACEs* classes. The combination of physical and emotional abuse, plus non-violent family dysfunction could be important predictors of perpetration of psychological IPV. This could be due to the combination having more of an effect on attachment than either abuse or non-violent family dysfunction alone, which, in turn, has an effect on perpetration of psychological IPV.

However, more research is needed to replicate the findings from the study on ACEs and IPV, as well as to understand the mechanisms by which the combination of emotional and physical abuse and non-violent family maladjustment is related to psychological IPV perpetration, but not physical and/or sexual IPV perpetration. Particularly, future research could examine these relationships within the lens of attachment. Having a parent who is absent or unreliably present in one's life due to separation/divorce, death, incarceration, untreated mental illness, and untreated substance use disorders can lead to insecure attachment (also known as attachment insecurity). According to Kobak, Zajac, and Madsen (2016), "the perception of physical accessibility remains the most fundamental appraisal of an attachment figure's availability (p. 30). Additionally, older children and adolescents (though much less likely to perceive prolonged physical separation as a threat to the attachment bond) are still vulnerable to the effects of loss of a caregiver, particularly unexplained separations, perceived loss of the caregiver through desertion or death, and lack of access to a caregiver in a moment of high need. A recent systematic review by Velotti, Zobel, Rogier, and Tambelli (2018) found that the majority of the 42 studies found a significant relationship between two forms of insecure attachment (anxious attachment and avoidant attachment), and the perpetration of psychological IPV in adolescence or adulthood.

However, insecure attachment has also been associated with perpetration of physical and sexual IPV and we did not find a significant relationship between any of the polyvictimization classes and these other forms of IPV (Velotti et al., 2018)). We could have lacked power to detect these relationship. Therefore, more research is needed to replicate the findings from our study, as well as to understand the mechanisms by which non-violent family maladjustment is related to psychological IPV perpetration, but not physical and/or sexual IPV perpetration.

4.4.2. Latent classes and PV perpetration—Three of the polyvictimization classes had higher odds of perpetrating peer violence than the other classes. This included the *Family Dysfunction and Occasional Physical and Emotional* class, the *Sexual Victimization and Occasional Physical and Emotional* class, and the *Severe Multiform ACEs* class. Both the *Sexual Victimization and Occasional Physical and Emotional* class, and the *Severe Multiform ACEs* class included any sexual violence. Additionally, both the *Family Dysfunction and Occasional Physical and Emotional* class and the *Severe Multiform ACEs* class had non-violent family dysfunction. The combination of physical and emotional abuse, plus sexual abuse and/or non-violent family dysfunction could be important factors in the relationship between ACEs and PV perpetration in adulthood. Particularly, the findings could point to an underexplored role of polyvictimization including child sexual abuse in aggression towards peers in adulthood.

More research is needed to replicate the findings from the study on ACEs and PV, as well as to understand the mechanisms by which the combination of emotional and physical abuse and sexual violence and/or non-violent family dysfunction is related to PV perpetration. Future work could study this through the theory of gender role strain in clinical psychology, where men's response to culturally constructed roles of masculinity, either conscious or unconscious, lead to adverse psychosocial and health outcomes. Within this theory, trauma strain is used to describe the experience of men whose gender role strain has been particularly harsh, including survivors of sexual abuse in childhood. Male survivors of sexual abuse often feel helpless and vulnerable, yet they have also internalized the culture's message that they must not let themselves express this, thus creating a "toxic amplification" of gender strain compared to non-abused men (Lisak, 1994; 1995). This leads to discrepancy strain, the distress that results from self-perceived failure to live up to masculine expectations. One of the effects of this strain is a "hypermasculine compensation," where men adopt a rigid persona that is aggressive and hypersensitive to insult. Additionally, there is evidence that physical aggression may serve to relieve discrepancy strain, contributing to violence among men who have experienced sexual abuse in childhood (Berke, Reidy, Gentile, & Zeichner, 2016). However, it is unclear why this does not generalize to IPV perpetration as well, since in general, adolescents who perpetrate peer violence are more likely to perpetrate IPV (Vagi et al., 2013).

4.5. Study limitations and strengths

Some limitations of this study should be noted. Though the study established temporality through retrospective report of ACEs, because ACEs and the outcomes were measured at the same time, there are weak causal assumptions compared to studies using a prospective

design since ACEs were measured at the same time point as perpetration of IPV and PV. We were also not able to control for adult experiences of trauma and mental health conditions. Additionally, given that the study did not collect data throughout the life course, we were not able to understand whether there were more sensitive developmental periods in which the men experienced more adverse experiences and/or if the effect of these experiences are heightened.

Self-report measures of ACEs are limited by their retrospective nature and recall bias (Hardt & Rutter, 2004). However, most studies with retrospective report of ACEs have men recalling effects from many years ago (Felitti et al., 1998). A review of studies that included validating data for retrospective recall such as child protective services records, found that retrospective reports in adulthood of major adverse experiences in childhood involve a substantial rate of false negatives and substantial measurement error. However, false positive reports, though harder to measure, are rare (Hardt & Rutter, 2004).

While we attempted to limit bias by using behaviorally specific measures for ACEs and IPV and PV perpetration, the estimates may also have been subject to social desirability bias, which could lead to underreporting. However, compared to other studies in the region, we found higher reported rates of ACEs, and comparable reports of IPV and PV. This suggests that underreporting may have been less of an issue in this study compared to others. Our team has extensive training and experience asking about sensitive behaviors and this training and experience of field staff likely helped men feel comfortable to report their experiences.

Additionally, the ten indicators used in this study are different from how ACEs have been used in other person-centered studies and the results from this study need to be validated. While the ACEs-IQ has been field tested and implemented in China, the Philippines, Saudi Arabia, South Africa, and Vietnam, there has not been widespread testing of the measure in diverse populations, including populations in East Africa. First, the content may not be a reliable measure of childhood adversity in the study population. Additionally, though ACEs-IQ was translated into Kiswahili and reviewed by native speakers who were experts on the topic, back-translation and cognitive interviewing were not conducted (World Health Organisation, 2007). The sample is also limited to men who belong to social groups called “camps” in Tanzania. Though the study found that camps were common through most of Dar es Salaam, the classes identified may not be generalizable to rural settings and other countries in the region.

The present study has several notable strengths. First, we focused on a population of high-risk men in an urban African setting, a population that has largely been overlooked in the literature on ACEs and violence. This study also assessed multiple indicators of ACEs and was able to analyze by frequency, instead of prevalence. This study fills a gap in understanding the risk factors for understanding common and distinct risk factors for interpersonal violence. We found five classes of ACEs, four of which demonstrated distinct patterns of polyvictimization. Additionally, we were able to isolate that experience of non-violent family dysfunction was related to perpetration of psychological IPV and childhood sexual abuse was related to perpetration of peer violence.

5. Conclusion

The current study responds to calls for research that explores distinct patterns of risk on emotional, cognitive, and neurobiological development and how these developmental processes are related to behavioral outcomes such as perpetration of interpersonal violence in adulthood.

We found useful, distinct latent classes of ACEs and their association with interpersonal violence perpetration in adulthood. However, there needs to be replication of these results in similar populations, as well as longitudinal research on this topic in order to establish stronger causal inference, as well as to identify modifiable mediators and effective ways to intervene over the life course.

Longitudinal research is particularly important in promoting the primary prevention of multiple types of violence. For instance, in our sample, non-violent family dysfunction was present in two-high risk classes that were associated with IPV and PV perpetration in adulthood. Some of these indicators, such as being an orphan and having a family member in jail tend to be more visible to and recorded by public institutions than abuse. This information may then be useful in targeting families for primary and secondary prevention of abuse and targeting children for interventions for externalizing behaviors.

Acknowledgement

This work was supported by the University of North Carolina at Chapel Hill Graduate School, Chapel Hill, North Carolina, USA.

References

- Almuneef M, ElChoueiry N, Saleheen HN, & Al-Eissa M (2017). Gender-based disparities in the impact of adverse childhood experiences on adult health: Findings from a national study in the Kingdom of Saudi Arabia. *International Journal for Equity in Health*, 16(1), 90 10.1186/s12939-017-0588-9. [PubMed: 28558774]
- Asparouhov T, & Muthén B (2014). Auxiliary variables in mixture modeling: Three-step approaches using *m plus*. *Structural Equation Modeling A Multidisciplinary Journal*, 21(3), 329–341. 10.1080/10705511.2014.915181.
- Bacchus LJ, Ranganathan M, Watts C, & Devries K (2018). Recent intimate partner violence against women and health: A systematic review and meta-analysis of cohort studies. *BMJ Open*, 8(7), e019995 10.1136/bmjopen-2017-019995.
- Bastiaens L, & Bastiaens I (2006). Youth aggression: Economic impact, causes, prevention, and treatment. *The Psychiatric Times*, 23(11), 1–2.
- Berke DS, Reidy DE, Gentile B, & Zeichner A (2019). Masculine Discrepancy Stress, Emotion-Regulation Difficulties, and Intimate Partner Violence. *Journal of Interpersonal Violence*, 34(6), 1163–1182. 10.1177/0886260516650967088626051665096. [PubMed: 27226013]
- Butchart A, Mikton C, Dahlberg LL, & Krug EG (2015). Global status report on violence prevention 2014. *Injury Prevention*, 21(3), 213 10.1136/injuryprev-2015-041640. [PubMed: 25995201]
- Charak R, & Koot HM (2015). Severity of maltreatment and personality pathology in adolescents of Jammu, India: A latent class approach. *Child Abuse & Neglect*, 50, 56–66. 10.1016/j.chiabu.2015.05.010. [PubMed: 26056057]
- Cluver L, Orkin M, Boyes ME, & Sherr L (2015). Child and adolescent suicide attempts, suicidal behavior, and adverse childhood experiences in South Africa: A prospective study. *Journal of Adolescent Health*, 57(1), 52–59. 10.1016/j.jadohealth.2015.03.001.

- Collins LM, & Lanza ST (2010). *Latent Class and Latent Transition Analysis: With Applications in the Social, Behavioral, and Health Sciences*. John Wiley & Sons, Inc. 10.1002/9780470567333.
- Dardis CM, Dixon KJ, Edwards KM, & Turchik JA (2015). An examination of the factors related to dating violence perpetration among young men and women and associated theoretical explanations: A review of the literature. *Trauma, Violence & Abuse*, 16(2), 136–152. 10.1177/1524838013517559.
- Debowska A, & Boduszek D (2017). Child abuse and neglect profiles and their psychosocial consequences in a large sample of incarcerated males. *Child Abuse & Neglect*, 65(March), 266–277. 10.1016/j.chiabu.2016.12.003. [PubMed: 27989568]
- Debowska A, Willmott D, Boduszek D, & Jones AD (2017). What do we know about child abuse and neglect patterns of co-occurrence? A systematic review of profiling studies and recommendations for future research. *Child Abuse & Neglect*, 70, 100–111. 10.1016/j.chiabu.2017.06.014. [PubMed: 28609690]
- Devries KM, Mak JY, Bacchus LJ, Child JC, Falder G, Petzold M, ... Watts CH (2013). Intimate partner violence and incident depressive symptoms and suicide attempts: A systematic review of longitudinal studies. *PLoS Medicine*, 10(5), e1001439 10.1371/journal.pmed.1001439. [PubMed: 23671407]
- Felitti VJ, Anda RF, Nordenberg D, Williamson DF, Spitz AM, Edwards V, ... Marks JS (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The adverse childhood experiences (ACE) study. *American Journal of Preventive Medicine*, 14(4), 245–258. 10.1016/S0749-3797(98)00017-8. [PubMed: 9635069]
- Fineran S, Bennett L, & Sacco T (2003). Peer sexual harassment and peer violence among adolescents in Johannesburg and Chicago. *International Social Work*, 46(3), 387–401.
- Finkelhor D, Ormrod RK, & Turner HA (2007). Polyvictimization and trauma in a national longitudinal cohort. *Development and Psychopathology*, 19 10.1017/S0954579407070083.
- Fleming LC, & Jacobsen KH (2010). Bullying among middle-school students in low and middle income countries. *Health Promotion International*, 25(1), 73–84. 10.1093/heapro/dap046. [PubMed: 19884243]
- Foshee VA, Gottfredson NC, Reyes HLM, Chen MS, David-Ferdon C, Latzman NE, Tharp AT, & Ennett ST (2016). Developmental outcomes of using physical violence against dates and peers. *Journal of Adolescent Health*, 58, 665–671. 10.1016/j.jadohealth.2016.03.002.
- Fulu E, Warner X, Miedema S, Jewkes R, Roselli T, & Lang J (2013). Why do some men use violence against women and how can we prevent it? Summary report of quantitative findings from the United Nations Multi-country Study on Men and Violence in Asia and the Pacific. *Onu Mujeres*, 1–108.
- Garcia-Moreno C, Jansen HA, Ellsberg M, Heise L, & Watts CH (2006). Prevalence of intimate partner violence: Findings from the WHO multi-country study on women's health and domestic violence. *Lancet*, 368(9543), 1260–1269. 10.1016/S0140-6736(06)69523-8. [PubMed: 17027732]
- Gil-Gonzalez D, Vives-Cases C, Ruiz MT, Carrasco-Portino M, & Alvarez-Dardet C (2008). Childhood experiences of violence in perpetrators as a risk factor of intimate partner violence: A systematic review. *Journal of Public Health*, 30(1), 14–22. 10.1093/pubmed/fdm071. [PubMed: 17986717]
- Hardt J, & Rutter M (2004). Validity of adult retrospective reports of adverse childhood experiences: review of the evidence. *Journal of Child Psychology and Psychiatry*, 45(2), 260–273. 10.1111/j.1469-7610.2004.00218.x. [PubMed: 14982240]
- Jennings WG, Okeem C, Piquero AR, Sellers CS, Theobald D, & Farrington DP (2017). Dating and intimate partner violence among young persons ages 15–30: Evidence from a systematic review. *Aggression and Violent Behavior*, 33(2017), 1359–1789. 10.1016/j.avb.2017.01.007.
- Jewkes R (2002). Intimate partner violence: Causes and prevention. *Lancet*, 359(9315), 1423–1429. 10.1016/S0140-6736(02)08357-5. [PubMed: 11978358]
- Kajula L, Balvanz P, Kilonzo MN, Mwikoko G, Yamanis T, Mulawa M, Kajuna D, Hill L, Conserve D, Reyes HL, Leatherman S, Singh B, & Maman S (2015). Vijana Vijiweni II: a cluster-randomized trial to evaluate the efficacy of a microfinance and peer health leadership intervention for HIV and

intimate partner violence prevention among social networks of young men in Dar es Salaam. *BMC Public Health*, 16(113), 10.1186/s12889-016-2774-x.

- Kobak R, Zajac K, & Madsen S (2016). Attachment disruptions, reparative processes, and psychopathology: Theoretical and clinical implications In Schwartz JC, & Shaver P (Eds.). *Handbook of Attachment: Theory, Research and Clinical Implications* (pp. 25–39). New York, NY: Guilford Press.
- Krug EG, Mercy JA, Dahlberg LL, & Zwi AB (2002). The world report on violence and health. Summary article. *Lancet*, 360(9339), 1083–1088. 10.1016/S0140-6736(02)11133-0. [PubMed: 12384003]
- Lanza ST, & Rhoades BL (2013). Latent class analysis: An alternative perspective on subgroup analysis in prevention and treatment. *Prevention Science*, 14(2), 157–168. 10.1007/s11121-011-0201-1. [PubMed: 21318625]
- Lisak D (1994). The psychological impact of sexual abuse: Content analysis of interviews with male survivors. *Journal of Traumatic Stress*, 7(4), 525–548. 10.1002/jts.2490070403. [PubMed: 7820347]
- Lisak D (1995). Integrating a critique of gender in the treatment of male survivors of childhood abuse. *Psychotherapy Theory Research Practice Training*, 32(2), 258–269. 10.1037/0033-3204.32.2.258.
- Mulawa MI, Kajula LJ, & Maman S (2018). Peer network influence on intimate partner violence perpetration among urban Tanzanian men, *Culture, Health & Sexuality*, 20(4), 474–488. 10.1080/13691058.2017.1357193.
- Mulawa M, Kajula LJ, Yamanis TJ, Balvanz P, Kilonzo MN, & Maman S (2018). Perpetration and Victimization of Intimate Partner Violence Among Young Men and Women in Dar es Salaam, Tanzania. *Journal of Interpersonal Violence*, 33(16), 2486–2511. 10.1177/0886260515625910. [PubMed: 26802044]
- Muthén L, & Muthén B (2012). *Mplus Version 7 user's guide*. Los Angeles, CA: Muthén Muthén.
- NBS (2016). Tanzania demographic and health survey and malaria Indicator survey (TDHS-MIS) 2015–16. Dar es Salaam, Tanzania, and Rockville, Maryland USA 10.1017/CBO9781107415324.004.
- O'Hara M, Legano L, Homel P, Walker-Descartes I, Rojas M, & Laraque D (2015). Children neglected: Where cumulative risk theory fails. *Child Abuse & Neglect*. 10.1016/j.chiabu.2015.03.007.
- Nylund KL, Asparouhov T, & Muthén BO (2007). Deciding on the number of classes in latent class analysis and growth mixture modeling: A monte carlo simulation study. *Structural Equation Modeling A Multidisciplinary Journal*, 14(4), 535–569. 10.1080/10705510701575396.
- Pill N, Day A, & Mildred H (2017). Trauma responses to intimate partner violence: A review of current knowledge. *Aggression and Violent Behavior*, 34, 178–184. 10.1016/j.avb.2017.01.014.
- Roberts AL, Gilman SE, Fitzmaurice G, Decker MR, & Koenen KC (2010). Witness of intimate partner violence in childhood and perpetration of intimate partner violence in adulthood. *Epidemiology*, 21(6), 809–818. 10.1097/EDE.0b013e3181f39f03. [PubMed: 20811285]
- Roberts AL, McLaughlin KA, Conron KJ, & Koenen KC (2011). Adulthood stressors, history of childhood adversity, and risk of perpetration of intimate partner violence. *American Journal of Preventive Medicine*, 40(2), 128–138. 10.1016/j.amepre.2010.10.016. [PubMed: 21238860]
- Skrzypiec G, Wyras M, & Didaskalou E (2019). *A global perspective of young adolescents' peer aggression and well-being: Beyond bullying*. Routledge.
- Tomer JF (2014). Adverse childhood experiences, poverty, and inequality. *World Social and Economic Review*, 2014(3, 2014), 20.
- Tran QA, Dunne MP, Vo TV, & Luu NH (2015). Adverse childhood experiences and the health of university students in eight provinces of Vietnam. *Asia-Pacific Journal of Public Health*, 27(8), 26S–32S. 10.1177/1010539515589812. [PubMed: 26047629]
- Turner HA, Finkelhor D, Hamby SL, Shattuck A, & Ormrod RK (2011). Specifying type and location of peer victimization in a national sample of children and youth. *Journal of Youth and Adolescence*, 40(8), 1052–1067. [PubMed: 21373905]
- UNICEF and CDC (2011). *Violence against children in Tanzania Findings from a National Survey 2009*. UNICEF, Dar es Salaam.

- Vagi KJ, Rothman EF, Latzman NE, Tharp AT, Hall DM, & Breiding MJ (2013). Beyond correlates: a review of risk and protective factors for adolescent dating violence perpetration. *Journal of Youth and Adolescence*, 42, 633–649. 10.1007/s10964-013-9907-7. [PubMed: 23385616]
- Vaughn MG, Salas-Wright CP, Underwood S, & Gochez-Kerr T (2015). Subtypes of non-suicidal self-injury based on childhood adversity. *The Psychiatric Quarterly*, 86(1), 137–151. 10.1007/s11126-014-9313-7. [PubMed: 25124121]
- Velotti P, Beomonte Zobel S, Rogier G, & Tambelli R (2018). Exploring relationships: A systematic review on intimate partner violence and attachment. *Frontiers in Psychology*, 9, 1166 Retrieved from <https://www.frontiersin.org/article/10.3389/fpsyg.2018.011>. [PubMed: 30026719]
- Weir SS, Pailman C, Mahlalela X, Coetzee N, Meidany F, & Boerma JT (2003). From people to places: focusing AIDS prevention efforts where it matters most. *AIDS*, 17(6).
- Wilkins N, Tsao B, Hertz M, Davis R, & Klevens J (2014). Connecting the dots: An overview of the links among multiple forms of violence. National Center for Injury Prevention and Control, Centers for Disease Control and Prevention.
- World Health Organisation (2007). Process of translation and adaptation of instruments. Retrieved February 17, 2019, from https://www.who.int/substance_abuse/research_tools/translation/en/.
- Yamanis TJ, Maman S, Mbwapo JK, Earp JAE, & Kajula LJ (2010). Social venues that protect against and promote HIV risk for young men in Dar es Salaam, Tanzania. *Social Science & Medicine*, 71(9), 1601–1609. 10.1016/j.socscimed.2010.07.039. [PubMed: 20846768]

Fig. 1.
Latent class prevalence's and item-response probabilities for the five-class model.

Table 1

Endline Sample Characteristics (n = 987).

	% (N)
Demographic Characteristics	
Age	Mean 29 (18–62; SD = 7.14)
Education	
Primary school or less	53.4 % (527)
Some secondary school	8.7 % (86)
Secondary school or higher	37.9 % (374)
Wealth Tercile	
Lowest	36.1 % (356)
Medium	41.9 % (413)
Highest	22.0 % (217)
Study Condition-Intervention	48.3 % (477)
ACEs Indicators (in first 18 years of life)	
1: Alcohol Drugs	50.5 % (497)
2: Mental Illness	24.9 % (245)
3: Jail	36.2 % (355)
4: Divorce	41.7 % (407)
5: Orphan	52.1 % (513)
6: Physical Abuse	
Occasional	43.9 % (433)
Frequent	20.0 % (197)
7: Emotional Abuse	
Occasional	52.6 % (519)
Frequent	14.7 % (145)
8: Witnessed violence against household member	
Occasional	37.9 % (374)
Frequent	28.3 % (279)
9: Experienced unwanted attempted and/or actual touch or fondling	
Occasional	18.2 % (180)
Frequent	27.6 % (272)
10: Experienced any unwanted attempted and/or enacted oral, anal, or vaginal intercourse	18.2 % (178)
IPV Indicators	
Any IPV perpetration in past 12 months	34.1 % (330)
Psychological IPV	24.8 % (245)
Physical IPV	17.0 % (165)
Sexual IPV	9.22 % (91)
Any IPV victimization in past 12 months	47.3 % (460)
Psychological IPV	40.7 % (402)
Physical IPV	15.1 % (149)
Sexual IPV	14.4 % (142)

	% (N)
Peer Violence Indicators	
Any Peer Violence Perpetration in past 12 months	29.5 % (291)
Any Peer Violence Victimization in past 12 months	37.0 % (365)

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Table 2

Fit Indices for Unconditional Latent Class Analysis of Adverse Childhood Experiences Indicators.

	Unconditional Model					
	1 Class	2 Classes	3 Classes	4 Classes	5 Classes	6 Classes
AIC	15,288	14,384	14,150	14,029	13,942	13,885
ssBIC	15,312	14,433	14,225	14,130	14,068	14,037
BIC	15,357	14,525	14,365	14,317	14,303	14,319
LMR-LRT <i>p-value</i>	NA	<.001	0.020	<.0010	0.05	0.15
Entropy	NA	0.73	0.71	0.77	0.74	0.77

Table 3

Parameter estimates for model of five latent classes of ACEs.

	Nonvictims	Occasional Physical and Emotional	Family Dysfunction and Occasional Physical and Emotional	Sexual Victimization and Occasional Physical and Emotional	Severe Multiform ACEs
Latent Class Membership Probabilities	.33	.27	.16	.13	.11
ACEs Indicators	Item Response	Probabilities			
Alcohol Drugs	.29	.43	.94	.36	.17
Mental Illness	.08	.08	.67	.18	.59
Jail	.18	.02	.87	.23	.68
Divorce	.35	.37	.56	.22	.71
Orphan	.51	.20	.64	.37	.83
Physical abuse					
Occasional	.15	.72	.58	.70	.06
Frequent	.001	.21	.13	.12	.94
Emotional Abuse					
Occasional	.24	.82	.71	.72	.19
Frequent	.008	.09	.07	.01	.81
Witness violence in HH					
Occasional	.26	.44	.42	.70	.14
Frequent	.05	.29	.04	.19	.86
Attempted and/or enacted unwanted touch or fondling					
Occasional	.12	.19	.22	.28	.19
Frequent	.09	.13	.43	.64	.50
Attempted or enacted unwanted Intercourse	.06	.0	.29	.73	.21

Table 4

Adjusted odds ratios of perpetration of intimate partner violence and peer violence by adverse childhood experiences class membership\.

Outcome	Latent Class				
	Class 1 Nonvictims	Class 2 Occasional Physical and Emotional	Class 3 Family Dysfunction and Occasional Physical and Emotional	Class 4 Sexual Victimization and Occasional Physical and Emotional	Class 5 Severe Multiform ACEs
<i>IPV Indicators</i>					
Psychological	Ref 1.00	1.23 (0.61, 2.08)	2.33 (1.39, 3.92)	0.91 (0.34, 2.40)	3.04 (1.61, 5.71)
Physical	Ref 1.00	1.69 (0.91, 3.15)	1.39 (0.67, 2.89)	1.14 (0.45, 2.90)	0.89 (0.35, 2.32)
Sexual	Ref 1.00	0.98 (0.35, 2.76)	1.11 (0.41, 2.98)	1.81 (0.59, 5.54)	1.53 (0.73, 3.19)
<i>PV</i>	Ref 1.00	1.14 (0.52, 2.38)	3.54 (2.03, 6.15)	6.10 (2.53, 14.71)	7.42 (3.36, 16.37)
<i>IPV Indicators</i>					
Psychological	0.89 (0.48, 1.65)	Ref 1.00	2.08 (1.05, 4.12)	0.80 (0.26, 2.46)	2.70 (1.29, 5.69)
Physical	0.59 (0.32, 1.10)	Ref 1.00	0.82 (0.38, 1.76)	0.67 (0.24, 1.90)	0.52 (0.19, 1.46)
Sexual	1.22 (0.36, 2.88)	Ref 1.00	1.13 (0.40, 3.19)	1.86 (0.54, 6.33)	1.56 (0.52, 4.00)
<i>PV</i>	0.90 (4.66, 1.57)	Ref 1.00	3.18 (1.64, 6.14)	5.48 (2.40, 14.73)	6.64 (2.72, 16.33)
<i>IPV Indicators</i>					
Psychological	0.43 (0.26, 7.22)	0.48 (0.24, 0.96)	Ref 1.00	0.39 (0.13, 1.14)	1.31 (0.67, 2.54)
Physical	0.72 (0.35, 1.50)	1.22 (0.57, 0.26)	Ref 1.00	0.82 (0.33, 2.08)	0.65 (0.25, 1.70)
Sexual	0.90 (0.34, 2.42)	0.88 (0.31, 2.48)	Ref 1.00	1.64 (0.64, 4.19)	1.38 (0.61, 3.12)
<i>PV</i>	0.28 (0.16, 0.49)	0.32 (0.16, 0.61)	Ref 1.00	1.73 (0.72, 4.16)	2.10 (0.95, 4.12)
<i>IPV Indicators</i>					
Psychological	1.11 (0.41, 2.96)	1.25 (0.41, 2.83)	2.59 (0.88, 7.23)	Ref 1.00	3.37 (1.29, 8.80)
Physical	0.88 (0.35, 2.22)	1.48 (0.53, 4.18)	1.21 (0.48, 2.07)	Ref 1.00	0.78 (0.27, 2.29)
Sexual	0.55 (0.18, 1.69)	0.54 (0.16, 1.84)	0.61 (0.24, 1.57)	Ref 1.00	0.84 (0.40, 1.80)
<i>PV</i>	0.16 (0.07, 3.95)	0.18 (0.07, 0.49)	0.58 (0.24, 1.40)	Ref 1.00	1.22 (0.68, 2.18)

Note: Confidence intervals appear in parentheses. All analyses were measurement-error weighted using the Vermunt 3-Step method.