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AN EXAMINATION OF THE ASSOCIATION BETWEEN ADVERSE CHILDHOOD
EXPERIENCES AND ALCOHOL CONSUMPTION PATTERNS AMONG HIGH
RISK YOUTH IN KAMPALA, UGANDA

By

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B.A., UGANDA CHRISTIAN UNIVERSITY

A Thesis Submitted to the Graduate Faculty of Georgia State University in Partial

Fulfillment of the Requirements for the Degree

MASTER OF PUBLIC HEALTH

ATLANTA, GEORGIA 30303

2014

APPROVAL PAGE

AN EXAMINATION OF THE ROLE OF ADVERSE CHILDHOOD EXPERIENCES
ON ALCOHOL CONSUMPTION AMONG HIGH RISK YOUTH IN UGANDA

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I would like to thank God for his goodness over the years, I would also like to thank the faculty and staff of the School of Public Health at Georgia State University for enriching me with a wealth of knowledge and skills over the past two years.

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ABSTRACT

Objective: To examine the prevalence of adverse childhood experiences and associations with early alcohol use initiation and alcohol use patterns among high-risk urban youth in Kampala, Uganda.

Methodology: Data from the Kampala Youth Survey (N=457) conducted in May through June 2011 in Kampala, Uganda was used for analysis. Indicators of adverse childhood experiences included: hunger, having parents, talking to parents, ever having lived on the street, parents hitting each other, parents hitting children and parental use of alcohol. These were dichotomized as either possessing the characteristic or not. Alcohol outcomes assessed were; age at alcohol initiation (age 13 was the cutoff point), frequency of drinking and intensity of drinking. Bivariate and multinomial logistic regression analyses were computed to determine statistical association between adverse childhood experiences and alcohol use patterns.

Results: Findings in this study showed that parents hitting the youth ($p<.05$), parental use of alcohol ($p<.001$), being hungry ($p<.001$), having ever lived on the street ($p<.001$), and having been raped ($p<.001$) were significantly associated with the youth's age of alcohol initiation by age 13, frequent drinking and heavy drinking in bivariate analyses. Results also showed gender differences for: parental alcohol use ($p<.05$), parents hitting each other ($p<.05$), being hungry ($p<.001$), ever having lived on the street ($p<.001$) and having been raped ($p<.001$). Girls reported higher values for these measures except for being raped where boys had higher values. Parental use of alcohol ($p<.001$), having ever lived on the street ($p<.001$) and having been raped ($p<.001$) were particularly significant included in a multivariate model.

Conclusion: This study demonstrates that adverse childhood experiences are strongly associated with early alcohol use initiation as well as frequent and heavy drinking. As such, early prevention efforts are urgently needed to ameliorate the consequences of adverse childhood experiences.

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CHAPTER I

INTRODUCTION

1a. Background

The WHO global status report on alcohol and health 2014 describes alcohol as a psychoactive substance with dependence-producing properties that has been widely used in many cultures for centuries (“WHO | Global status report on alcohol and health 2014,” n.d.). The WHO highlights the harmful use of alcohol including causing disease, social and economic burden in societies (“WHO | Alcohol,” n.d.-a). There are differences and historical trends in alcohol consumption and related harm that can be explained by environmental factors such as economic development, culture, availability of alcohol and the level and effectiveness of alcohol policies (“WHO | Global status report on alcohol and health 2014,” n.d.).

Globally, alcohol is the third-leading risk factor for premature death and disability (“Alcohol grows as risk factor for death and disability in 2010 GBD Study,” n.d.). Alcohol consumption can lead to alcohol dependence and abuse, contribute to a number of diseases and mental and behavioral disorders, and may lead to a range of injuries (“NIAAA Publications,” n.d.). Also, drinkers and their families are subject to social problems like; familial dysfunction, criminal convictions, and financial problems. Drinking leads to enormous costs to society in terms of health care expenses, lost productivity, and lost years of lives (“NIAAA Publications,” n.d.; Thavorncharoensap et al., 2009; Rehm et al., 2009; Rehm, 2011).

Alcohol consumption is an important risk factor for chronic disease and injury (Seitz & Becker, 2007; Taylor et al., 2010). Researchers have quantified the burden of mortality and disease attributable to alcohol, both globally and across nations (Lim et al., 2012; Rehm et al., 2009; WHO, 2009). Findings have shown that the harmful effects of alcohol consumption on health account for 3.8% of all global deaths and 4.6% of global disability-adjusted life-years attributable to alcohol (Rehm et al., 2009). Disease burden was found to be closely linked to volume of alcohol consumption, with disproportionate effects on poor people and those marginalized in society (Rehm et al., 2009). Alcohol consumption was identified as one of the major avoidable risk factors for injury/disease and death and actions to reduce the burden and costs associated with alcohol should be made a priority (Rehm et al., 2009). While alcohol consumers cite various reasons for initiating alcohol use and for drinking relatively large amounts of alcohol, researchers have found that early childhood trauma including adverse childhood experiences more broadly, likely exacerbate risk for early alcohol use initiation and heavier drinking in adulthood.

Adverse Childhood Experiences (ACEs), also referred to as child maltreatment, refer to any act or series of acts of commission or omission by a parent or other caregiver that results in harm, potential for harm, or threat of harm to a child (CDC, 2014). Similarly, the Substance Abuse and Mental Health Services Administration (SAMHSA) defines ACEs as stressful or traumatic experiences, including abuse, neglect and a range of household dysfunction such as witnessing domestic violence, or growing up with substance abuse, mental illness, parental discord, or crime in the home (SAMHSA, 2014). Finally, the CDC identifies and defines the several categories of ACEs as follows;

Abuse (Emotional Abuse, Physical Abuse, Sexual Abuse), neglect (Emotional Neglect, Physical Neglect), Household dysfunction, household substance abuse, household mental illness, parental separation or divorce and incarcerated household member (CDC, 2014). From an international perspective, ACEs include multiple types of abuse; neglect; exploitation; exposure to violence between parents or caregivers; other kinds of serious household dysfunction such as growing up with alcohol and substance abusing family members; and peer, community and collective violence (WHO, 2014).

International studies assessing childhood adversities indicate that approximately 20% of women and 5–10% of men report being sexually abused as children, while 23% of people report being physically abused as children (WHO, 2014). Many more children are subject to emotional or psychological abuse and to neglect. In armed conflict and refugee settings specifically, girls are particularly vulnerable to sexual violence, exploitation and abuse by combatants, security forces, members of their communities, aid workers and others (Gender Based Violence and livelihood Interventions, 2007). Every year, there are an estimated 34,000 homicide deaths in children under 15 years of age and this is an underestimate (WHO, 2014).

ACEs are strongly related to child and adolescent development and have been associated with the prevalence of a wide range of health and social problems. These problems include substance abuse (alcohol and drug abuse) and problems with forming and maintaining relationships (Dube et al., 2002).

Findings from a number of studies suggest that early-life social environments can have long-lasting impacts on health that persist well into adulthood (Shonkoff et al., 2012; Cohen et al., 2010; Springer et al.). Maltreated children are at increased risk for

behavioral, physical and mental health problems such as: being a victim or perpetrator of violence, depression, substance abuse, obesity, high-risk sexual behaviors, unintended pregnancy, HIV/AIDS, heart disease and cancer that they experience for a large part of their lives and premature mortality at worst (Springer et al., 2003; Shuper et al., 2010; Dube et al., 2002). In addition to the health and social consequences of child maltreatment, there is an added economic impact, including costs of hospitalization, mental health treatment, child welfare, and longer-term health (physical and emotional) costs (Rehm et al., 2009; Dube et al., 2002).

Alcohol use especially as a consequence of ACEs is an important public health concern because of the several detrimental health and social outcomes (“The Health and Social Impact of Growing Up With Adverse Childhood Experiences,” n.d.). However, despite the vast literature on either alcohol use or ACEs, there is surprisingly limited research on ACEs and alcohol use in Sub Saharan Africa where alcohol use is highly prevalent. It is of particular interest to examine ACEs and links to alcohol use patterns particularly among high-risk youth in Kampala, Uganda who do not attend school because these youth have many unmet needs and are likely to drink alcohol at young ages, drinking frequently and heavily. As such, this study seeks to examine ACEs and alcohol drinking patterns, that is, early alcohol use initiation, frequency and intensity of drinking with the goal of informing program planning and intervention strategies among youth in Kampala.

1b. Purpose of study

To examine the association between ACEs and alcohol use patterns among high-risk urban youth in Kampala, Uganda.

Research Questions

1. What is the prevalence and socio demographic correlates of ACEs among high - risk youth living in the slums of Kampala?
2. Do high-risk youth living in the slums of Kampala who report ACEs initiate alcohol use earlier and use alcohol frequently and heavily compared to those who do not report any ACEs?

1c. Hypotheses

For research question #2, there are three alternative hypotheses:

1. High-risk youth living in the slums of Kampala who report ACEs will report initiating alcohol use at an earlier age compared to youth who do not report ACEs.
2. High-risk youth living in the slums of Kampala who report ACEs will report frequent alcohol use compared to youth who do not report ACEs.
3. High-risk youth living in the slums of Kampala who report ACEs will report heavy alcohol use compared to youth who do not report ACEs.

Several reasons have influenced these assumptions including previous research that has demonstrated that there is a strong dose-response relationship between ACEs and a variety of substance use-related behaviors, including early initiation of alcohol use

compared to those who did not report experiencing ACEs (“Exploring the Connection between Adverse Childhood Experiences (ACEs) and Alcohol Abuse,” n.d.).

1d. Biological Plausibility

In Bradford Hill’s 9 criteria for establishing an argument for causation, biological plausibility is considered a key element and it refers to the strength of the convergence between epidemiology and neurobiology (“Public Health Classics: Association or causation: evaluating links between ‘environment and disease,’” n.d.).

Research findings from population studies and those from the neurobiology discipline have indicated that ACEs disrupt normal brain development and function. This then leads victims of ACEs to suffer with long lasting health effects (Teicher et al., 2003). This effect on the brain gives biological evidence to support public health research findings that have linked ACEs to the negative outcomes including affecting an individual’s long term health (Anda et al., 2006).

In addition, study findings have shown that the regular operation of the immune and nervous systems of people who experience ACEs are interfered with (Thavorncharoensap et al., 2009). These findings are particularly critical for those who have these experiences early on in life because of the emotional vulnerability associated with them across lifespan including alcohol and drug abuse (Dube et al., 2002; Dube et al., 2006).

CHAPTER II

LITERATURE REVIEW

The literature review will comprise of compiled research from various studies on the prevalence of alcohol use and the prevalence of ACEs and studies documenting an association between ACEs and alcohol consumption among youth. Studies reviewed will be global in nature including those from the United States and sub-Saharan Africa, including Uganda. The words child maltreatment and ACEs will be used interchangeably.

2a. Studies on alcohol use, age of alcohol use initiation frequent and heavy drinking

The deleterious impact of alcohol is among the top five risk factors for disease, disability and death throughout the world (WHO, 2014). It is a causal factor in more than 200 disease and injury conditions and is associated with health problems like alcohol dependence, liver cirrhosis, cancers and injuries and for most diseases and injuries causally impacted by alcohol, there is a dose–response relationship (WHO, 2014; WHO, 2014). Alcohol use has been found to be associated with alcohol dependence (Hingson et al., 2006; NIAAA Publications, 2014), other substance use (NIAAA Publications, 2014), criminal activity (NIAAA Publications, 2014), unintentional injuries (Hingson, et al., 2003; Hingson et al., 2006), suicidal ideation and attempts (Swahn & Bossarte, 2007), chronic disease and injury (Seitz & Becker, 2007; Taylor et al., 2010) as well as social

problems like forming and maintain relationships (“The Health and Social Impact of Growing Up With Adverse Childhood Experiences,” n.d.). Recent findings from research also suggest associations between harmful alcohol use and infectious diseases such as tuberculosis and HIV/AIDS (WHO, 2013). Findings have also shown differences and historical trends in alcohol consumption and related harm which can be explained by environmental factors such as economic development, culture, availability of alcohol and the level and effectiveness of alcohol policies (WHO, 2014).

Correlates of alcohol use include: genetic factors (NIAAA, 2008; “WHO 2014), age (Hilton, 1987; Midanik & Clark, 1995; Mäkelä & Mustonen, 2000; WHO, 2014), gender (Grucza et al., 2008; Wilsnack, 2013; “WHO | Global status report on alcohol and health 2014,” n.d.), family characteristics (Merigankas et al., 1998; WHO, 2004a; WHO, 2014), socio economic status (Grittner et al., 2012; WHO, 2014), culture (Neumark et al., 2003; Chartier et al., 2013; WHO, 2014) and childhood maltreatment (Springer et al., 2003; Shuper et al., 2010; Dube et al., 2002). Findings on alcohol consumption particularly in Africa have shown that alcohol use and risky sexual behaviors are linked to drinking venues and alcohol serving establishments, sexual coercion, and poverty (Kalichman et al., 2007; Swahn et al., 2011). These results point to the pressing public health issue of alcohol use in sub-Saharan Africa which is linked to other health-risk behaviors and adverse outcomes.

In 2012, 5.9% of all global deaths were as a result of alcohol consumption (“WHO, 2013; Gulland, 2014). There are significant sex differences in the proportion of global deaths attributable to alcohol, for example, in 2012, 7.6% of deaths among males and 4.0% of deaths among females were attributable to alcohol (WHO, 2014). Similarly,

in 2012, 5.1% of the global burden of disease and injury were as a result of alcohol consumption (WHO, 2014).

Children and adolescents are more vulnerable to alcohol-related harm from a given volume of alcohol than adults (Faden, 2006; NIAAA, 2009). Early initiation of alcohol use (before 14 years of age) is also a predictor of impaired health status because of its association with increased risk for alcohol dependence and abuse at later ages (DeWit et al., 2000) leading to alcohol-related motor vehicle crashes and other unintentional injuries. Family history of alcohol use disorders is considered a key susceptibility factor for both genetic and environmental reasons and account for an extensive fraction of the disparity in alcohol dependence and people with lower socioeconomic status (SES) who appear to be more susceptible to the problems and consequences associated with alcohol consumption (WHO, 2014).

Youth who report being stressed are at a higher risk of initiating alcohol use at an early age and are likely to drink more frequently as well (NIAAA, 2014). Research findings indicated that street children, specifically in Brazil who lived and slept on the streets were more likely to use alcohol and on nearly a daily basis (Leticia et al., 1996; WHO, 2001). Similarly, findings from a 1989 study of a national sample of Canadian youths who lived on the street found that over 80 per cent drank alcohol and 9 per cent reported drinking daily (WHO, 2001).

2b. The pioneer ACE Study conducted in the United States

The CDC initiated the ACE Study, one of the largest investigations ever conducted to assess associations between childhood maltreatment and later-life health and well-being which it has continued on an ongoing basis (CDC, 2014). This study has created a wealth of knowledge in the area of ACEs and the several factors that surround them. Interest in replications of the ACE Study is growing globally and presently there are efforts to replicate the ACE Study or use its questionnaire in Canada, China, Jordan, Norway, the Philippines and the United Kingdom and the World Health Organization has included the ACE Study questionnaires as an addendum to the document, 'Preventing Child Maltreatment: A Guide to Taking Action and Generating Evidence' (Dube et al., 2002).

The original ACE study which began in 1995 with more than 17,000 Kaiser patients completing a confidential survey comprising questions about childhood maltreatment and family dysfunction, as well as their current health status and behaviors (CDC, 2014). Findings also revealed that: ACEs are strongly related to development and prevalence of a wide range of health and social problems throughout their lifespan and across birth cohorts (Dube et al., 2002; Dube et al., 2003). Furthermore, many ACE-related problems have a tendency to be co-occurring (CDC, 2014).

The ACE Study uses the ACE Score, which is a total count of the number of ACEs reported by adult respondents (CDC, 2014). The ACE Score is used to retrospectively assess the total amount of adversity during childhood and its impact on adult life. Findings have shown that as the number of ACEs significantly increase, the risk for several health and social problems including: substance abuse, chronic

obstructive pulmonary disease, depression, fetal death, chronic disease, intimate partner violence and risky sexual behavior, suicidal behavior (Anda, 2006).

2c. Studies of alcohol use and ACEs in the United States

The CDC emphasizes that excessive alcohol use is the third leading cause of preventable death in the United States and is a risk factor for many health and societal problems (CDC, 2014). In 2006, the estimated economic cost of excessive drinking in the U. S. was \$223.5 billion (Bouchery et al.; Brewer, 2011; CDC, 2014). Excessive alcohol consumption can take the form of heavy drinking - more than two drinks per day on average for men or more than one drink per day on average for women, binge drinking - five or more drinks during a single occasion for men or four or more drinks during a single occasion for women, or underage drinking (NIAAA, 2014.; CDC , 2014). This makes alcohol and its associated risk factors particularly child maltreatment, a major area of concern for public health research and practice (The Community Guide, 2014).

In a retrospective cohort study of adult health maintenance organization (HMO) members in California examining the relationship between multiple ACEs and both the likelihood of ever drinking and the age at initiating alcohol use; respondents completed a survey about ACEs which included; childhood abuse and neglect, growing up with various forms of household dysfunction and alcohol use in adolescence and adulthood. Results showed that 89% of the cohort reported ever drinking and all individual ACEs except physical neglect increased the risk of ever using alcohol ($p < .05$). Among ever drinkers, initiating alcohol use by age 14 was increased two to three times by individual ACEs ($p < .05$). Significant findings between the ACE score and drinking by age 14 for

four birth cohorts emphasizes that the negative effects of ACEs exceed changes overtime, something that should inform prevention efforts (Dube et al., 2003).

In the 2001- 2002 National Epidemiologic Survey on Alcohol and Related Conditions, researchers studied associations between ACEs, psychological distress and adult alcohol problems among more than 43,000 participants. Findings showed that those who experienced 2 or more adverse events in childhood were about 2 times more likely to develop alcohol dependence than those who experienced one or no ACE, ACEs and psychological distress were also associated with increased risk of self-reported alcohol problems in both men and women although different ACEs were associated with these alcohol problems for each gender. With alcohol use, alcoholism, and alcohol abuse among men tending to be higher than for women, findings in this study suggest that behaviors among men may be influenced by early childhood actors. The use of alcohol in this context may be a coping technique to deal with distress and unresolved trauma. It is therefore vital to identify early childhood trauma in interventions that aim to reduce alcohol abuse (Strine et al., 2012; NIAAA, 2014).

In examining the mediating role of psychological distress on the relationship between ACEs and adult alcohol problems by gender, researchers found that psychological distress mediated large portions of alcohol problems associated with childhood emotional and physical maltreatment, mental illness, parental separation or divorce, sexual abuse, and household drug use among women and; mental illness in the household, emotional and physical maltreatment, household drug use, and sexual abuse among men. It is therefore imperative to recognize the role of adverse experiences in

childhood in programs trying to reduce alcohol abuse as well as identifying the contributing factors that are gender sensitive (Strine et al., 2012).

2d. Alcohol use and ACE studies in sub-Saharan Africa

Nationally representative data from Burkina Faso, Ghana, Malawi, and Uganda (N=9,819, ages 12-19) were examined in a study to assess the association between four ACEs and self-reported past year drunkenness among adolescents. ACEs were measured by; living in a food-insecure household, living with a problem drinker, having been physically abused, and having been coerced into having sex. Findings showed that respondents who had experienced an adverse event during childhood were more likely to report drunkenness and the association between adverse events and reported drunkenness was more pronounced for females. For both males and females there was an association between the number of adverse events experienced and the proportion reporting drunkenness and researchers found that ACEs may predispose adolescents to alcohol use (Kabiru et al., 2010).

Associations between childhood adversity, depression, substance abuse and HIV in rural South African youth were studied to describe prevalence of childhood experiences of adversity and their associations with health outcomes. Findings showed that sexual abuse was associated with alcohol abuse in men (AOR 3.68, 95% CI 2.00, 6.77, $p < .0001$) and alcohol abuse in women (AOR 3.94, 95% CI 1.90, 8.17, $p < .0001$). This finding emphasizes that childhood exposure to adversity is very common and exposure of children to adverse experiences has been a highly neglected area of research

in Africa particularly research on emotional abuse and neglect, which has shown an negative impacts on the health of young people (Jewkes et al., 2010).

In a study to determine the prevalence of violence involving weapons in a convenience sample of service-seeking youth in Kampala (N=457), researchers found that reporting drunkenness (AOR=2.35 ;95%CI:1.12-4.92) was significantly associated with violence while parental neglect as a result of alcohol use was a significant correlate of violence victimization among the youth (Swahn, Gressard, et al., 2012).

Using data from students in Zambia and Uganda from the Global School-Based Student Health Survey, researchers studied the associations between early alcohol use, before age 13, and problem drinking among adolescents. Findings from the study showed that early alcohol initiation was associated with problem drinking in both Zambia (AOR=1.28; 95% CI:1.02-1.61) and Uganda (AOR=1.48; 95% CI: 1.11- 1.98) among youth as well as a significant association between alcohol initiation before 13 years of age and problem drinking among youth in both countries (Swahn et al., 2011).

To describe the magnitude of risky sexual and its association with Khat and alcohol consumption in Ethiopia, researchers studied 20,434 in-school and out-of-school youths aged between 15 and 24 years of age about their sexual behavior and substance use. Findings showed that there was a significant and linear association between alcohol intake and unprotected sex, with those using alcohol daily having a threefold increased odds compared to those not using it (Kebede et al., 2005).

In a study to examine the associations between alcohol marketing strategies, alcohol education and alcohol problems, researchers analyzed data from the Global

School-Based Student Health Survey conducted in Zambia in 2004 of students largely 11 to 16 years of age (N=2257). Findings indicated that alcohol marketing, especially providing of free alcohol through a company representative, was associated with drunkenness (AOR = 1.49; 95% CI: 1.09–2.02) and problem drinking (AOR = 1.41; 95% CI: 1.06–1.87) among youth (Swahn et al., 2011).

In Uganda, a country with one of the highest per capita alcohol consumptions in the world (Tumwesigye et al., 2009), research was conducted to establish the relationship between social interaction and alcohol consumption in Uganda among 1479 participants in 2003 as part of a transnational study. Findings showed that the stronger the social interaction, the more the likelihood of taking alcohol frequently $p < 0.001$ even after controlling for sex, age group and education level (Tumwesigye et al., 2009).

Researchers analyzed data on patterns of alcohol consumption with adjustment for cluster effects and found a significant variation in the likelihood of drinking frequently at village level ($p < 0.01$). The variation in the likelihood of heavy drinking remained significant after controlling for background characteristics of respondents and village-level prevalence of drinking and unemployment (Tumwesigye et al., 2013).

Researchers examined the role of religion and religiosity on alcohol consumption at two fish landing sites on Lake Victoria in Uganda. Findings indicated that people reporting low religiosity were five times more likely to have consumed alcohol compared to those reporting low/average religiosity (Tumwesigye et al., 2013).

2e. Risk Factors, Prevention Strategies and Recommendations for ACEs and their impact

Through research, several risk factors associated with ACEs have been identified and although they are not present in all social and cultural contexts, they give an understanding of the causes of child maltreatment and its link to alcohol problems (CDC, 2014). The risk factors include but are not limited to the following; characteristics of a parent or caregiver such as - difficulty bonding with a newborn, not nurturing the child, having been maltreated themselves as a child, lacking awareness of child development or having unrealistic expectations, misusing alcohol or drugs, being involved in criminal activity and experiencing financial difficulties; family breakdown including parent-child relationships or violence between other family members as well as community and societal factors like gender and social inequality, high levels of unemployment and poverty, easy access to alcohol and drugs, and inadequate policies and programs (Dube et al., 2002).

Alcohol literature demonstrates a critical gap in the literature for the need to examine the role of ACEs in early alcohol use especially in sub-Saharan Africa. In particular, early alcohol use initiation has been found to be associated with a host of other adverse consequences such as alcohol dependence, suicide, self-harm, injuries and diseases including the risk of acquiring HIV (Swahn & Bossarte, 2007; Stueve & O'Donnell, 2005; Hawkins et al., 1997; Hingson & Zha, 2009). As such, it is clear that early alcohol use initiation should be a key outcome when examining the role of ACEs. Additionally, epidemiologic research of alcohol use among youth also tend to focus on frequency of use (Muchimba et al., 2013; Weitzman et al., 2003) as well as heavy use (Dawson et al., 2004; Klima et al., 2014).

The present study will examine the prevalence of ACEs and socio demographic correlates, as well as the contribution of ACEs to early alcohol use initiation, frequency of alcohol use and heavy alcohol use in a population of high risk youth living in the slums and streets of Kampala, Uganda.

2f. Measures selected

Measures selected for this study were informed by previous research that has shown prevalent alcohol use (Swahn et al., 2013) and adverse experiences (Swahn et al., 2012) in this and such populations. They are described below.

Parental involvement characteristics – In a study of street and slum youth in Kampala, more than three quarters of the youth in our survey reported one or both parents deceased, an alarming issue that is likely the key underlying cause of their current living conditions (Swahn et al., 2012a).

Parents hitting each other - Family breakdown including parent-child relationships or violence between other family members have been identified as one of several risk factors associated with ACEs. (CDC, 2014; DHHS 2001; Lipsey and Derzon 1998; Resnick et al. 2004; Dube et al., 2002)

Parents hitting youth – In a study of youth living on the streets and slums of Kampala, 63% reported being hit or beaten by their parents (Swahn et al., 2012).

Parental alcohol use - 21% of youth living on the streets and slums of Kampala reported that their parents' alcohol use had prevented them from providing care for them (Swahn et al., 2012).

Hunger - 61% of youth living on the streets and slums of Kampala reported experiencing hunger (Swahn et al., 2012).

Ever lived on street- Street children specifically in Brazil who lived with their families and attended school were less likely to drink alcohol than those who spent all day in the streets and slept there while a 1989 study of a national sample of Canadian youths who lived on the street found that over 80 per cent drank alcohol and 9 per cent reported drinking daily (WHO, 2001).

Raped- International studies have shown that approximately 20% of women and 5–10% of men report being sexually abused as children (WHO, 2014) something that has been identified as a risk factor for alcohol use later in life.

Alcohol has serious long lasting implications on the life of the individual and the presence of ACEs increases this risk something that it likely for the population that will be a part of this study. This study will give an opportunity for knowledge about this particular population to be shared beyond the borders of the slums in which these high risk youth live thereby providing an opportunity for more exploratory research opportunities and possibly interventions to improve the public health in this and such populations. This study will also address a gap in the literature concerning research on alcohol use and ACEs in Uganda, sub-Saharan Africa and similar at risk populations.

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CHAPTER III

MANUSCRIPT

INTRODUCTION

Globally, alcohol is the third-leading risk factor for premature death and disability (Lim et al., 2012) and it accounts for 3.2% of all deaths and 4.0% of the disease burden (WHO, 2007). The World Health Organization (WHO) has highlighted the detrimental use of alcohol globally (WHO, 2010). The disease burden of alcohol has been found to be closely linked to volume of alcohol consumption, with disproportionate effects on poor people and those marginalized in society (Rehm et al., 2009).

A key area that has yet to be explored is the role of early Adverse Childhood Experiences (ACEs) in early alcohol use initiation and consumption patterns. Research in the U.S. on ACEs shows that; an association between ACEs and alcohol use at an early age which transcends time (Dube et al., 2002; Dube et al., 2006) experiencing 2 or more ACEs increases the risk of alcohol dependence by a similar margin, psychological distress increases the risk of self-reported alcohol problems (Strine et al., 2012; NIAAA, 2004) and there are differences in how ACEs affect men and women (Strine et al., 2012; NIAAA, 2004) thereby indicating that ACEs likely have a strong association with early alcohol use and alcohol consumption patterns. Alcohol use is frequently used as a coping

strategy among youth based on research in North America and Europe. It is very likely that youth in sub-Saharan Africa, and in Kampala specifically, will have similar experiences (Swahn et al., 2013). As such, the following study was guided by two research questions: What is the prevalence and socio demographic correlates of ACEs among high -risk youth living in the slums of Kampala? Do high-risk youth living in the slums of Kampala who report ACEs initiate alcohol use earlier and use alcohol frequently and heavily than those who did not experience ACES? In this study, ACES were broadly defined and used indicators to reflect whether youth did not having living biological parents, did not actively talk to parents, saw parents hitting each other, parents hit the youth, parental use of alcohol, hunger, having ever lived on the street and having been raped.

These indicators were guided by previous research (Swahn et al., 2013; Swahn et al., 2012; WHO, 2014; CDC, 2014). Moreover, alcohol use initiation (≤ 13 years and >13 years) was a key outcome as it is a key metric for efforts to delay and reduce alcohol use. Also, having had more than 5 drinks in the past month and having been drunk on more than 5 days in the past month were used to measure frequent and heavy drinking respectively.

Youth in the slums of Kampala lack so many basic needs (Swahn et al., 2013; Swahn, Gressard, et al., 2012; Swahn et al., 2011). Youth who live in the slums and on the streets rarely attend school and are particularly vulnerable to a range of health risks including substance abuse (Leticia et al. 1996; WHO, 2001). As such, early public health interventions are needed and the current study is conducted to inform prevention strategies in resource-poor settings.

METHODS

Data from the Kampala Youth Survey conducted in May and June 2011 in Kampala, Uganda was used. The study protocol was approved by the Georgia State University Institutional Review Board and also by the Uganda National Council for Science and Technology. The main objective of this cross-sectional survey was to quantify and describe high-risk behaviors and exposures in a convenience sample of urban youth living on the streets or in the slums, 14–24 years of age, who were participating in a Uganda Youth Development Link (UYDEL) drop-in center for disadvantaged street youth. UYDEL is a non-profit making organization that operates in Kampala, Uganda whose goal is to enhance human capital development among the disadvantaged youth (UYDEL, 2014).

Face-to-face surveys, lasting about 30 minutes, were administered by social workers or peer educators employed by UYDEL. The study was implemented across eight drop-in centers across Kampala. Detailed methodology from the cross-sectional study has been reported previously (Swahn et al., 2012; Swahn, Gressard, et al., 2012).

The youth who were selected to be a part of the study were those who were receiving services from any of UYDEL's 8 drop-in centers for street youth (UYDEL, 2013), which altogether serve approximately 650 youth per month. For the present study, 507 youth were approached to participate in the survey. Among these, 46 declined and 461 agreed to participate, yielding a participation rate of 90.9%. Four surveys were missing substantial numbers of responses and were therefore excluded, yielding 457 completed surveys for the final analytic sample of youth between the ages of 14 and 24 (31.1% boys and 68.5% girls).

Several variables informed by previous research (WHO, 2014) and the CDC ACE Study questionnaire (CDC, 2014), were used in the analysis to find relationships between adverse experiences and alcohol use patterns. Independent variables included were: hunger, having parents, talking to parents, ever having lived on the street, parents hitting each other, parents hitting children and parental use of alcohol, these were dichotomized to form two groups of either possessing the characteristic or not. For all selected variables, all missing values were excluded.

Indicators to measure ACEs were informed by; (WHO, 2014) and the CDC ACE Study questionnaire (CDC, 2014). A description of the eight measures used as broad indicators of ACEs is described below;

Talking to parents - Participants were asked how often they talked to their fathers and mothers (Categories were: 'Yes' for daily, weekly, monthly and annually or 'no' for never).

For the following indicators, there were 2 categories (Yes - for presence of the indicator, No and N/A - for absence of the indicator).

Having parents - Participants were asked if their parents (fathers and mothers) were alive at the time of the survey. Parents hitting each other - Participants were asked if they had seen or heard their parents hitting each other. Parents hitting you - Participants were asked if they had ever been hit or beaten by their parents. Parental use of alcohol - Participants were asked if their parents used alcohol. Hunger – Participants were asked if they were ever hungry. Having ever lived on the street – Participants were asked if they

had ever lived on the streets or were currently living on the streets. Having been raped – Participants were asked if they had ever been raped.

The three outcome measures of interest were measured by; age of alcohol use initiation (≤ 13 years or >13 years), frequent drinking (≤ 5 drinks or >5 drinks in the past month) and heavy drinking (≤ 5 days or >5 days in the past month). All measures had three levels - presence or absence of the measure under study and the third level was non-drinkers who served as the reference group.

Three statistical techniques were used; Chi-Square tests of associations, Bivariate and Multivariate multinomial logistic regression analyses were computed to determine statistical association between ACEs and each of the 3 alcohol use measures among youth. Analyses were conducted using the SPSS statistical software package version 21. Initial bivariate analyses were performed. Measures with significant associations with the outcome variables were also examined in multivariate analyses.

RESULTS

Bivariate associations between demographic characteristics and ACE indicators by sex are presented in Table 1. Chi-square tests of association were performed to identify gender differences on other demographic variables and ACEs. Results showed significant gender differences for; parental alcohol use, being hungry, ever having lived on the street and having been raped.

The demographic characteristics and ACE indicators' association with alcohol use are presented in Table 2. Factors associated with alcohol use varied by sex (alcohol use

was more common among girls), age (alcohol use more common among youth 18 years of age and older) and alcohol use was also more common among youth who reported the following ACEs; parents hitting each other, parental use of alcohol, hunger, having ever lived on the street and rape.

Bivariate multilogistic regression analyses of the associations between ACEs and alcohol use initiation, frequent drinking, heavy drinking are presented in Table 3.

Significant results were shown for youth who reported parents hitting each other (OR $\leq 13 = 2.30$; 95% confidence interval (CI):1.22-4.35, OR $> 13 = 2.89$; 95% CI:1.85-4.54); parents hitting the youth (OR $\leq 13 = 1.31$; 95% CI:0.69-2.47, OR $> 13 = 1.85$; 95% CI:1.16-2.93); parental use of alcohol (OR $\leq 13 = 7.21$; 95% CI:3.66-14.2, OR $> 13 = 4.50$; 95% CI:2.86-7.10); being hungry (OR $\leq 13 = 4.55$; 95% CI:2.06-10.1), OR $> 13 = 2.09$; 95% CI:1.34-3.29); having ever lived on the street (OR $\leq 13 = 4.84$; 95% CI:2.41-9.72, OR $> 13 = 4.95$; 95% CI:2.94-8.32) and having been raped (OR $\leq 13 = 3.22$; 95% CI:1.63-6.35, OR $> 13 = 4.73$; 95% CI:2.89-7.72).

Results also indicated significant differences between frequent drinking and ACEs on: parents hitting each other (OR $\leq 5 = 2.26$; 95% CI:1.353-7.9, OR $> 5 = 3.62$; 95% CI:2.01-6.52); parental use of alcohol (OR $\leq 5 = 3.79$; 95% CI:2.24-6.45, OR $> 5 = 6.01$; 95% CI:3.16-11.4); being hungry (OR $\leq 5 = 2.31$; 95% CI:1.33-4.03, OR $> 5 = 3.06$; 95% CI:1.56-5.99); having ever lived on the street (OR $\leq 5 = 4.45$; 95% CI:2.50-7.92, OR $> 5 = 8.62$; 95% CI:4.63-16.04) and having been raped (OR $\leq 5 = 3.54$; 95% CI:2.05-6.12, OR $> 5 = 5.75$; 95% CI:3.16-10.46).

Lastly, results indicated significant differences between heavy drinking and ACEs on: parents hitting each other (OR $\leq 5 = 2.81$; 95% CI:1.69-4.66, OR $> 5 = 1.77$; 95% CI:.79-

3.92); parental use of alcohol ($OR_{\leq 5}=4.45$; 95% CI:2.61-7.60), $OR_{>5}=3.49$; 95% CI:1.55-7.88); being hungry ($OR_{\leq 5}=2.99$; 95% CI:1.66-5.39, $OR_{>5}=2.09$; 95% CI:.91-4.83); having ever lived on the street ($OR_{\leq 5}=6.09$; 95% CI:3.51-10.57), $OR_{>5}=10.52$; 95% CI:4.69-23.6) and having been raped ($OR_{\leq 5}=5.23$; 95% CI:3.09-8.83, $OR_{>5}=2.81$; 95% CI:1.27-6.21).

The multivariate associations between ACEs and alcohol use patterns (age of alcohol use initiation, frequent and heavy drinking) are presented in Table 4. Results indicated that parental use of alcohol, having ever lived on the street and having been raped were all significantly associated with age of alcohol initiation, frequent drinking and heavy drinking.

Parental use of alcohol, $AOR_{\leq 13}=5.43$ (95% CI:2.47-11.94), $AOR_{>13}=3.28$ (95% CI:1.85-5.80), having ever lived on the street, $AOR_{\leq 13}=3.67$ (95% CI:1.61-8.37), $AOR_{>13}=3.34$ (95% CI:1.72-6.49) and having been raped, $AOR_{\leq 13}=2.17$ (95% CI:.93-5.05), $AOR_{>13}=3.89$ (95% CI:2.06-7.33) were significantly associated with age of alcohol use initiation.

Similarly, parental use of alcohol, $AOR_{\leq 5}=3.24$ (95% CI:1.73-6.05), $AOR_{>5}=4.04$ (95% CI:1.88-8.65), having ever lived on the street, $AOR_{\leq 15}=3.45$ (95% CI:1.75-6.81), $AOR_{>5}=4.67$ (95% CI:2.18-9.99) and having been raped, $AOR_{\leq 5}=2.49$ (95% CI:1.27-4.93), $AOR_{>5}=4.81$ (95% CI:2.29-10.12) were significantly associated with frequent drinking.

Finally, parental use of alcohol, $AOR_{\leq 5}=3.29$ (95% CI:1.72-6.30), $AOR_{>5}=3.31$ (95% CI:1.27-8.66), having ever lived on the street, $AOR_{\leq 5}=3.41$ (95% CI:1.75-6.63),

AOR_{>5} = 9.38 (95% CI:3.51-25.05) and having been raped AOR_{≤5} = 3.59 (95% CI:1.89-6.84), AOR_{>5} = 2.70 (95% CI:1.04-7.03) were significantly associated with heavy drinking.

DISCUSSION

The present study provides novel data to further document that adverse childhood experiences are common and are associated with alcohol use consumption patterns among youth living in slums in Kampala. Findings of relatively high prevalence of ACEs (> 20% for each indicator) were expected because of the unique circumstances that face these youth (Swahn, Gressard, et al., 2012).

It was surprising that several parental involvement characteristics were not significantly associated with alcohol consumption patterns among these youth but this may be attributed to the unique circumstances of these youth that make them resilient or that parental involvement is viewed differently in this culture thus its impact on alcohol use would be different. Moreover, several ACEs are also strongly associated with all three outcome measures examined that is; parents hitting each other, parental use of alcohol, hunger, ever having lived on the street and having been raped. These findings were consistent with previous research that has found similar results (Anda et al., 2002; WHO, 2001; Jewkes et al., 2010; Dube et al., 2001).

This study examined slightly different ACEs than the original Kaiser study in order to take into account the cultural differences in this population. Culturally, for this highly vulnerable population and similar populations, it will be important to emphasize the broader definitions of ACEs as they relate to the circumstances of these youth.

This study, a first of its kind, examined the associations between ACEs and several alcohol measures in an under studied, vulnerable, urban population in Kampala, Uganda and this gives an opportunity for knowledge about this particular population to be shared beyond the borders of the slums in which these high risk youth live thus providing an opportunity for more exploratory research and possibly interventions to improve public health in this and such populations. The study also looked at multiple outcome measures of alcohol consumption patterns, that is; age of initiation, frequency and intensity of drinking to assess their association with ACEs and this was able to give a better understanding of alcohol use behavior and not just current drinking patterns.

The outcome measures which were analyzed at three levels gave insight into the differences of the impact of ACEs on alcohol use behavior. This is particularly evident in the fact that ACEs increased the risk of alcohol consumption for all age groups but the risk was more pronounced for those aged 13 and under. Similarly, the risk of drinking was increased by ACEs but it was more pronounced for frequent drinking and heavy drinking compared to those who did not experience ACEs.

The results detailed here should be viewed in light of several limitations. The study population was based on a convenience sample of youth who self-selected to attend the drop-in centers and to take part of the study thereby limiting the generalizability of the findings. The definition of youth who live in the slums was broad and included both street youth who were homeless and youth who lived in the slums but may have had a stable living arrangement. Due to limited literacy rates, participants were read the questionnaire which could have led to interviewer bias and information was self-reported which could have led to information bias due to social desirability. Most of the questions

on alcohol use and high-risk behaviors were selected from valid surveys (Youth Risk Behavior Survey conducted in the U.S. and the Global School-based Student Health Survey conducted primarily in Africa, Asia, and Latin America) where adjustments were made to facilitate the administration of the survey by the interviewers. With the cross-sectional nature of the survey, the temporal ordering of ACEs and alcohol use cannot be determined, nor can causation be inferred.

For public health practice, it is important to recognize that evidence-based strategies used elsewhere may not be relevant for a low-income country such as Uganda or for vulnerable youth with particular needs and circumstances. With the limited healthcare resources in this and similar settings, public health issues such as alcohol use and ACEs are given less priority (WHO, 2014). However, the findings from this study can be used to advocate for the urgency of providing more resources and services to these vulnerable youth. As such, resources need to be focused on primary prevention of harmful alcohol use and ACEs among youth complimentary to, and not competing with, other prevention efforts addressing critical health problems like disease, hunger and poverty as it could prevent a number of negative consequences (Substance Abuse and Mental Health Services Administration, 2014). Specifically, prevention efforts can be supported by: collecting ACE data to inform policy, increasing awareness of ACEs nationwide and at the community-level, emphasizing the relevance of ACEs to multiple health disciplines, and using ACEs research and collected data to identify groups of people who may be at higher risk for substance abuse and related behavioral health problems and tailoring interventions to best assist them (Dube et al., 2006). More culturally appropriate research is needed in Uganda and sub-Saharan Africa at large in

the area of youth alcohol consumption and ACEs and their association with social and health problems to inform prevention strategies for these youths who may be difficult to reach.

Also, for future research, the biological plausibility that may explain the increased risk of alcohol use for people who experience ACEs should be made a priority. This will give insight into the possible biological mechanisms that make some populations more susceptible to the alcohol use effects of ACEs or possibly infer causality (Anda et al., 2006).

The WHO highlights the need for a multi-sectoral approach in preventing child maltreatment and to maximize the effects of prevention and care. It recommends that interventions are delivered by: defining the problem; identifying causes and risk factors; designing and testing interventions; disseminating information about the effectiveness of interventions and increasing the scale of proven effective interventions (WHO, 2014).

Alcohol has serious long lasting implications on the life of the individual especially for those who experience adversity early on in life. The high prevalence of exposure to adverse childhood experience and use of alcohol early in the life stage should be made a priority for researchers and policy makers to address particularly in understudied populations like the current study, as well as in sub-Saharan Africa

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TABLES

Table 1: Bivariate associations between demographic characteristics and ACE measures by sex

Variable name	N (%)	Categories	%		Total	P value
			Boys	Girls		
Age	452 (98.9)	≤ 18	19.9	38.1	58.0	.114
		≥18	11.5	30.5	42.0	
Education	453 (99.1)	In school	3.8	10.6	14.3	.329
		Out of school	27.6	58.1	85.7	
Talk to mom	453 (99.1)	Yes	19.4	43.7	63.1	.729
		No	11.9	24.9	36.9	
Talk to dad	451 (98.7)	Yes	13.1	27.7	40.8	.697
		No	18.0	41.2	59.2	
Mom living	448 (98.0)	Yes	21.2	45.8	67.0	.573
		No	9.6	23.4	33.0	
Dad living	448 (98.0)	Yes	16.5	30.8	47.3	.114
		No	14.7	37.9	52.7	
Parents hit each other	443 (96.9)	Yes	12.0	19.6	31.6	.038*
		No	19.2	49.2	68.4	
Parents hit you	443 (96.9)	Yes	19.6	44.5	64.1	.652
		No	11.7	24.2	35.9	
Parents use alcohol	434 (95.0)	Yes	15.0	25.8	40.8	.014*
		No	15.2	44.0	59.2	
Hunger	445 (97.4)	Yes	23.1	38.7	61.8	.000***
		No	7.4	30.8	38.2	
Ever lived on street	416 (91.0)	Yes	9.9	14.4	24.3	.003**
		No	19.0	56.7	75.7	
Raped	446 (97.6)	Yes	19.5	5.2	24.7	.000***
		No	11.7	63.7	75.3	

^a Chi-square tests of association between boys and girls for demographic characteristics

and ACEs, (*p < 05, **p <.01, ***p <.001)

Table 2: Bivariate associations between demographic characteristics and ACE indicators by alcohol use

Variable name	N (%)	Categories	Alcohol Use %	Alcohol non-Use %	Total alcohol use	P value
Sex	455 (99.6)	Boys	12.1	19.1	29.9	.006**
		Girls	17.8	51.0	70.1	
Age	454 (99.3)	≤ 18	11.0	46.9	30.2	.000***
		≥ 18	19.2	22.9	69.8	
Education	455 (99.6)	In school	4.0	10.5	29.9	.615
		Out of school	25.9	59.6	70.1	
Talk to mom	455 (99.6)	Yes	27.1	72.9	30.1	.065
		No	35.3	64.7	69.9	
Talk to dad	453 (99.1)	Yes	27.4	72.6	30.2	.275
		No	32.2	67.8	69.8	
Mom living	450 (98.5)	Yes	27.5	72.5	30.0	.096
		No	35.1	64.9	70.0	
Dad living	450 (98.5)	Yes	29.0	71.0	30.0	.650
		No	30.9	69.1	70.0	
Parents hit each other	445 (97.4)	Yes	44.7	55.3	29.7	.000***
		No	22.7	77.3	70.3	
Parents hit you	445 (97.4)	Yes	32.5	67.5	29.7	.077
		No	24.5	75.5	70.3	
Parents use alcohol	436 (95.4)	Yes	47.8	52.2	29.4	.000*
		No	16.7	83.3	70.6	
Hunger	447 (97.8)	Yes	37.5	62.5	30.4	.000***
		No	18.8	81.2	69.6	
Ever lived on street	418 (91.5)	Yes	62.4	37.6	31.6	.000***
		No	21.8	78.2	68.4	
Raped	448 (98.0)	Yes	55.5	44.5	30.4	.000***
		No	22.2	77.8	69.6	

^b Chi-square tests of association between alcohol use or non-use on demographic

variables and ACEs, (*p < 05, **p < .01, ***p < .001)

Table 3: Bivariate associations between age of alcohol use initiation, frequent, heavy drinking and ACEs among youth living in the slums of Kampala

Variable name	Age of alcohol initiation		Frequent drinking		Heavy drinking	
	OR (95% CI)		OR (95% CI)		OR (95% CI)	
	>13	≤13	≤5 days	>5 days	≤5 days	>5days
Talk to mom	0.91 (0.59-1.40)	0.65 (0.36-1.19)	.58 (.35-.96)	.84 (.47-1.50)	1.68 (.41-1.11)	2.69 (.32-1.47)
Talk to dad	0.77 (0.50-1.18)	0.84 (0.46-1.56)	.621 (.37-1.05)	1.09 (.62-1.91)	1.77 (.46-1.27)	.78 (.36-1.69)
Mom living	0.90 (0.58-1.41)	0.78 (0.42-1.45)	.65 (.39-1.09)	.77 (.43-1.39)	.74 (.44-1.23)	.68 (.32-1.46)
Dad living	0.96 (0.63-1.46)	0.97 (0.53-1.76)	.75 (.45-1.23)	1.19 (.68-2.09)	1.01 (.62-1.64)	.77 (.36-1.65)
Parents hit each other	2.89 (1.85-4.54)	2.30 (1.22-4.35)	2.26 (1.353-7.9)	3.62 (2.01-6.52)	2.81 (1.69-4.66)	1.77 (.79-3.92)
Parents hit you	1.85 (1.16-2.93)	1.31 (0.69-2.47)	1.49 (.87-2.59)	1.46 (.79-2.69)	1.53 (.88-2.65)	.76 (.36-1.63)
Parents use alcohol	4.50 (2.86-7.10)	7.21 (3.66-14.2)	3.79 (2.24-6.45)	6.01 (3.16-11.4)	4.45 (2.61-7.60)	3.49 (1.55-7.88)
Hunger	2.09 (1.34-3.29)	4.55 (2.06-10.1)	2.31 (1.33-4.03)	3.06 (1.56-5.99)	2.99 (1.66-5.39)	2.09 (.91-4.83)
Ever lived on street	4.95 (2.94-8.32)	4.84 (2.41-9.72)	4.45 (2.50-7.92)	8.62 (4.6316.04)	6.09 (3.51-10.57)	10.52(4.69-23.6)
Raped	4.73 (2.89-7.72)	3.22 (1.63-6.35)	3.54 (2.05-6.12)	5.75 (3.16-10.46)	5.23 (3.09-8.83)	2.81 (1.27-6.21)

Table 4: Multivariate associations between alcohol use (initiation, frequency and heavy drinking) and ACEs among youth living in the slums of Kampala (N=457)

Variable name	N (%)	AOR (95% CI)		P value
Age of alcohol use initiation		≤13	>13	
Parents hit each other	445 (97.4)	.90 (.40-2.05)	1.62 (.88-2.98)	.196
Parents hit you	445 (97.4)	.98 (.44-2.21)	1.54 (.82-2.88)	.357
Parents use alcohol	436 (95.4)	5.43 (2.47-11.94)	3.28 (1.85-5.80)	.000***
Hunger	447 (97.8)	2.42 (.92-6.34)	.88 (.48-1.59)	.115
Ever lived on street	418 (91.5)	3.67 (1.61-8.37)	3.34 (1.72-6.49)	.000***
Raped	448 (98.0)	2.17 (.93-5.05)	3.89 (2.06-7.33)	.000***
Frequent drinking		≤5	>5	
Parents hit each other	445 (97.4)	1.42 (.76-2.66)	1.96 (.95-4.05)	.174
Parents use alcohol	436 (95.4)	3.24 (1.73-6.05)	4.04 (1.88-8.65)	.000***
Hunger	447 (97.8)	1.06 (.54-2.10)	1.11 (.46-2.69)	.964
Ever lived on street	418 (91.5)	3.45 (1.75-6.81)	4.67 (2.18-9.99)	.000***
Raped	448 (98.0)	2.49 (1.27-4.93)	4.81(2.29-10.12)	.000***
Heavy drinking		≤5	>5	
Parents hit each other	445 (97.4)	1.43 (.76-2.69)	.92 (.36-2.37)	.484
Parents use alcohol	436 (95.4)	3.29 (1.72-6.30)	3.31 (1.27-8.66)	.000***
Hunger	447 (97.8)	1.24 (.59-2.59)	.73 (.24-2.22)	.688
Ever lived on street	418 (91.5)	3.41 (1.75-6.63)	9.38(3.51-25.05)	.000***
Raped	448 (98.0)	3.59 (1.89-6.84)	2.70 (1.04-7.03)	.000***

^d (*p < .05, **p < .01, ***p < .001)

Appendix

Table 5: Variable name and description of variables examined in the Kampala Youth Survey (2011)

Variable name (N)	Variable description
Sex	What is your sex?
Age	How old are you?
Education	Do you go to school?
Dad living	Is your dad living?
Mom living	Is your mom living?
Talk to dad	How often do you talk to your dad?
Talk to mom	How often do you talk to your mom?
Parents hit each other	Did you ever see or hear your parents hit/beat each other?
Parents hit you	Did your parents ever hit/beat you?
Parents use alcohol	Did your parents use alcohol?
Hunger	Do you ever go hungry?
Ever lived on the street	Indicate if child is currently or in the past has lived on the street
Rape	Has someone ever raped you or forced you to have sex with him/her?
Age of first drink	How old were you when you had your first drink of alcohol?
Drinks in past month	In the past month, On how many days did you drink alcohol?
Drunk in past month	In the past month, How many days did you drink so much that you were really drunk?

Table 6: Prevalence of ACEs among the Kampala youth (N=457)

Variable	Categories	%
Talk to mom	Yes	63.0
	No	36.5
Talk to dad	Yes	40.7
	No	58.4
Mom living	Yes	66.1
	No	32.4
Dad living	Yes	46.8
	No	51.6
Parents hit each other	Yes	30.9
	No	66.5
Parents hit you	Yes	62.6
	No	34.8
Parents use alcohol	Yes	38.9
	No	56.5
Hunger	Yes	60.6
	No	37.2
Ever lived on street	Yes	22.1
	No	69.4
Raped	Yes	24.1
	No	74.0