CHILDHOOD SEXUAL ABUSE AGAINST GIRLS IN SUB-SAHARAN AFRICA: INDIVIDUAL AND CONTEXTUAL RISK FACTORS

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To my loving parents, for the sacrifices they made towards my upbringing and ensuring that I received all love, care and basic needs of life.
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ABSTRACT
Background and objectives: Childhood sexual abuse (CSA) is a substantial public health and human rights problem, as well as a growing concern in sub-Saharan Africa (SSA). It has both short and long term effects on girls: physical and psychological, including negative sexual outcomes. Up to one-third of adolescent girls report their first sexual experience as being forced. Despite growing evidence supporting a link between contextual factors and violence, no studies have investigated the connection between CSA and contextual factors. It is therefore important to identify the extent of CSA and understand factors associated with it in SSA in order to develop interventions aimed to address the scale of the problem.
Aim: The overall aim of this thesis is to assess the individual and contextual factors associated with CSA. In addition, the thesis aims to quantify the magnitude of CSA and describe the factors associated with CSA among women from SSA (Study I). This thesis also examines the independent contribution of individual and community socio-economic status on CSA (Study II). Moreover, it scrutinises the effect of social disorganisation on CSA (Study III) and explores the relationship between CSA and sexual risk behaviours as well as potential mediators (Study IV).
Methods: This thesis used the Demographic and Health Survey (DHS) datasets conducted between 2006 and 2008 from six SSA countries. The thesis used multiple logistic regression models to describe and explore factors associated with CSA.
among 69,977 women (Study I). It used multivariable multilevel logistic regression analysis to explore the effect of contextual level variables (neighbourhood socio-economic status) on CSA among 6,351 girls (Study II). Neighbourhood socio-economic status was operationalized with a principal component analysis using the proportion of respondents who were unemployed, illiterates, living below poverty level and rural residents. Study III applied multivariable multilevel logistic regression analysis on 6,351 girls and considered five measures of social disorganisation at the community level: neighbourhood poverty, female-headed households, residential mobility, place of residence, population density, and ethnic diversity. In study IV, 12,800 women from the Nigerian DHS were used. Structural equation modelling was applied using a two-step approach. The first step used a confirmatory factor analysis to develop an acceptable measurement model while the second step involved modifying the measurement model to represent the postulated causal model framework.

**Results:** In study I, the reported prevalence of CSA ranged from 0.3% in Liberia to 4.3% in Zambia when the prevalence was based on all respondents aged between 15 and 49 years and who were present during the survey. None of the socio-economic factors were associated with CSA. In study II, where the data was restricted to permanent residents aged between 15 and 18 years, the prevalence ranged between 1.04% in Liberia to 5.8% in Zambia. At the individual level, there was no significant association between CSA and wealth status while at the community level, there was no significant association between CSA and socio-economic position. However, 22% of the variation in CSA was attributed to the community level factors. In study III, there was significant variation in the odds of reporting CSA across the communities, with community level factors accounting for 18% of the variation. In addition, respondents from communities with a high family disruption rate were 57% more likely to have reported sexual abuse in childhood. Study IV showed that there was a significant association between CSA
and sexual risk behaviours and the association was mediated by alcohol and cigarette use.

**Conclusions:** The study provides evidence that adolescents in the same community were subjected to common contextual influences. It also highlighted the significance of mediators in the relationship between CSA and sexual risk behaviours. It is therefore important that effective preventive strategies are developed and implemented that will cut across all socio-economic spheres in a context that both permits and encourages disclosure as well as identifying predisposing circumstances for recurrence.

**Keywords:** alcohol, child sexual abuse, demographic and health survey, multilevel, neighbourhood, sexual violence, smoking, social disorganisation, socio-economic status, sub-Saharan Africa.
LIST OF PAPERS

This thesis is based on the following papers, which are referred to in the text by their Roman numerals:


Paper IV Yahaya I., De Leon, A.P., Uthman, O.A., Soares, J., Macassa, G. Childhood sexual abuse among girls and determinants of sexual risk behaviours in adult life in sub-Saharan Africa (Submitted)
**LIST OF ABBREVIATIONS**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>AIDS</td>
<td>Acquired immunodeficiency syndrome</td>
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<tr>
<td>CSA</td>
<td>Childhood sexual abuse</td>
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<tr>
<td>CI</td>
<td>Confidence intervals</td>
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<td>DHS</td>
<td>Demographic and health surveys</td>
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<td>HIV</td>
<td>Human immunodeficiency virus</td>
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<td>ICC</td>
<td>Intra-cluster correlation</td>
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<td>OR</td>
<td>Odds ratio</td>
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<tr>
<td>PSU</td>
<td>Primary Sample Units</td>
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<td>PCV</td>
<td>Proportional change in variance</td>
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<td>SEM</td>
<td>Structural equation modelling</td>
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<td>SES</td>
<td>Socio-economic status</td>
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<td>SHS</td>
<td>School-based Student Health Survey</td>
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<td>SSA</td>
<td>Sub-Saharan Africa</td>
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<td>STD</td>
<td>Sexually transmitted diseases</td>
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<td>USA</td>
<td>United States of America</td>
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<td>VIF</td>
<td>Variance inflation factor</td>
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1. INTRODUCTION

Sexual abuse of children occurs throughout the world and happens in different circumstances and settings. An estimated 150 million girls and 73 million boys under the age of 18 years have experienced forced sexual intercourse or other forms of sexual violence involving physical contact (Pinheiro 2006). In a recent global meta-analysis (Stoltenborgh et al. 2011), the estimated prevalence of childhood sexual abuse in self-reported studies was 18% among female and 7.6% among male participants. It is a problem of considerable proportion in Africa, where up to one-third of adolescent girls report their first sexual experience as being forced (Jewkes et al. 2001; Matasha et al. 1998; Moore et al. 2007). Embarrassment, shame or fear of being blamed and a desire to keep the abuse secret makes disclosure of Childhood sexual abuse (CSA) uncommon. Nondisclosure or delayed disclosure of abuse can prevent appropriate intervention (Bruck et al. 2006). This may further increase vulnerability to further attacks and risks of sexually transmitted infections (STIs), including Human immunodeficiency virus/Acquired immunodeficiency syndrome (HIV/AIDS) (Lewis 2012). Childhood sexual abuse cuts across all socio-economic, educational, racial and ethnic groups (Senn et al. 2008). The impact of CSA resonates in all areas of health: physical and psychological, including negative sexual outcomes (Brown et al. 2009; Holmes et al. 2005; Malow et al. 2006a; Paolucci et al. 2001; Senn et al. 2008). This substantial public health and human rights problem is indeed a growing concern in sub-Saharan Africa (SSA) (Reza et al. 2009).

A troubling aspect of SSA is the interwoven effects of social, economic and political crises that have plagued this part of the world, which makes children more vulnerable. Individual socio-economic position has been documented to be a contributing factor to sexual violence (Jewkes et al. 2002). In contrast, most studies
on CSA are not associated with socio-economic status (SES). Recently, community-
level factors have been the focus of attention when considering risk factors for
violence. The ecological framework has been the cornerstone for identifying such
community level factors. The ecological model sees violence as a multifaceted
phenomenon grounded in interplay among personal, situational and sociocultural
factors (Heise 1998).

The majority of the studies of CSA in SSA have been clinical studies, up until
recently when school surveys and nationally representative samples (Brown et al.
2009; Reza et al. 2009) have added to the body of knowledge available. They have
focused on prevalence of CSA and its determinants at the individual level, without
addressing the broader social factors. Social factors in their own right are
important since violence depends on both individual and community factors. It is
therefore important to identify the extent of CSA and understand factors
associated with it in SSA in order to develop interventions aimed to address the
scale of the problem.
2. BACKGROUND

2.1 Definition of child sexual abuse

The definition of CSA varies widely across studies. Some researchers use different age criteria, while the type of sexual act that is considered abusive also differs across studies. It has been important since as far back as 1986 when Wyatt et al. (1986) raised the issues in the definition of CSA in prevalence research. However, as Wyatt and colleagues stated in their excellent discussion of this issue “despite efforts to promote uniform criteria for defining child sexual abuse, there are still variations in the definitions adopted by individual researchers” (Wyatt & Peters 1986).

Pereda et al. (2009a) stated that sexual abuse researchers have used different definitions of what constitutes CSA (e.g. the age difference between the perpetrator and the victim, the age used to define childhood or the type of sexual abuse). However, Peters et al. (1986) cautioned that much of the variability in child sexual abuse prevalence is presumed to be due to methodological differences between studies, especially concerning the methods of data collection.

Often there are different variations in the way a child is defined; the same also applies to childhood sexual abuse. While some researchers have set the cut-off age at 18 years for sexual abuse victims to be considered as childhood sexual abuse, others have used a different cut-off ranging from 13–17 years (Kalichman et al. 2004; Mayall and Gold 1995; Walser & Kern 1996). More so, the use of age-discrepancy has been utilised as definition for CSA in some instances (Briere et al. 1995). In this regard, the perpetrator must be a certain age older than the victim before the abuse can be considered as sexual abuse. In Finkelhor’s graded age-discrepancy definition (Finkelhor 1979), the perpetrator must be at least 5 years
older than the victim if the abuse occurred before the age of 13 years or at least 10 years older than the victim if the abuse occurred between the ages of 13 and 16 years before the act can be considered sexual abuse.

Sexual abuse can also be classified depending on the type of sexual act involved. This includes non-contact, contact and penetrative abuse. In non-contact abuse, which is the less restrictive abuse, it includes all forms of sexual acts, including inappropriate sexual solicitation or indecent exposure. Contact abuse may involve sexual contact between the perpetrator and the child. Such contacts include touching of the sexual organs. The most restrictive of all abuse types is penetrative contact, which involves oral, vaginal or anal intercourse.

Other researchers have used different approaches to the definition of CSA. For instance, Peters and colleagues distinguished the definitions of CSA into relationship-specific and activity-specific (Peters et al. 1986). In this instance, relationship-specific definitions use respondents’ own perception of whether they have been sexually abused by asking them if they have ever been a victim of sexual abuse, while activity-specific definitions are based on a description of specific behaviour like by asking if their genitals have been touched or fondled as a child.

Despite attempts to develop standardised questionnaires, researchers have continued to use different definitions. Such differences in definitions and how CSA is operationalised can account for the range in the reported prevalence of CSA studies. Defining CSA includes several terms (Stoltenborgh et al. 2011). It includes defining cut-off age for childhood, defining minimum age differences between victims and perpetrators and acts that constitute CSA. As a result of this, it has been difficult to compare results across studies and even in some instances difficult to satisfactorily compare similar data. Whether or not differences in the prevalence
of CSA are related to criteria for defining CSA (contact or non-contact abuse) and childhood remains unclear. Some studies have shown that the use of non-contact definition of CSA and a cut-off age of 18 years to define childhood lead to higher prevalence rate, while some studies (Pereda et al. 2009b; Stoltenborgh et al. 2011) did not report such a difference. It should be noted that prevalence estimates can be affected based on the number of questions asked to assess CSA, as multiple questions tend to include more specific information with regards to the definition of CSA than a single question (Stoltenborgh et al. 2011).

Some definitions used in recent population-based studies are as follows:
In the study by Pereda et al. (2009a), the prevalence of child sexual abuse was defined as the proportion of a population who suffered sexual abuse during childhood (generally before the age of 18) and it was based on retrospective accounts. On the other hand, Devries et al. (2011) defined CSA using the following criteria: Had anyone ever touched her sexually or made her do anything sexual that she did not want to do, or if her first sexual experience was under the age of 15 and was either forced or she had sex but did not want to; versus neither of the above.

Meade et al. (2012) defined CSA using one item adapted from the Traumatic Events Questionnaire (Kaplan et al. 1995). Specifically, participants were asked, “As a child, were you ever sexually abused (forced to have some kind of sexual contact, like touching, oral sex, or intercourse).”

Despite the apparent widespread discrepancies in its definition, CSA is often referred to as sexual abuse that occurs during either childhood or adolescence (Bensley et al. 2000; Hillis et al. 2001), that is, sexual activity before the age of 18 years. A more comprehensive definition of CSA by World Health Organisation
states that CSA concerns the involvement of a child in sexual activity that she or he does not fully comprehend, is unable to give informed consent to, or for which the child is not developmentally prepared and cannot give consent, or that violates the laws or social taboos of society (World Health Organization 1999; World Health Organization 2004).

In this thesis, CSA was defined as forceful sexual act or being forced to perform any other sexual acts in any girl below the age of 18 years. The age 18 was chosen as this is the most widely used cut-off for children both within the context of definition of child or the widely used age in sexual history literatures.

2.2 Context of child sexual abuse

Violence against children cuts across boundaries of geography, race, social class, religion and culture (Pinheiro 2006). It occurs in different circumstances and settings. Violence against children is a major threat to global development and the ability to achieve the Millennium Development Goals (Pinheiro 2006). One of the three areas emphasized by the Millennium Development Goals with the intention of increasing living standards is human rights. Without human rights (violence reduction, increasing political voice, women empowerment and increasing security of property) the objectives of the Millennium Development Goals will not be achieved. Perpetrators are usually known to the victims and include parents, family members, teachers, caretakers, law enforcement authorities and other children (Edgardh & Ormstad 2000; Fergusson et al. 1996b; Lalor 2004). Childhood sexual abuse is a complex problem that results from the interaction between individual, family, social and cultural factors (Brown et al. 1998).
2.2.1 Male dominance

Childhood sexual abuse is linked to the idea of the male dominated nature of society (Lalor 2004). Nature has given men a physical advantage over women and some use it to force women to do what they want. This also involves the role of physical force in sexual relations. The patriarchal structure and ideas of the society have continued to restrict women’s opportunities and favoured men to maintain the position of power in the society (Crittenden & Wright 2013). The direction of much of this violence towards women and girls might be explained by sex inequalities, a culture of male sexual entitlement, and the climate of relative impunity for rape (Jewkes & Abrahams 2002).

Women and girls in Africa are vulnerable to and experience gender based violence on a large scale (Borwankar et al. 2008). The level of acceptance of this practice is high in SSA (Callands et al. 2013; Uthman et al. 2011). Socio-economic hardships limit women’s power within relationships and in some instances lead to reduced ability to engage in safe sexual practices (Kennedy et al. 2012) and to an increased acceptance of violence. It is also within this context that CSA leads to situations where it is effectively normalised and seen as what can be expected by some. Although there are laws which aim to protect women’s rights, they have little effect on the practical lives of most women as it remains true that the social construction of masculinity and femininity in SSA generally prescribes low status for women and high status for men. Different factors influence the status of men and women in a society and thus influence these processes. Among other potential factors is the widespread belief and cultural acceptance of the urgency of male sexual relief and a certain tolerance or expectancy of the use of physical coercion in sexual relations (Lalor 2004). This may suggest that CSA could be more common in these societies.
2.2.2 Rapid social change

Childhood sexual abuse is present in almost all societies including SSA. In SSA, the increase in child abuse has been attributed to rapid and radical social change (Haffejee 1991; Jinadu 1986; Loening 1981). Such changes have been linked with an increase in child maltreatment and as such been attributed to a breakdown of traditional values and practices (Korbin 1991). Apparently, higher occurrence of CSA has also focused on social fragmentation (Lalor 2004). Such views have attributed CSA to the increasing isolation of individuals and families from a sense of community; the result of increased mobility and the disintegration of neighbourhoods, communities and kin networks (Lalor 2004). With isolation, people are deprived of socially sanctioned forms of support and intimacy, and consequently they turn instead to incestuous behaviours, therefore facilitating CSA.

2.2.3 Collective and interpersonal violence

Sub-Saharan Africa has been subject to conflict and extreme violence over the past few decades. Such violence can take place within families, in the communities in which children live, or in areas of armed conflict. Available research suggests that women’s susceptibility to sexual violence is greatest in homes where domestic violence is perpetrated (Van Niekerk 2004). Living in a context of violence increases children’s vulnerability to the full range of abuse, including sexual abuse. Being displaced from home as a consequence of violence further increases vulnerability. This vulnerability arises from the disruption and dismantling of the formal and informal protection mechanisms of families, communities and the state that subject women and children to risks that contribute to violence against women, especially sexual violence. Girls in particular are often the primary targets of abductions, often resulting in them being forced to participate directly in
hostilities as fighters, or in “support” roles as spies, messengers, servants and sexual and domestic slaves (African Development Forum 2008).

2.2.4 Poverty and child labour

More than 51% of the population in SSA live below the international poverty threshold of US$1.25 per day (UNDP 2009). High levels of poverty have contributed to the high prevalence of child labour, with parents also encouraging children in order to improve the living standard of the household. In a study involving 24 countries in SSA, sexual exploitation was noted to be on the rise and was linked to labour, child prostitution, sex tourism, and the production of pornography (Malow et al. 2006b). Sexual exploitation is the most commonly identified form of human trafficking globally (79%) (UNODC 2009). Prevailing poverty renders children vulnerable to trafficking and is associated with exploitative, often hazardous and frequently violent child labour, including domestic work and prostitution. The scale of the problem is difficult to ascertain, with children working on the streets being vulnerable to sexual abuse from many individuals, including from passers-by and in some cases from those who offer them shelter (Mandalazi et al. 2013). Some of the sexual behaviours evident in parts of SSA are not the results of traditional “permissiveness”, but from the breakdown of traditional norms and regulations surrounding sexual behaviour, aggravated by widespread of poverty (Silberschmidt 2001).

2.3 Consequences of child sexual abuse

The consequences of CSA form a significant portion of the global burden of disease and can be devastating. Above all, they can result in early death. But even children who survive must cope with terrible physical and emotional scars. Indeed, violence places at risk not only their health, but also their ability to learn and grow.
into adults who can create sound families and communities. The effects of abuse are profound, extending beyond the health and happiness of individuals to affect the well-being of entire communities. The consequences of sexual abuse are higher when the abuse is intra-familial (Browne & Finkelhor 1986). Among the more common effects of sexual violence are those related to reproductive health, mental health, physical health and social wellbeing (Jewkes et al. 2002), which are further described below.

### 2.3.1 Mental health

Many of those who have been exposed to sexual abuse in childhood have impaired mental health as adults. Stressful life events may predispose or aggravate emotional and physical ill-health (Cohen 2004). Studies addressing the association of CSA and mental health issues have shown that the severity and duration of CSA, and in some instances the age at onset, determines the degree of impairment experienced by the victim (Browne & Finkelhor 1986). These range from short-term to long-term psychological sequelae, and include for instance depression, low self-esteem, somatisation disorder, post-traumatic stress disorder and anxiety. These findings have been supported by several studies including literature reviews and meta-analyses (Davidson et al. 1991; Kendler et al. 2000; Molnar et al. 2001; Nelson et al. 2002; Paolucci et al. 2001).

### 2.3.2 Physical health and social well-being

The effects of CSA extend beyond the sexual and reproductive health, but rather affect the physical health and social well-being of its victim (Senn et al. 2008) and in the long run affects the economic and social welfare of a nation. By being victims of sexual abuse, with its associated psychological long-term sequelae, children are involved in negative behaviours such as smoking, use of drugs, truancy, running
away from home, and sometimes marrying early in order to escape the abuse (Browne & Finkelhor 1986). The implication of this is that women are being deprived of their place in the society and with this comes social isolation, physical health problems including functional impairment, injury and permanent disability.

2.3.3 Sexual risk behaviours

Exposure to CSA may affect later sexual adjustment and may also increase the risk of re-victimization (Loeb et al. 2011; Miller 1999). It has been established that victims of CSA exhibit a variety of short and long-term sequelae. Such sequelae include emotional and behavioural problems, which in turn often may include increased sexual risk behaviour, alcohol and drug use (Fergusson et al. 1996a; Peltzer et al. 2013; Senn et al. 2008). While CSA is one of the childhood and adolescent experiences that may influence sexual behaviour, it can serve as a measure of traumatic experience that precipitates rapid sexual development (Trickett et al. 2011). These often arise because exposure to CSA may influence later sexual adjustments and sexual risks (Fergusson et al. 1997). Sexually abused girls are at risk of sexually transmitted diseases including HIV/AIDS (Senn et al. 2008). It is also unlikely that a condom or other forms of contraception will be used when an adolescent girl is being forced into sexual acts, increasing the likelihood of unwanted pregnancy (Jewkes et al. 2001). Other gynaecological complications linked to sexual violence include vaginal bleeding, infection, unsafe abortion and urinary tract infections.

A growing body of evidence has shown that CSA is associated with later sexual risk behaviour, which includes multiple sexual partners, use of drugs or alcohol with sex, frequency of unprotected sex, engagement in sex work (Lalor 2008; Miller 1999; Senn et al. 2006; Senn et al. 2008; Senn and Carey 2010). It has been suggested that the increased sexual risk behaviours in sexually abused children may have
been influenced via a variety of mechanisms. This may be due to difficulty in regulating affect (Van der Kolk et al. 1996) or negative attitudes about victims’ sexuality lowering their interpersonal power in sexual relationships (Finkelhor and Browne 1985). Lescano and colleagues were of the opinion that sexual abuse may influence sexual risk behaviour through attitudes about self and sex (Lescano et al. 2007). Recently, the relationship between CSA and sexual risk behaviours have been linked to the long-term sequelae of CSA (Miller 1999). Milller et al. (1999) attributed the relationships to three things: the initiation of an increasing reliance on recreational drugs as a coping strategy following sexual abuse, problems with sexual adjustment that may be related to sex risk taking, and psychopathology which may often increase participation in HIV risky sexual behaviours. In addition, those exposed to CSA are often people with adverse family features including parental conflict, family change, parental psychopathology and associated factors that may influence later sexual behaviours and adjustments (Brown and Anderson 1991; Fergusson et al. 1996a; Gruber and Jones 1983).

2.3.4 HIV/AIDS

Violence places a serious burden on the society, especially on women and their children. The rising tide of HIV has further added to this burden. The HIV pandemic has caused more havoc upon families and communities of SSA than in any other region, where between 20.8 million and 24.1 million people are living with HIV, a majority of which are women (UNAIDS 2009). Childhood sexual abuse was found to increase vulnerability to HIV (Jewkes et al. 2002; Jewkes et al. 2010), while HIV, in turn, was found to exacerbate vulnerability to CSA (Epstein and Jewkes 2009; Meintjes et al. 2010). The problem of HIV often seen in victims of CSA has been linked to the belief of the cleansing nature of sex with virgins or young
girls in certain regions of Africa (Jewkes et al. 2005), while in some sectors it has been attributed to sexual risk behaviours of CSA victims.

Learning more about the causes of CSA is crucial for addressing women’s health and dealing with the menace attributed to sexual violence. The beliefs in the “cleansing” nature of sex with virgins and young girls is widely thought to be a contributing factor to the increase in CSA and HIV in young women in certain areas (Jewkes et al. 2005). An idea shaped by the misconception that sex with children is a cure for sexually transmitted diseases, including HIV. However, such claims have been disputed in certain areas (Saunders et al. 1999). Epstein highlighted that although the idea of a virgin sex cure may be familiar in some African communities it is rarely a motivating factor in majority of cases (Epstein and Jewkes 2009). Instead, the socio-economic instability (disruption of families and communities, high levels of poverty, high levels of violence of all forms) experienced in the societies is the aggravating factor for sexual violence (Fergusson et al. 1997; Fomby and Cherlin 2007; Li et al. 2012; Turner et al. 2012).

2.4 Conceptual framework: The ecological model

For the purpose of this thesis, the ecological model has been adopted as the main conceptual model to help understand the association between neighbourhood factors and CSA. The ecological model was first used to understand child abuse (Garbarino and Crouer 1978) before being applied to youth violence (Garbarino 1985) and intimate partner violence (Heise 1998). Although the model had been used in a variety of settings, all share the same notion. It conceptualises violence as a multifaceted phenomenon grounded in the interplay between individual, family, community and societal factors (Heise 1998). The model explores the relationship
between individual and contextual factors and considers violence as the product of multiple levels of influence on behaviour (Dahlberg and Krug 2002).

Although sexual violence against girls/women is found in most places, no single factor can explain why certain individuals or certain communities are more violent than others (Dahlberg & Krug 2002). As such, it is difficult to understand the factors that put people at risk of experiencing violence without using multiple levels of approach. Recently, research has been focusing on both individual and the context in which people live, e.g. the area or neighbourhood of residence (Diez-Roux 1998; Feng Astell-Burt 2013; Nikulina & Widom 2013). The more homogenous the health of people within a neighbourhood is (as compared to the health of people from different neighbourhoods), the more probable it is that the determinants of individual health are directly related to the contextual environment of the neighbourhood and/or that social processes of geographical segregation are taking place (Merlo et al. 2005).
The ecological model takes into account various levels of societal organisation, how each level interacts with the others and influence violence, in this case CSA. The ecological model (Figure 1) considers a person as being at the centre of nested structures of the ecological environment: the individual, relationship, community and society. A change in one level can affect the other levels and could also potentially influence an individual’s developmental outcomes either directly or indirectly through multiple contextual changes (Bronfenbrenner 1979). The ecological model can only be explored by the use of a multi-level modelling technique. A two-level approach of the ecological model was adopted for this thesis: individual and community (Figure 2). The individual and relationship were collapsed into one (individual) level as there was no available variable in the dataset that could represent relationship except marital status. In addition, it was also not possible to use societal level as the number of countries available (six) were not sufficient enough to be considered for a three or four level analysis. The first level (individual) identifies the biological and personal history factors of the
individual or otherwise the characteristics of the individual that influence the violence. Such characteristics include age, sexual risk behaviour, alcohol/cigarette use and socio-economic factors like wealth index, occupation, education, place of residence. The second level (community level) examines the community contexts in which social relationships are rooted and look out to identify the characteristics of these settings that influence violence (Dahlberg & Krug 2002). Examples of such characteristics used in this thesis are community socio-economic status, ethnic diversity, residential instability, family disruption, poverty and household size.

The ecological model has been used extensively to better understand violence and the effect of potential prevention strategies (Houck et al. 2009). The benefit of the ecological model lies in its capacity to consider, in a systematic way, the factors that influence health behaviours, in this case those factors that put people at risk of experiencing or perpetrating violence. Community measures of poverty have been found to have the greatest explanatory power among socio-ecological theory variables (Harries 1995). Community poverty weakens social network and the capacity to control the behaviour of people and hence increase the likelihood of reporting CSA (Browning 2002). Building such a model offers a framework for understanding the complex interplay of all the factors that influence CSA, and can therefore provide key points for prevention and intervention (Dahlberg & Krug 2002).
2.5 Rationale

Most research on CSA has been at the individual level (Brown et al. 2009; Chavez et al. 2009; Edgardh & Ormstad 2000; Goldman & Padayachi 1997; Reza et al. 2009), despite suggestions that distribution and determinants of population health and social risk behaviours is epistemologically multilevel (Durkheim 1964). Neighbourhood constitutes a key determinant of socio-economic disparities in health, as they shape individual opportunities and expose residents to multiple risks and resources over the life course (Leventhal & Brooks-Gunn 2000; Sampson 2003). It is only by multi-level analysis that the individual and contextual factors as described by the ecological model can be explained. Studying health factors using a multilevel approach provides the opportunity to identify the social and economic context in which an individual experiences CSA. It therefore provides further opportunity to understand and develop preventive measures for CSA based on the understanding of its determinants and consequences. By also using data from...
several nations, this thesis will be able to study the effects of the various factors across the various countries, to provide more robust evidence of the factors associated with CSA.

The use of nationally representative data to study CSA has been possible in developing countries due to available sexual violence data from Demographic and Health Surveys (DHS). The ability to collect such accurate data provides opportunity for comparisons across countries.
3. MAIN AIM AND SPECIFIC AIMS

3.1 Main aim

The overall aim of this thesis was to improve our understanding of individual and neighbourhood factors associated with childhood sexual abuse. In addition, the thesis aimed to investigate the associations between childhood sexual abuse and sexual risk behaviour in later life.

3.2 Specific aims

- To describe the prevalence of childhood sexual abuse and variations across socio-economic factors among women from sub-Saharan Africa (Study 1)
- To study the independent effects of individual and community socio-economic status on childhood sexual abuse (Study 2)
- To examine whether measure of social disorganisation are associated with childhood sexual abuse (Study 3)
- To explore the effects of potential mediators of the association between childhood sexual abuse and sexual risk behaviour (Study 4)
4. MATERIALS AND METHODS

4.1 Data sources

This thesis used the most recent data from DHS conducted between 2006 and 2008 in sub-Saharan African countries. The countries were selected based on the availability of data sets on sexual violence. This resulted in the inclusion of the following six countries: Ghana, Liberia, Nigeria, Uganda, Zambia and Zimbabwe (Figure 3). Although the initial plan was to use 12 countries, this could not be done as there was no data on violence in some of the countries. All six countries were included in all four studies that make up this thesis. The exception was study IV, which used only the Nigerian data set. Demographic and health surveys were implemented by the respective national institutions and ICF International (Calverton, MD) with financial support from the United States Agency for International Development. Methods and data collection procedures have been described elsewhere (ICF International 2012). Demographic and health surveys are good quality, nationally representative cross-sectional data on demographic and health indicators in developing countries. The response rate of the participants was high (98%) in all the countries.

The sampling design typically involves multistage cluster sampling techniques, using strata for rural and urban areas and for different regions of the countries. This ensures that the sample is generally representative at the national level, residence level (urban-rural) and at the regional level (department, states). In the first sampling stage, each of the countries was stratified into major regions. Enumeration areas (EAs) are generally drawn from the regions, with a probability of selection proportional to their size. The sampling frame is a list of all EAs (clusters) from a recently completed population census. In the second stage, samples of households are randomly selected from an updated list of households.
within the selected enumeration area. A standardised questionnaire was administered by the interviewers to participants in each country.

Figure 3: Map of Africa showing countries studied
The surveys are designed to monitor reproductive and health behaviours, demographic trends, attitudes and outcomes, maternal and child health, and social and demographic characteristics of women and men of reproductive age. Collection of data is conducted by face-to-face household interviews, and women of reproductive age (15–49) are the focus of the survey. Three standard core questionnaires (household, woman and man) are included in each survey. The Household Questionnaire is used to list all the usual members and visitors of the selected households. This allows for collection of basic information on the characteristics of each person listed in the household, information on housing characteristics, as well as identifying women and men eligible for individual interview. The household questionnaire also permits the interviewer to identify women, men and children who are eligible for anthropometry and anaemia and HIV testing.

In addition to the core questionnaires, there are also several standardised modules not contained in the core questionnaires for countries with interest in those topics. Such optional questionnaires were developed on a series of topics to achieve some level of comparability across countries that used them. The topics include: maternal mortality, HIV/AIDS, domestic violence, malaria, health expenditures and female genital cutting. This thesis utilised the advantage of the DHS domestic violence to collect and analyse data on violence against girls/women.

Interviewers receive special training and they ensure good professional standards during the entire process. In any household, only one woman should receive the domestic violence module and the Kish grid is used to randomly select one woman from the eligible women in the household. Only female interviewers are allowed to interview female respondents in the domestic violence module and strict privacy is ensured during the entire interview. Before starting the interview, additional
informed consent is obtained for the violence module and the respondents are reassured of the confidentiality of the information.

Recent surveys from sub-Saharan Africa were considered for inclusion in this thesis if they were conducted in 2006 or later. In the DHS, all women aged between 15 and 49 years in a household are eligible for the women’s questionnaires. The sample is further reduced as only one randomly selected eligible woman in a household is administered the domestic violence module. This practice is used to maintain confidentiality and maximize the safety of the respondents. The sample for analysis was further restricted to include only respondents who were between 15 and 18 years of age and whose principal residence was at the place where the survey interview was conducted (Study II and III). No exclusion based on age or residency status was applied to Study I and IV.

### 4.2 Definition of community

Community was used to describe clustering within the same geographical area and within the DHS, communities were based on sharing a common primary sample unit (PSU). The PSU is usually based on the most recent sampling frame for each country as defined by census enumeration blocks. In urban areas, the census enumeration blocks were identified for this purpose, while in rural areas village areas were used to identify the PSU. The unit of analysis was chosen for the following reasons: PSU provides the most consistent measure of community across all the surveys (Griffiths et al. 2004), and thus is the most appropriate identifier of community for this cross-region comparison. Second, it has been shown that for most of the DHS conducted, the sample size per cluster met the optimum size with a tolerable precision loss (Kravdal 2006).
4.3 Variable description and measurement

4.3.1 Outcome variables

4.3.1.1 Childhood sexual abuse

For this thesis, CSA was defined as sexual violence on or before the age of 18 years and was the outcome variable for studies I, II and III. “To assess if participants were sexually abused in childhood, all eligible women were asked the following questions: “At any time in your life, as a child or as an adult, has anyone forced you in any way to have sexual intercourse or perform any other sexual act?” The two possible outcomes for the question were “yes” or “no”. Respondents who said yes were then asked questions about the age at which this first happened and the person who committed the act. Respondents who gave an affirmative reply, and if the violence occurred when they were under the age of 18 years, were considered as cases of CSA and coded as “1” while those who gave a negative response or if the abuse occurred after the age of 18 years, formed the other group of the dichotomy and were coded “0”. All women who did not respond to the question were excluded” (Yahaya et al. 2013).

4.3.1.2 HIV risk behaviours

In study IV, HIV risk sexual behaviour was the outcome variable. It is a latent variable and was constructed from three other variables namely: lack of condom use, extramarital sex and STDs in the last 12 months. Extramarital sex was defined as the act of having intercourse with a man other than one’s spouse or cohabitating sexual partner.
4.3.2 Independent variables

4.3.2.1 Individual level factors
The following individual-level factors were included as control variables.

Age
Study I: Age of the respondents was categorized into three groups: (15–24 years, 25–34 years, 35 years or older)

Education
Study I and III: Level of education was categorized into three groups: (no education, primary, secondary or higher)

Study II: Level of education was categorized into two groups: educated or not educated.

Marital status
Study II: Marital status was categorized into three groups: never married, currently married and formerly married.

Occupation
Study I and III: Occupation was categorized into two groups: working and not working.

Place of residence
Study I, II and III: type of residence was either defined as rural or urban.
Cigarette smoking
Study IV: Cigarette use was identified based on the respondent’s response to the use of cigarettes. Those who currently consume cigarette were categorized as smokers while the other group was non-smokers.

Alcohol use
Study IV: Alcohol use was defined as the act of drinking alcohol before the last sexual intercourse. The respondents were further categorized into four groups namely (a) neither the respondent nor his partner consumed alcohol before the last sex (b) the respondent consumed alcohol but the sexual partner did not (c) the sexual partner consumed alcohol but the respondent did not and (d) both the respondent and the sexual partner consumed alcohol.

Wealth status
Study I, II and III: DHS did not collect direct information on household income and expenditure. The DHS wealth index was used as a proxy indicator for socio-economic position. The methods used in calculating DHS wealth index have been described elsewhere (Deon & Pritchett 2001; Montgomery et al. 2000; Vyas & Kumararayake 2006). An index of economic status for each household was constructed using principal components analysis based on household ownership of selected assets: number of rooms per house, ownership of car, motorcycle, bicycle, fridge, television and telephone as well as any kind of heating device. From these criteria the DHS wealth index quintiles was categorized into three groups in study I (poorer, middle, richer) and five groups in study II and III (poorest, poor, middle, rich, and richest).
### 4.3.2.2 Community level factors

Neighbourhood socio-economic disadvantage was used as community-level variable in this thesis. Neighbourhood socio-economic disadvantage consisted of an index constructed from three variables using principal component analysis. The variables were proportion of respondents: with no education (illiterate), unemployed, and living below the poverty level (asset index below 20% poorest quintile). A standardized score with mean 0 and standard deviation 1 was generated from this index, which we divided into five quintiles (quintiles 1 to 5). Quintile 5 represented highest SES while quintile 1 represented lowest SES.

Other community level variables used are as follows:

1. **Neighbourhood poverty**: percentage of households below 20% of wealth index (Rustein & Kiersten 2004).
2. **Female-headed households (family disruption)**, expressed as percentages of households headed by a female in an area (Coulton et al. 1995).
3. **Residential mobility/instability** was defined as the proportion of households occupied by persons who had moved from another dwelling during the previous 5 years (Sampson 1985; Warner & Pierce 1993).
4. **Place of residence** was defined as either urban or rural, as administratively defined by each country.
5. **Population density (average household size)** was operationalised as the median household size in a community.
6. **Ethnic diversity**: an index of ethnic diversity was created using a formula (equation 1) that captures both the number of different groups in an area and the relative representation of each group (Rustein & Kiersten 2004):

   \[
   \text{Ethnic diversity index} = 1 - \sum_{i=1}^{X} \left( \frac{X_i}{Y} \right)^2
   \]   

   (1)
where:
\( x_i \) = population of ethnic group \( i \) of the area,
\( y \) = total population of the area,
\( n \) = number of ethnic groups in the area

Scores can range from 0 to approximately 1. For clarity of interpretation, each diversity index is multiplied by 100; the larger the index, the greater diversity there is in the area. If an area’s entire population belongs to one ethnic group, then an area has zero diversity. An area’s diversity index increases to 100 when the population is evenly divided into ethnic groups.

### 4.4 Statistical analyses

In the descriptive statistics, frequency tabulations were constructed to describe the distribution of the respondents by the key variables. The key variables were expressed as percentages. The Pearson's chi-squared test for analyzing contingency tables was used. All cases in the DHS data were given weights to adjust for differences in probability of selection and to adjust for non-response. Pooled sample weights were used for descriptive statistics, using Stata 11 for Windows (Stata Corp, College Station, TX, USA).

**Study I**

Frequency tabulation was constructed to describe the distribution of correspondents. The chi-squared test was then used to check the impact of all potential predictors on CSA. Univariate analysis was conducted using the pre-defined explanatory variables and the outcome variable (CSA). A multiple logistic regression analysis was then conducted entering all the variables simultaneously. The results were expressed in the form of odds ratio while the significance level was set at \( p<0.05 \).
### Table 1: Overview of the designs and methods used in the four studies.

<table>
<thead>
<tr>
<th>Study</th>
<th>Data source</th>
<th>Study design</th>
<th>Outcome</th>
<th>Statistical method</th>
<th>Level of analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>DHS</td>
<td>Cross-sectional</td>
<td>CSA</td>
<td>Multivariable logistic regression</td>
<td>Individual</td>
</tr>
<tr>
<td>II</td>
<td>DHS</td>
<td>Cross-sectional</td>
<td>CSA</td>
<td>Multilevel logistic regression</td>
<td>Individual and community</td>
</tr>
<tr>
<td>III</td>
<td>DHS</td>
<td>Cross-sectional</td>
<td>CSA</td>
<td>Multilevel logistic regression</td>
<td>Individual and community</td>
</tr>
<tr>
<td>IV</td>
<td>DHS</td>
<td>Cross-sectional</td>
<td>Sexual risk behaviours</td>
<td>Structural equation modelling</td>
<td>Individual</td>
</tr>
</tbody>
</table>

### Study II

A multilevel logistic regression modelling with individuals at the first level and neighbourhood at the second level was used. The analysis specified a two-level model for binary response reporting CSA or not, for adolescents (level 1) living in a community (level 2). Three models were constructed. The first model, an empty model, had no explanatory variable. The model focused on decomposing total variance into its individual and community components. The second model was constructed to have only the control variable. The third model (full model) included all the studied variable i.e. control, individual and neighbourhood variable.
Study III

The analysis was a 2-level multilevel logistic model for the binary outcome (i.e. CSA) with individuals at level 1 and community at level 2. Two models were constructed. The first model (an empty or unconditional model) had no exposure variables, was specified to decompose the amount of variance that existed between community and country levels. The second (full) model controlled for all the variables simultaneously.

Fixed effect model (measures of association)

Study II and III: the results of the fixed effect model (measures of association) were expressed as odds ratios (ORs) with 95% confidence intervals (CI).

Random effects model (measures of variation)

Study II and III: the results of the random-intercept models (measures of variation) were expressed as variance partition coefficient (VPC) and proportional change in variance (PCV). The Intra-community correlation (ICC) is a simple VPC and is often used interchangeably. The VPC was calculated by the linear threshold (latent variable) method according to the formula used by Snijders (Snijders & Bosker 1999) as follows:

$$ VPC = \frac{V_c}{V_c + \left( \frac{\pi^2}{3} \right)} $$

where $V_c = \text{community level (neighbourhood) variance}$.

The PCV is calculated as follows: $PCV = \frac{(V_a - V_b)}{V_a} . 100$

where $V_a = \text{variance of the empty model}$, and $V_b = \text{variance of the model with more terms}$. 

30
MLwiN software, version 2.10 (Rasbash et al. 2008) was used for the analysis. The statistical significance of covariates was calculated using Wald’s test. All significance tests were two-sided and statistical significance was defined at 5% level.

**Study IV**

Pearson’s product moment correlation was used to identify the correlations between variables. A confirmatory factor analysis was initially used to develop an acceptable measurement model. The measurement model defined the observed variables in terms of “true” latent variables (endogenous or exogenous) and a measurement error term. At this stage, each latent variable was allowed to correlate freely with every other latent variable. In step two, the measurement model was modified to represent the postulated causal model framework. A mediator (i.e. alcohol and cigarette use) or an intervening variable is a third variable that links the independent variable (i.e. CSA) to the dependent variable (i.e. sexual risk behaviour) (Baron & Kenny 1986). The indirect effect involves the direct effects from the independent variable on mediator and from mediator to dependent variable, while the total effect denotes as the sum of direct effect of independent variable on dependent variable and the indirect effect.

**4.4.1. Model fit and specifications**

In study I, II and III, regression diagnostics were used to judge the goodness-of-fit of the model. They included the tolerance test for multicollinearity, its reciprocal variance inflation factors (VIF) (Tu et al. 2004; Tu et al. 2005), presence of outliers and estimates of adjusted R square of the regression model. The largest VIF greater than 10 or the mean VIF greater than 6, represent severe multicollinearity (Hocking 1996). Regression estimates were calculated by means of the reweighted iterative generalized least square algorithm using MLwiN 2.20 (Rasbash et al. 2008). In the
multilevel logistic regression models, second order penalized quasi-likelihood estimation was used (Goldstein 2003). The statistical significance of covariates was calculated using the Wald test (Rasbash et al. 2008). All significance tests were two-tailed and statistical significance was defined at the 5% alpha level.

Study IV: the model testing was conducted with Stata for Windows. Using criteria suggested by Hu & Bentler 1999, the model fit was evaluated by using the following indicators: chi-square statistics, comparative fit index, Tucker-Lewis index and a root mean square error of approximation. A good fit was indicated by a root mean square error of approximation value below 0.05, comparative fit index and Tucker-Lewis index above 0.90 and 0.95 respectively.

4.5 Ethical considerations

The thesis is based on analyses of secondary data which has already been approved by the ethics committee of ICF International in the United States of America and by the National Ethics committee in the respective countries. The thesis follows the standards for ethical and safety recommendations for research on domestic violence against women in order to ensure women’s safety and maximizing the disclosure of actual violence. Confidentiality was maintained throughout the process of survey with all identifier information removed and all study participants gave informed consent before participation. The use of translators was avoided as it reduces the quality of information and violates confidentiality. The Kish grid was used to randomly select only one woman from among eligible women in any household. Special training and support was provided to all staff, while field staff received additional training to ensure they implement the survey using the safety procedures established and to deal with any
crisis situations. Referrals and additional information, including if possible, any legal help/services was made available to any woman who requires it.
5. RESULTS

5.1 Paper I: Prevalence of child sexual abuse

A total number of 69,977 women between the ages of 15 and 49 years from six countries (Ghana, Liberia, Nigeria, Uganda, Zambia and Zimbabwe) were recruited for this thesis. However, for studies II and III, a subset of the population was used. In this case, 6,351 adolescents between the ages of 15 and 18 years from the six countries were analysed. In study IV, participants were recruited only from Nigeria.

The prevalence of CSA in the countries reported in this thesis was low. The prevalence ranges from 0.3% in Liberia to 4.3% in Zambia (Figure 4). The prevalence of CSA was also 0.4%, 0.7%, 0.8% and 2.0% in Uganda, Zimbabwe, Ghana and Nigeria respectively. These figures were based on all participants that took part in the survey from the age of 15 years to 49 years and who were present in the respective communities during the survey (Study 1). The youngest age of exposure to CSA was five years (Figure 5). The reported cases of CSA were highest between 14 and 17 years. Most of the respondents had at least a primary education except in Liberia and Nigeria were 41.8% and 39.7% of the respondents were uneducated. A majority of the respondents were working, except in Zimbabwe were 57.4% were not working. Most of the respondents resided in rural community and the majority were from Nigeria. Most of the perpetrators of the violence were known to the victims (partners, families or friends). It is only in Nigeria and Zambia that about a quarter of the perpetrators were strangers.

After adjusting for all the socio-economic factors, there was no association between CSA and wealth index. Similarly, there was no significant association between CSA and level of education. There was contrasting association between CSA and
occupation. In this case, the employed in Ghana, Uganda and Zambia were less likely to have been victims of abuse.

**Figure 4:** Description of Demographic and Health Surveys data 2006–2008 in sub-Saharan Africa by country, survey year, eligible sample, communities sampled and reported childhood sexual abuse (CSA).
5.2 Paper II: Individual and community factors associated with CSA

The prevalence of CSA ranges from 1.04% in Liberia to 5.84% in Zambia (Figure 6). This value was calculated based on permanent residency and after excluding all participants above 18 years. In Uganda, Nigeria, Ghana and Zimbabwe the prevalence was 1.4%, 2.4%, 4.6% and 5.0% respectively.

Reported cases of CSA varied across the six countries, with Zambia being the country most likely to report cases of CSA. After adjusting for all factors, uneducated women were less likely to report CSA when compared to educated women (OR = 0.36, 95% CI 0.16–0.81). The addition of community socio-economic status and area of residence did not have any effect on reported cases of CSA.
In Model 1, the empty model, the estimated variances in reported CSA was 0.926 (SE=0.442) at the community level, indicating that there was a significant variation in the odds of reporting CSA across the communities. The empty model revealed that a significant proportion of the total individual variability in the probability of reporting CSA was attributable to the neighbourhood level or community-level factors (ICC=21.9%). This suggests that there is neighbourhood clustering of CSA. In Model 2, after adjusting for the country variable, the total remaining variance in reported CSA was 0.505 (SE=0.370), while the explained variance for reported CSA with the country level factor was 13.3%. About 46% of the variance in the odds of reporting CSA across communities was explained by the country variable. In Model 3, after adjusting for all the variables, the total variance in reported CSA
5.3 Paper III: Community factors associated with CSA

After adjusting for both individual and community-level factors, there was no association between wealth status and CSA. The odds of reporting CSA increased with literacy. Respondents with no education were less likely to have reported CSA compared to respondents with higher level of education (OR = 0.16, 95% CI 0.07–0.39). Furthermore, working respondents were associated with higher probability of reporting history of CSA (OR = 2.05 CI 1.48–2.83).

None of the factors of social disorganisation except family disruption was significantly associated with CSA. Living in the neighbourhood of higher family disruption was associated with higher probability of CSA (OR = 1.57, 95% CI 1.14–2.16).

There was significant variation in the odds of reporting CSA across the communities with a variance of 0.74 (SE=0.31). The intra-community correlation coefficient in the empty model specified that 18% of the variation of reported CSA could be attributed to community level factors. In the full Model, about 54% of the variance in the odds of reporting CSA was explained by all the variables included in the model.

5.4 Paper IV: Mediators of CSA and sexual risk behaviour in later life

The reported prevalence of CSA in Nigeria was 2%. The 0.55% of the respondents reported using condom while 1.5% reported STDs in the past 12 months.
Extramarital sex was as high as 13%, while alcohol and cigarette use were low (1%).

All the variables used were significantly and positively correlated. In addition, the respondents that experienced CSA had high likelihood to smoke cigarettes, drink alcohol, and were likely to engage in sexual risk behaviours. The direct effect of child sexual abuse on sexual risk behaviour was found to be significant (p<0.0001). Similarly, the indirect effect of child sexual abuse on sexual risk behaviour via alcohol and cigarette use was also found to be significant (p<0.0001), indicating that cigarette smoking and alcohol intake mediated the relationship between CSA and sexual risk behaviour (Figure 7).

**Figure 7**: Model pathway of the association between child sexual abuse and sexual risk behaviours
6. DISCUSSION

6.1 Prevalence of child sexual abuse

Overall, the prevalence of CSA was low in this thesis, ranging from 0.3% in Liberia to 4.3% in Zambia. When the prevalence was calculated based on permanent residency status and using only respondents between the ages of 15 and 18 years, the prevalence of CSA was still relatively low and ranged between 1.04% in Liberia to 5.84% in Zambia. These rates are lower compared to those of other prevalence studies where CSA has been reported to be between 10% and 54% (Brown et al. 2009; Fergusson et al. 1996b; Finkelhor et al. 1990; Goldman & Padayachi 1997; Madu and Peltzer 2000). Several reasons may have accounted for the reported low prevalence in this thesis, which include the sample characteristics and definitions used. First, this study used relationship-specific definitions to define if the respondents experienced CSA by asking them if anyone forced them to have sexual intercourse or perform any other sexual acts. This form of definition has been reported to lead to low prevalence rates when compared to studies that used an activity-specific definition (Peters et al. 1986). More so, the lower prevalence reported in this thesis could be explained by the fact that the definition of CSA was based on contact form of CSA. This is the most restrictive definition of CSA and is a definition that excluded non-contact sexual acts like sexual request or exhibitionism. Generally, prevalence rates decrease when non-contact form of CSA is excluded. This is confirmed in previous CSA prevalence studies conducted in Sweden (Edgardh & Ormstad 2000) which compared the prevalence when exhibitionism was excluded (7.1%) and when it was included (11.2%). Another possible reason for the low prevalence of CSA in this thesis may be related to the fact that respondents may not be willing to disclose the abuse because of embarrassment, shame or a desire to keep the abuse secret. In certain instances, the low prevalence rate may be attributed to the inability to recall events due to the
trauma surrounding the event. Although it was reported that absolute privacy was required when implementing the domestic violence module, it is important to note that privacy may be difficult to achieve in an extended family settings where the housing units do not give much room for such opportunity.

The characteristic of perpetrators observed in this study is consistent with previous studies (Fergusson et al. 1996b; Reza et al. 2009), most of them were known to the respondents prior to the episode of the abuse. Studies have shown that most abuse is committed by men (90%) and by persons known to the child (70–90%), with family members constituting one-third to one-half of the perpetrators against girls (Finkelhor 1994). Most sexually abused children do not tell anyone they were abused, even when directly asked by parents or other authority figures. Victims of sexual abuse are often too afraid that the news will hurt their parents, or they are afraid of not being believed, or they were threatened in some way by the offender (Hershkowitz et al. 2007). This may be a possible factor that influenced the low prevalence of CSA in this thesis.

6.2 Individual factors associated with child sexual abuse

The findings of this thesis showed that there was no association between CSA and individual SES (Study I, II and III). The findings corroborate those of previous CSA studies (Fergusson et al. 1996b) and compliment the larger literature on the non-important nature of SES on risk of CSA. In particular, it showed that CSA was not significantly higher in families of low SES. When compared with other violence studies like intimate partner violence and child abuse where violence is associated with SES, it makes it difficult to comprehend why the same is not the case for CSA. Although the result of this thesis is also contrary to a previous study (Finkelhor 1980) showing that CSA is higher in families with lower SES. Why the result of this
study (Finkelhor 1980) is different from other CSA studies is still unclear. One possible reason may be because the aforementioned study (Finkelhor 1980) was school based which is not representative of the larger population.

There was a contrasting association between CSA and occupation of respondents. Those reporting CSA less often were women currently working. This result is not consistent with previous findings (Finkelhor 1993) suggesting that there was no linkage between CSA and socio-economic factors. A possible explanation for this may be because the variable (occupation) was derived by combining all working groups together (skilled manual, unskilled manual, agriculture, sales, services, clerical, professional, technical and managerial). Such a group contains a combination of people from the lower and higher social class. On the other hand, those in the second group (unemployed) are those without a job and in most instances people without a job are usually in the lower socio-economic class. The variable was derived in this way for convenience as dichotomous variables are better analysed and interpreted rather than the previous nominal nature of the variable.

Contrary to earlier evidence, this thesis found that uneducated women were less likely to report CSA. The higher prevalence of abuse reported in educated girls compared to non-educated girls was unexpected. This finding requires further investigation, as high level of education is not a common factor for CSA (Edgardh & Ormstad 2000). A possible contributory factor may be the high rate of reported sexual violence in African schools (Jewkes et al. 2002). Although, most of the perpetrators of sexual abuse are either family members or those known to the victim, most cases of this maltreatment still takes place either on the way to school, in schools or on the way back from schools (Reza et al. 2009).
6.3 Community factors associated with child sexual abuse

Regarding community factors, neighbourhood was an important contextual factor in this thesis (study II and III). Neighbourhoods constitute a key determinant of socio-economic disparities in health, as they shape individual opportunities and expose residents to multiple risks and resources over the life course. Just as with individual SES, there was no relationship between CSA and community SES (Study II and III). While there has been no previous study to evaluate the relationship between CSA and community SES; this provides further evidence to show that CSA transcends across all strata of community socio-economic context and that adolescents in the same community tended to report CSA. Even though community SES was not statistically significant, this does not imply that it is not important from the public health perspective. Rather it may imply that there may not be evidence of socio-economic inequality in the reported cases of CSA. Inadequate sample size to reach a statistically significant level may be a possible reason for this.

The findings from the random effect part of multilevel modelling add to the existing knowledge about the contribution of ecological context on CSA. An important finding was that there was evidence of significant geographical clustering of reported cases of CSA (Study II and III). This shows that there is significant variation in the odds of reporting CSA across the communities, implying that respondents from the same area may be more similar to each other in relation to their exposure to CSA than to people from other areas (Merlo et al. 2005). If people in the same neighbourhood/community have similar exposure to CSA, it implies that they are prone to common contextual influences.
While most of the variance was explained by individual and community factors (full model), about half of the variance in the community was explained by the unmeasured country effects. This implies that the likelihood of reported cases of CSA was due to factors at all levels (individual, community, and country level). This supports the idea of the ecological model which considers violence as the product of multiple levels of influence on behaviour (Dahlberg & Krug 2002). The findings suggested the importance of including both individual and community variables in addressing CSA issues. To understand CSA, the entire environment, which includes individual characteristics, the environmental factors all need to be considered or studied.

Similarly, variations across communities proved to be not statistically significant after controlling for the effects of unmeasured control factors. This suggests that the likelihood of reported CSA may be due to the unmeasured country-level effects. It is possible that the community-level variance was due to shared social norms. The full model was able to explain most of the observed variations. The findings have important implications for targeting policy as well as the exploration of factors not included in the model that could explain the remaining unexplained variation.

This thesis confirms the importance of family disruption as it relates to history of CSA (Study III). This is corroborated by previous studies on family disruption and history of CSA (Fergusson et al. 1997; Fomby & Cherlin 2007; Li et al. 2012), highlighting the importance of the role of a stable family in the training of a child and in the building of a sound community free of violence. Children who experience multiple transitions in family structure may experience worse development and health outcomes compared to children raised in stable two-parent families and perhaps even worse than children raised in stable, single-
parent families (Fomby & Cherlin 2007). Disruptions of family structure may deprive children of the benefits of a male role model in the family. This is of considerable importance in African society where the family structure and especially the father is important and plays a significant role in the shaping and building of children’s life. The individuals and there attributes make up a family and a family is the unit of a society or community. So a disruptive family can still have a diminishing effect on the social cohesion of neighbourhoods and reduce the power of the social norm and informal social control required to regulate a deviant behaviour. In some instances, the reduced parental control during childhood and adolescence makes children more exposed to potential perpetrators like step fathers or even susceptible to peer pressure. Similarly, children on the streets are also exposed to the dangers of the outside world, especially paedophiles which further increase their risk of sexual abuse. Some of these children are the breadwinners at home and may be involved in either petty trading, working late into the night which further increases their exposure to vulnerable people.

It is important to highlight the risks and circumstances of children of CSA victims. Children born to victims of CSA are at increased risks of being victims themselves (Trickett et al. 2011). Such children are either at risks at the hands of their own caregivers or from the deleterious consequences of having caregivers who suffer from the sequelae of their own childhood abuse (Noll et al. 2009). Domestic violence may increase the probability of sexual abuse within the family (Chavez et al. 2009). Such abuse has been linked to either the parents being neglectful or through recreation of environmental conditions in which abuse was allowed to persist across generations (Trickett et al. 2011). This has led to the notion that abusive parents were themselves abused and that abused and neglected children would become tomorrow’s perpetrators of family violence (Church II et al. 2012). A vast proportion of sexual violence takes place within the victim’s immediate
environment with a majority of the perpetrators being known to the victims but still remains unreported. Most sexually abused children do not tell anyone they were abused, even when directly asked by parents or other authority figures. The stigma associated with being a victim of sexual assault makes it difficult for victims or even their parents to report suspected cases. Within a family, cases of CSA may go unreported by a spouse to avoid marital separation, divorce, loss of friends, loss of job and loss of income (Richardson 1990). The secrecy and collusion within the family serves as a barrier for any family member to report the abuse. In addition to this, there are strong norms against informing on one’s family members (Finkelhor 1984). More so, the dominant nature of men in society prevents mothers and daughters from exposing the male figure in the house who might have been responsible for the abuse.

6.4 Mediators and risky behaviour in later life

This thesis highlights the relation between CSA and sexual risk behaviours (Study IV). One of the findings was that women with history of CSA reported using cigarettes and alcohol. This corroborates previous studies that found an association between CSA with use of recreational drugs (Malow et al. 2006b; Meade et al. 2012; Senn et al. 2008). This may strengthen the notion that drug and alcohol use in sexually abused girls is higher than non-abused girls and the purpose for such use was to avoid abuse specific memories and affective response (Briere & Runtz 1991; Briere & Runtz 1993).

This thesis also supports the fact that girls with histories of CSA report sexual risk behaviours at a later age. This corroborates earlier empirical findings and theory that CSA increases sexual risk behaviours (Holmes et al. 2005; Miller 1999). It is thought that women with sexual abuse histories place themselves at risk of sexual
behaviours linked to beliefs about sexuality developed in response to sexual abuse (Miller 1999). There has been conflicting reports on the association between CSA and sexual risk behaviour. While some studies have reported an association (Arriola et al. 2005; Miller 1999; Richter et al. 2013; Senn et al. 2006; Senn & Carey 2010), other studies have not found any association between CSA and sexual risk behaviour (Peltzer et al. 2013). Such differences are difficult to ascertain, but it could be that the studies were not adequately powered to detect a difference or it may have been due to the way the variables (CSA and sexual risk behaviour) were operationalized.

In addition, this thesis shows that the association between CSA and sexual risk behaviour was both directly and indirectly linked. While most of the association was direct, the remaining association which was indirect was through the use of alcohol and cigarette. While sexual abuse victims may be prone to increased sexual risk behaviour due to the psychological effect of the abuse, the use of recreational substances like alcohol often found among violence victims can further impair their judgement for safe sexual practice (Walsh et al. 2014; Zawacki et al. 2009). Practices such as non-use of condom and multiple sexual partners may increase the risk of STD including HIV/AIDS and further worsen the burden of HIV/AIDS in communities with weak health systems. Findings from this study also add to existing knowledge regarding the association between CSA and risky sexual behaviour in SSA. Existing research on CSA in SSA has been limited and primarily focused on cross-sectional data using logistic regression techniques. No study has attempted to utilise the SEM technique which is considered to offer more meaningful and valid results.
6.5 Methodological considerations

Despite the contribution the study makes to the existing literature, there are certain limitations. The DHS covered general health issues on population health with questions on sexual abuse constituting a minor part of the whole survey. With the limited sexual abuse variables available from the survey, it was not possible to construct CSA variables and utilise some socio-demographic factors. Other predictors of CSA such as family stability and marital conflict, parenting and parent-child relationships and parental adjustment were not available in the survey, and so could not be included in the analysis. Furthermore, some of these variables might have explained some associations between community and CSA. In addition, almost half of the samples included in the model were from Nigeria. It is possible that the associations may be influenced by the large number of adolescents from Nigeria. However, the study found that not only Nigeria’s country dummy variable was associated with the likelihood of reporting CSA. As this is a cross-sectional study, it is difficult to assess the direction of associations and the causality from its findings. Data was collected through self-report and therefore subject to potential recall bias. This is more likely in Study I and IV, were respondents in the study were between 15 and 49 years, and who had to recollect sexual abuse that occurred some years back. More so, because of the sensitive nature of the questions being asked, there is the likelihood that some respondents might not have disclosed their past experience(s). Therefore, it is unlikely that an exact account of the exposure to the CSA will be available. It is also feasible that the cases of CSA are underreported because of the stigma associated with sexual violence.

The fact that the data used a cross-sectional design, limited the opportunity to deal with temporal ordering of abuse, risk behaviour and social marginality. Sexual abuse was limited to the time of onset and perpetrator of the abuse while precise
information about the nature and extent of the abuse was not provided. There was also no data on household income. The thesis used asset-based wealth index which is a proxy indicator of household economic status.

The communities used in the analyses were administrative boundaries, which may not adequately capture the social context important for individual exposure to CSA. However, due to the high community-level variance observed, the communities used seem to be appropriate to capture the social context. Finally, the study focused on socio-demographic characteristics as a predictor of CSA. We did not assess the effect of other predictors of CSA such as family stability and marital conflict, parenting and parent-child relationships and parental adjustment, as these variables were not obtainable from the DHS. There is a need for longitudinal studies that will identify all relevant variables and follow them up over a long period of time to identify relevant factors associated with CSA in SSA.

6.6 Strengths

Despite the above mentioned limitations, the strengths of the thesis are important. To the best of available knowledge, this is one of the first studies to examine the association between community SES and CSA applying a multilevel approach. It is also a large, population based study from six countries in sub-Saharan Africa with high response rates. It is a nationally representative sample with similar indicators used across regions and countries, making it possible for numerical values to be compared across the sites. More so, the data obtained from DHS is widely perceived to be of high quality based on sound sampling methodology and adherence to ethical standards of data collection including violence data (Macro O.Calverto 2006). About 70% of the community variations in the reported CSA were accounted for by individual and community contextual characteristics,
signifying that the models were effective in predicting the risk of CSA. Similarly, we were able to limit and avoid cohort effect and recall bias. By including only respondents aged 18 or younger in Study II and III, we were able to improve timeliness of information gathering, such that the interval between the event (i.e. CSA) and the interview (i.e. the recall period) is as short as possible, thus reducing non-differential recall bias. Similarly, by including only permanent residents at the time of the interview, we were able to prevent cohort effect – that is, variations in the characteristics of the community over time among respondents who are defined by some common life experience or shared temporal experience.

6.7 Conclusions and implications

The findings from this thesis indicate that there is no evidence of socio-economic differentials in adolescents’ experience of CSA regardless of their individual and community-level socio-economic position. The perpetrators of sexual abuse are known and close to the abused children. In addition, the findings showed that the exposure to CSA is associated with high community levels of family instability, thus suggesting that neighborhoods may indeed have important effects on exposure to CSA in SSA.

Drawing upon multilevel perspectives, this thesis offers alternative ways for exploring the association between CSA and socio-economic status. Further, the thesis demonstrated that adolescents in the same community were subjected to common contextual influences. It is therefore important that effective preventive strategies are developed and implemented that will cut across all socio-economic positions in a context that both permits and encourages disclosure as well as identifying predisposing circumstances for recurrence. Further studies are needed to investigate the pathways through which neighbourhood factors interact with individual factors to influence CSA. A better understanding of the mechanisms
involved might be important for designing public health interventions aimed at reducing CSA in Sub-Saharan Africa.

6.8 Future directions

This thesis provides insight into the individual and contextual factors associated with CSA by conceptualizing CSA within an ecological model framework and applying multilevel modeling to explain the effect of each ecological context on CSA. Future studies are required to include more community and individual variables not addressed in this study. When studies are conducted, they may be able to account for the unexplained neighbourhood variations in reported cases of CSA.

This research was a cross-sectional study; as such it limits the opportunity to deal with causality. Future longitudinal studies are required that will identify all relevant variables and follow them up for a long period of time to identify relevant factors.
7. ACKNOWLEDGEMENTS

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Paper I
Research

A comparative study of the socioeconomic factors associated with childhood sexual abuse in sub-Saharan Africa

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Key words: Childhood Sexual abuse, sexual violence, sub-Saharan Africa, socio-demographic factors, demographic and health survey

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Abstract

Background: Childhood sexual abuse (CSA) is a problem of considerable proportion in Africa where up to one-third of adolescent girls report their first sexual experience as being forced. The impact of childhood sexual abuse resonates in all areas of health. The aim of this study was to describe the prevalence of childhood sexual abuse and variations across socioeconomic status in six sub-Saharan countries. Methods: Datasets from Demographic and Health Surveys (DHS) in six sub-Saharan African countries conducted between 2003 and 2007 were used to access the relationship between CSA and socio economic status using multiple logistic regression models. Results: There was no association between CSA and education, wealth and area of settlement. However, there was contrasting association between CSA and working status of women. Conclusion: This study concurs with other western studies which indicate that CSA transcends across all socio-economic group. It is therefore important that effective preventive strategies are developed and implemented that will cross across all socio-economic groups.
Background

Sexual abuse of children occurs throughout the world and can occur in different circumstances and settings. It is a problem of considerable proportion in Africa where up to one-third of adolescent girls report their first sexual experience as being forced [1-3]. However, it has been largely neglected in research and very little data are available on childhood sexual abuse (CSA) in Africa. Sexual abuse of children is a silent epidemic as well as a public health issue with negative long term effects which vary across individuals. It also depends on the extent or the degree of the abuse [4]. It is recognised as a cause of severe distress among young people [5]. The embarrassment, shame or fear of being blamed and a desire to keep the abuse secret make disclosure uncommon. The most frequent explanations for the sexual abuse of children in sub-Saharan Africa (SSA) include rapid social change and the patriarchal nature of society [6]. The impact of CSA resonates in all areas of health: physical, psychological, including negative sexual outcomes [7-11]. Victims of sexual abuse in childhood are predisposed to recurrent or repeated abuse in adulthood [12-15]. Most of the existing studies in Africa are either limited to school settings or are country specific [16-21]. School based studies are usually not nationally representative as high proportions of children still do not attend primary schools in African countries [22]. In addition, a significant proportion of children who are exposed to sexual violence in school are more likely to drop out [23]. Moreover, where studies have been done in specific settings, methodology and definition issues have limited comparability across settings [24]. There is the need for studies which are nationally representative, methodologically sound and comparable across countries in SSA. Therefore, the aim of this study was to describe the prevalence of childhood sexual abuse and variations across socioeconomic status in six sub-Saharan Countries.

Methods

The data reported here were from the Demographic and Health Surveys (DHS) conducted between 2003 and 2008 in six countries (Ghana, Liberia, Nigeria, Uganda, Zambia and Zimbabwe) in SSA available as of November 2010. The countries were chosen based on the availability of data sets on childhood sexual violence (sexual violence). DHS surveys were implemented by respective national institutions and ICF Macro International Inc (Calverton, MD). Methods and data collection procedures have been published elsewhere [25]. The surveys were designed to collect good quality, nationally representative data on demographic and health indicators in most developing countries, with at least one woman of reproductive age (between 15 and 49 years) from each household. Sample sizes ranged between 5,000 and 15,000 households. Each domain is made up of enumeration areas (EAs) established by a National implementing agency in each of the countries. The sampling frame is a list of all EAs (clusters). Within each domain, a two stage sample was selected. The first stage involved selecting clusters (primary sampling units) with a probability proportional to the size, the size being the number of households in the cluster. The second stage involved the systematic sampling of households from the selected clusters. A standardised questionnaire was administered by interviewers to participants in each country. The survey's questionnaires were similar across countries making comparability across settings feasible.

Outcome variable

For this study, CSA was defined as sexual violence on or before the age of 18 years. To assess if participants were sexually abused at childhood, all eligible women were asked the following questions: “At any time in your life, as a child or as an adult, has anyone forced you in any way to have sexual intercourse or perform any other sexual acts?” The two possible outcomes for the questions were “yes” or “no”. Respondents who said yes were then asked questions about the age at which this first happened and the person who committed the act. Respondents who responded yes and if the violence occurred when they were less than 18 years were considered as cases of CSA and coded as “1” while those who responded no or if it occurred after the age of 18 years formed the other group of the dichotomy and coded “0”.

Determinants variables

Socioeconomic factors: This study considered four measures of socioeconomic positions: wealth index, occupation, education and place of residence. We selected these four socioeconomic factors based on previous studies that investigated factors associated with CSA and availability of the variables on the DHS. The wealth index was calculated using easy-to-collect data on household ownership of selected assets, such as televisions and cars; dwelling characteristics such as flooring materials; type of drinking water sources; toilet facilities; and other characteristics that are related to wealth status. They are then assigned a weight or factor score generated through principal component analysis. The weighted scores were divided into quintiles for the analytic models (lowest, middle, and highest). The level of education was assessed using a 3-point scale which reflected the highest level of education attained by the participants (no education, primary and secondary/ higher level of education). Women’s current occupation was defined as not working or working. Place of residence was defined as rural or urban. Age of respondents was categorized into 15-24, 25-34, and 35-49 years. The relationship of the respondents to the perpetrators of sexual abuse is considered to be partners, families, friends, strangers or others.

Ethics: The surveys were approved by the ICF Macro’s Ethics Committee, USA and the Ethics Committee in each of the participating countries. All study participants gave informed consent before participation and confidentiality of all data was maintained.

Statistical analysis

In the descriptive statistics, frequency tabulations were conducted to describe the distribution of correspondents. The key variables were expressed as percentages. This was followed by contingency table analysis to examine the impact of all potential predictors on CSA using chi-squared test. Univariate analysis (unadjusted) with pre-defined explanatory variables and CSA as the dependent variable were performed in the instance. In the final model, multiple logistic regression analysis was used to examine factors associated with CSA, with all covariates entered simultaneously in the regression model. The results were presented in the form of odds ratio with significant levels and 95% confidence intervals.
Regression diagnostics were used to judge the goodness-of-fit of the model. They included the tolerance test for multi-collinearity, its reciprocal variance inflation factors (VIF) [26,27], presence of outliers and estimates of adjusted R square of the regression model. The largest VIF, lesser than 10, or a mean VIF lesser than 6, represented acceptable fit of the models [28]. Stata, release 11.1 for Windows (Stata Corp., College Station, TX, USA) was used for all analyses. All tests were two tailed and p-value less than 0.05 was considered significant.

Results

Sample characteristics

The study uses data from DHS conducted between 2005 and 2008 in six sub-Saharan Africa countries. Table 1 shows the countries, years of data collection, sample size and the reported childhood sexual abuse. The sample ranged from almost 5000 in Ghana to as more than 10,000 in Nigeria. In general, Zambia (OR=0.45, CI 0.27 – 0.67) had the lowest reported levels of childhood sexual abuse. Reported cases of CSA were highest in Zimbabwe (43.9%) and the least in Liberia (0.3%). The level of urbanisation varies across countries, ranging from 17% in Uganda to 44-45% in Zambia and Liberia. Table 2 illustrates the socio-demographic characteristics of the study participants. Most (38.0-45.8%) of the study participants were aged between 15-24 years. The level of education varies among respondents across the countries. Liberia recorded the highest respondents without education (41.8%) while Zimbabwe had the least number of non-educated (4.3%). Liberia recorded the least number of respondents unemployed (1.3%), while Zimbabwe recorded the highest number of respondents without a job (63%). Half of the respondents were distributed within the middle wealth status. Vast majority of the study participants live in rural area. The perpetrators of the sexual abuse vary across the countries, with most of the perpetrators known to the victims.

Unadjusted results

Table 3 shows unadjusted association between CSA and socio-demographic factors. Compared to respondents aged 15-24 years, respondents aged 25-34 years or 35-39 years were less likely to have been a victim of CSA in all countries except in Ghana and Liberia. Level of education was not associated with CSA except in Nigeria and Zambia where those with higher level of education (primary, secondary and higher) were more significantly likely to have been victims of CSA. The relationship between CSA and occupation was mixed. Respondents working at increased risk to have experienced CSA in Nigeria (odds ratio (OR) 1.24, 95% confidence interval (CI) 1.05 – 1.46) while respondents working in Uganda were at reduced risk (OR 0.40, 95% CI 0.19 – 0.84). The association was not significant in other four countries. Respondents in the highest wealth status were more likely to have experienced CSA in Ghana, Nigeria and Uganda. No statistically significant difference in the odds of CSA was found based on the type of residence in any of the countries. The offenders vary across countries and they were more likely to be families, friends or strangers.

Adjusted results

Table 3 presents the results of adjusted odds ratio of factors associated with CSA. The diagnosis of multi-collinearity showed that the largest VIF ranged from 2.21 to 7.70; and the average VIF ranged from 1.46 to 2.37. Since none of the VIF values exceeds 10 and none of the average VIF exceeds 6, we concluded that there was no multi-collinearity problem. After adjusting for respondents socio-demographic factors, the association between age and CSA remained significant in Nigeria, Uganda and Zimbabwe. However, respondents aged 35-49 years were less likely to be victims of CSA compared to those aged 15-24 years. The association between education and CSA which was initially significant became non-significant in Nigeria and Zambia. Similarly, there was no statistical significant association between wealth and CSA in any of the six countries. Respondents in the working force were less likely to have been victims of CSA in Ghana (OR 0.34, CI 0.15 – 0.77), Uganda (OR=0.24, CI 0.08 – 0.69) and Zambia (OR=0.45, CI 0.27 – 0.74). It was only in Nigeria (OR 0.60, CI 0.42 – 0.87) that those living in the urban areas compared to the rural areas were less likely to have been victims of CSA. The perpetrators of sexual abuse vary across countries just as in the unadjusted analysis.

Discussion

In this nationally representative cross sectional study of six countries in SSA, low levels of childhood sexual abuse was reported, with little associations with demographic characteristics. Findings presented in this paper show that older women were less likely to have experienced CSA. Further, our analysis found that currently working women were also less likely to have experienced sexual abuse in childhood.

The reported prevalence rates of CSA in this study fall below the lower range of reported rates typically reported in CSA studies, which reports between 10% and 25% of female [29-31] cases of CSA. There are possible explanations for this. Firstly, it might be related to the population characteristics and definitions used for CSA in the study. Child abuse operational definitions and the study response rates co-vary with response rates [32], i.e. a high response rate is associated with a relatively low prevalence rate. DHS are usually well conducted with a high response rate (average of 96%), and may as well contribute to the low prevalence of CSA in this study. In addition, the most restrictive definition of CSA was used; a definition that excluded non-contact sexual acts such as sexual request or exhibitionism. With this restrictive definition it is expected to have reduced prevalence of CSA. In addition, it might also be that the low prevalence was because of underreporting of cases, as study respondents may not be willing to disclose sexual abuse during the time of reporting [34]. The characteristic of perpetrators observed in this study is consistent with previous studies [6,30,33], that most of the perpetrators were known to the respondents prior to the episode of the abuse. Studies have shown that most abuse is committed by men (90%) and by persons known to the child (70-90%), with family members constituting one-third to one-half of the perpetrators against girls [34]. Most sexually abused children do not tell anyone they were abused, even when directly asked by parents or other authority figures. Victims of sexual abuse are often too afraid that the news will hurt their parents, or they are afraid of not being believed, or they were threatened in some way by the offender. The finding presented in our paper is consistent with the findings from other studies [30,35] that the risk of CSA is not related to socioeconomic factors. Rates of CSA were not significantly higher in families with low

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level of education, low wealth status and in rural communities. Nonetheless, there were instances where CSA was associated with higher level of education in Zimbabwe and small tendency for the risk of CSA to be related to type of residence in Nigeria.

There was contradicting association between CSA and occupation of respondents. Those reporting CSA less often were women currently working. This result is not consistent with previous findings [35] that have suggested that there was no linkage between CSA and socioeconomic factors. A possible explanation for this may be because the variable (occupation) was derived by combining all working groups together (official and non-official) versus those that were not employed. In such combinations, it is expected that each category of the groups could contain both high and low socioeconomic class.

This study is not without limitations. The DHS covered general health issues on population health with questions on sexual abuse constituting a minor part of the whole survey. With cross sectional study it is difficult to resolve the direction of causal association. The data were collected through self-report and it is likely that prevalence estimates obtained may be lower than the true prevalence because respondents may not disclose previous sexual abuse due to the sensitive nature of the questions being asked. Considering the accuracy in which respondents will be able to report CSA, it would be unrealistic that an exact account of the exposure to CSA will be available. The fact that the data used a cross-sectional design, limited the opportunity to deal with temporal ordering of abuse, risk behaviour and social marginality. Sexual abuse was limited to the time of onset and perpetrator of the abuse while precise information about the nature and extent of the abuse was not provided. Our study focused on socio-demographic characteristics as a predictor of CSA. We did not assess the effect of other predictors of CSA such as family stability and marital conflict, parenting and parent-child relationships and parental adjustment, as these variables were not obtainable from the DHS. There is a need for longitudinal studies that will identify all relevant variables and follow them up over a long period to identify relevant factors associated with CSA in SSA.

Despite the limitations, our study obtained strength in it being a large population-based study in six countries with a high response rate. It is a nationally representative sample with similar variables used across countries, making it possible for numerical values to be comparable across countries. More so, the data obtained from DHS are widely perceived to be of high quality based on sound sampling methodology and adherence to ethical standards of data collection including violence data.

**Conclusion**

The findings from this study indicate that CSA is not linked to any socioeconomic background and that perpetrators of sexual abuse are known and close to the children abused. However, victims are usually not willing to disclose events and in the process leading to recurrent events. It is therefore important that effective preventive strategies are developed and implemented that will cut across all socioeconomic sphere in a context that both permit and encourages disclosure as well as identifying predisposing circumstances for recurrence.

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**Competing interests**

The authors declare that they have no competing interests.

**Authors contributions**

JY, GM, JS and AP were involved in the conception of the study. JY set up the statistical analysis under the supervision of GM, JS and AP. JY was involved in the drafting of the manuscripts with contributions from all the authors. All the authors have read and approved the final version of the manuscript.

**Tables**

| Table 1: Description of data sets and selected demographic characteristics |
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Table 1: Description of data sets and selected demographic characteristics

<table>
<thead>
<tr>
<th></th>
<th>Year of survey</th>
<th>Sample size</th>
<th>Reported Childhood sexual abuse (%)</th>
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<tbody>
<tr>
<td>Ghana</td>
<td>2008</td>
<td>4916</td>
<td>0.8</td>
</tr>
<tr>
<td>Liberia</td>
<td>2007</td>
<td>7062</td>
<td>0.3</td>
</tr>
<tr>
<td>Nigeria</td>
<td>2008</td>
<td>33385</td>
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</tr>
<tr>
<td>Uganda</td>
<td>2006</td>
<td>8531</td>
<td>0.4</td>
</tr>
<tr>
<td>Zambia</td>
<td>2007</td>
<td>7146</td>
<td>4.3</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>2005/06</td>
<td>8907</td>
<td>0.7</td>
</tr>
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</table>

Table 2: Percentage distribution of selected characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Ghana</th>
<th>Liberia</th>
<th>Nigeria</th>
<th>Uganda</th>
<th>Zambia</th>
<th>Zimbabwe</th>
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<tr>
<td></td>
<td>%</td>
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<td>Age</td>
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**OR:** odds ratio, **CI:** confidence interval
Individual and community-level socioeconomic position and its association with adolescents experience of childhood sexual abuse: a multilevel analysis of six countries in Sub-Saharan Africa

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KEY WORDS
Childhood sexual abuse
Sexual violence
Sub-Saharan Africa
Socio-economic status
Neighborhoods
Health survey

Abstract:
Background: Childhood sexual abuse (CSA) is a substantial global health and human rights problem and consequently a growing concern in sub-Saharan Africa. We examined the association between individual and community-level socioeconomic status (SES) and the likelihood of reporting CSA.

Methods: We applied multiple multilevel logistic regression analysis on Demographic and Health Survey data for 6,351 female adolescents between the ages of 15 and 18 years from six countries in sub-Saharan Africa, between 2006 and 2008.

Results: About 70% of the reported cases of CSA were between 14 and 17 years. Zambia had the highest proportion of reported cases of CSA (5.8%). At the individual and community level, we found that there was no association between CSA and socioeconomic position. This study provides evidence that the likelihood of reporting CSA cut across all individual SES as well as all community socioeconomic strata.

Conclusions: We found no evidence of socioeconomic differentials in adolescents’ experience of CSA, suggesting that adolescents from the six countries studied experienced CSA regardless of their individual- and community-level socioeconomic position. However, we found some evidence of geographical clustering, adolescents in the same community are subject to common contextual influences. Further studies are needed to explore possible affects of countries’ political, social, economic, legal, and cultural impact on childhood sexual abuse.

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Introduction

Childhood sexual abuse (CSA) against girls (defined as sexual violence experienced by female children below the age of 18 years) is a substantial global health and human-rights problem and a growing concern in sub-Saharan Africa. The World Health Organisation (WHO) Global School-
based Student Health Survey (SHS) documented the widespread nature of sexual abuse in children, with lifetime prevalence of sexual abuse among students 13-15 years of age in the five countries surveyed, ranging from 9% to 33%. In a review of population based studies, Pereda and colleagues found that 0% to 53% of women reported that they had experienced CSA. CSA is also associated with physical, social and psychological effects on young women. A troubling aspect of CSA is underreporting of cases. In SSA including the six countries in this study, most researchers believe that statistics of CSA under-represent the actual number of victims. The embarrassment, shame or fear of being blamed and a desire to keep the abuse secret make disclosure uncommon. Others stay silent for fear of provoking further violence, or insensitive interventions which could make their overall situation worse.

Individual based socioeconomic position has been documented to be a contributing factor to sexual violence. Higher socioeconomic status (SES) levels among women have generally been found to be protective factors against the risk of sexual violence towards women. In contrast, most studies on CSA are not associated with SES. The risk factors identified for CSA in preadolescents (before 10 years) and early adolescents (10 to 14 years) include having a stepfather, living without a natural parent, having an impaired mother, poor parenting, or witnessing family conflict. Such individual level factors under examination are limited in their scope and do not address how CSA is influenced by wider social structural forces. Recently, community-level factors have been the focus of attention when considering risk factors for violence. The association between area based socioeconomic indicators and health outcomes have been documented in recent studies. Although the mechanisms by which area based SES affects health are not clear, it has been suggested that community SES could influence health behaviours and health related beliefs of their residents, independent of their personal SES.

Strong evidence exists that contextual factors are important in determining levels of sexual violence across groups. Studies from developing and developed countries show that community-level measures of SES have significant effects on the risk of sexual violence. Previous research has focused predominantly on other forms of sexual violence especially intimate partner violence. To date, there are no studies that have investigated the role of socioeconomic indicators and community socioeconomic conditions simultaneously on CSA in sub-Saharan Africa. Understanding social factors such as SES, which are likely fundamental causes of health outcomes, are necessary to help adopt broad-based societal interventions that could produce substantial health benefits. Other factors which can increase the vulnerability to sexual violence (especially due to social, economic and political crises) include wars, political strife, natural and manmade disasters, as they disrupt the formal and informal protection mechanisms of families, communities and the states. However, such factors are not dealt with in this study.

Conceptual Framework

In this study, we drew on the elements of a socio-ecological model to examine the associations between neighbourhood factors and CSA. The socio-ecological model recognizes the interwoven relationship that exists between the individual, relationship, community and societal factors. The model explores the relationship between individual and contextual factors and considers violence as the product of multiple levels of influence on behaviour. The more homogenous the health of people within a neighbourhood is (as compared with the health of people from different neighbourhoods), the more probable it is that the determinants of individual health are directly related to the contextual environment of the neighbourhood and/or that social processes of geographical segregation are taking place. The socio-ecological model has been used extensively to better understand violence and the effect of potential prevention strategies. The benefit of the socio-ecological model lies in its capacity to consider, in a systematic way, the factors that influence health behaviours; in this case those factors that put people at risk of experiencing or perpetrating violence. Community measures of poverty have been found to have the greatest explanatory power among socio-ecological theory variables. Community poverty weakens social network and the capacity to control the behaviour of people and hence increase the likelihood of reporting CSA.

We also adopted the concept of social control theory which postulates that individuals are inherently inclined to become deviant as their ties to the “conventional order” within society becomes or is broken. According to the theory, strong social bond to social institutions promotes conformity to conventional norms, and hence individuals who possess weak or broken social bonds to conventional institutions are more likely to engage in deviant behaviour in this case CSA. According to differential association theory, negative behaviour is learned through interaction with
other deviant individuals and these interactions are formed through social and cultural transmission. Both social control theory and differential association theory show the importance of familial cohesion, parental stressors, and neighbourhood environment in the development of pro-social behaviour in deterring negative behaviour.

To the best of our knowledge, no studies exist that have examined the contributions of individual and contextual factors associated with CSA in sub-Saharan Africa. Thus, the overarching aim of this study was to fill this research gap and contribute to the existing literature on CSA. The specific objectives were (1) to examine individual and contextual factors associated with CSA and (2) to examine whether there is significant community level variation in reported CSA; whether people living in the same community share similar probability of reporting CSA.

Methods

The data reported here were from the Demographic and Health Surveys (DHS) conducted in six countries in sub-Saharan Africa (Ghana, Liberia, Nigeria, Uganda, Zambia and Zimbabwe) between 2006 and 2008. The six countries were chosen because they met the selection criteria of recent surveys during the past 10 years and because of the availability of data sets on sexual violence.

DHS surveys were designed to collect good quality, nationally representative data on demographic and health indicators of women and members of their households. In general, the surveys were well conducted with a high response rate (average of 96%). Methods and data collection procedures have been published elsewhere. Briefly, the survey applied utilised a two-stage cluster sampling design. The first stage involved taking up enumeration areas from Census files while in the second stage, a sample of households was drawn from an updated list of households within each enumeration area. Every survey was stratified by urban and rural status and additionally by country-specific geographic or administrative regions. A standardised questionnaire was administered by interviewers to all the female participants aged between 15 and 49 years in the selected households. To ensure standardisation and comparability across sites and time, DHS surveys employ intense interviewer training, standardised measurement tools and techniques, identical core questionnaires and instrument pretesting. The number of women included in the six DHS ranged from 4,916 in Ghana to 33,885 in Nigeria. The DHS survey was implemented by respective national implementing agencies with technical assistance from ICF Macro International Inc (Calverton, MD).

Outcome Variable

To be included in the analysis, the respondents were required to meet the following two criteria: (1) they must be eighteen years or younger and (2) they must be a permanent resident at the place where the interview was conducted. For this study, CSA was defined as sexual violence on or before the age of 18 years. To assess if participants were sexually abused in childhood, all eligible women were asked the following questions: “At any time in your life, as a child or as an adult, has anyone forced you in any way to have sexual intercourse or perform any other sexual acts?” The two possible outcomes for the questions were “yes” or “no”. Respondents who answered yes were then asked questions about the age at which the abuse first occurred and the identity of the person who committed the act. Respondents who answered yes and in cases where the violence occurred when they were under the age of 18 years, were considered as suitable cases of CSA and coded as “1”, while those who responded no or if the abuse occurred after the age of 18 years, formed the other group of the dichotomy and were coded “0”. All the women who did not answer the question were excluded from the survey.

Determinants Variables

Individual Level Factors

The main independent variables of interests at the individual level were wealth status and level of education. The wealth index was constructed using easy-to-collect data on the household’s ownership of selected assets, such as televisions and cars, dwelling characteristics such as flooring materials, type of drinking water sources, toilet facilities and other characteristics that are related to wealth status. They were then assigned a weight or factor score generated through principal component analysis. The weighted scores were divided into five quintiles for the analytic models (poorest, poorer, middle, richer and richest). The level of education of the participants was categorized into no formal education or educated.

Community-level Factors

Within the DHS, communities were defined as the primary sampling unit (PSU). The PSU was based on the
most recent sampling frame for each country as defined by census enumeration blocks. We included two community level factors: community SES and place of residence. Community SES was an index constructed from three variables using principal component analysis. The variables are the proportion of respondents: with no education (illiterate), unemployed and living below the poverty level (asset index below 20% poorest quintile). A standardised score with mean 0 and standard deviation 1 was generated from this index, which we divided into five quintiles (quintiles 1 to 5). Quintile 5 represented highest SEP while quintile 1 represented lowest SEP. Place of residence was categorised into either rural or urban residence.

Control Variable

Country of residence was also included as a categorical variable. The country was included as a partial control variable to control for the effects of unknown factors due to potential differences across the six countries.

Ethics

The surveys were approved by the ICF Macro’s Ethics Committee, USA and the National Ethics Committee in the Ministry of Health of the respective countries. Informed consent was obtained from participants before the collection of all data.

Statistical Analysis

In the descriptive statistics, frequency tabulations were conducted to describe the distribution of correspondents. The key variables were expressed as percentages. Given the hierarchical structure of the sample and the binary outcome, a logistic multilevel modelling approach was adopted. We specified a two-level model for binary response reporting CSA or not, for adolescents (level 1) living in a community (level 2).

Three models were fitted. In the first model, an empty model, no explanatory variable was included. This model was focused on decomposing total variance into its individual and community components. In the second model, only control variable was included. The third model (full model) included control, individual and neighbourhood variables.

The results of the fixed effect model (measures of association) were expressed as odds ratios (ORs) with 95% confidence intervals (CI). The results of the random-intercept models (measures of variation) were presented as variance partition coefficient (VPC) and proportional change in variance (PCV). The VPC was calculated by the linear threshold (latent variable method) according to the formula used by Snijders as follows:

$$VPC = \frac{V_c}{\frac{V_c + \frac{\sigma^2}{3}}{3}}$$

where $V_c$ = community level variance.

We calculated the PCV as follows:

$$PCV = \left(\frac{V_a - V_b}{V_a}\right) \times 100$$

where $V_a$ = variance of the empty model, and $V_b$ = variance of the model with more terms.

MLwin software, version 2.10 was used for the analysis. The statistical significance of covariates was calculated using Wald’s test. All significance tests were two-sided and statistical significance was defined at 5% level.

Results

Sample Characteristics

The countries, the survey year, and the eligible sample are shown in Figure 1. The number of adolescents who were permanent residents in the area at the time of the survey and thus included in the study was 477 in Ghana and 2,956 in Nigeria. The number of communities sampled ranged from as few as 300 in Liberia to as many as 888 in Nigeria. The percentage of adolescents that had experienced CSA ranged from 1.04% in Liberia to 5.84% in Zambia. The youngest age of exposure to CSA was 5 years old (Figure 2). As shown in Figure 2, the most common age at which respondents experienced CSA was between 14 and 17 years of age, with 70% of the reported cases of CSA occurring at this age group. The descriptive statistics of respondents are presented in Table 1. A total of 6,351 adolescents were analysed in this study. About one-fifth (12%) of the respondents were educated. Almost half of the respondents (46%) were sampled from Nigeria.

Measures of Variability (random intercept models)

The result of the random-intercept model is shown in Table 2. The empty model (null model) shows that there was a significant variation in the odds of reporting CSA across the communities ($\alpha=0.926, p<0.036$. The
intra-community correlation coefficient as implied by the intercept component variance specified that 22% of the variation in CSA could be attributed to the community level factors. As judged by a proportional change in variance, almost half (46%) of the variance in the odds of reporting CSA across communities was explained by country domain variable. After adjusting for all the variables in the full model (Model 3), about 70% of the variance in the odds of reporting CSA across communities was explained by all the variables included. The variations across communities became not statistically significant after controlling for control-variable in Model 2 and all variables in Model 3.
Measures of Associations (fixed effects)

The results of fitting the model including control, individual and community-level variables are also displayed in Table 2. Only country dummies and level education were statistically significantly associated with CSA. Respondents with no education were 64% less likely to have reported CSA than those with formal education (odds ratio [OR] = 0.36, 95% confidence interval [CI] 0.16 to 0.81). Compared with Zambia, residents in the other five countries were less likely to have reported CSA; Ghana (OR 0.19, 95% CI 0.09 to 0.47), Liberia (OR 0.03, 95% CI 0.01 to 0.22), Nigeria (OR 0.43, 95% CI 0.28 to 0.68), Uganda (OR 0.12, 95% CI 0.05 to 0.30) and Zimbabwe (OR 0.17, 95% CI 0.09 to 0.34).

Discussion

The present study examined the way in which individual and community level SES influenced the history of sexual abuse in childhood. The causes of CSA are many and complex, and there are numerous ideas that have been proposed to help understand this phenomenon. Research has focused on the effect of the family, the family environment, poverty, parental stress and other factors on CSA. The present study expands on the current literature in that it examined the way in which SES influenced the history of sexual abuse in childhood. Using the social ecological model, we hypothesised that history of CSA would be associated with community socioeconomic status (SES). The results of the present study corroborates those of previous studies on CSA that found no evidence of association between SES and history of CSA10, 37, 38 and between area of residence (rural/urban) and history of CSA.39, 40 CSA transcends across all SES at the individual level. More importantly, the findings uncover new evidence that risk of CSA cuts across all strata of community socioeconomic context. We found no evidence that CSA was associated with community-level SES. Though, these variables were not statistically significant, it should not imply that they are not important from public health perspective. This suggests that there may be lack of evidence of socioeconomic inequality in the occurrence of CSA, regardless of the household socioeconomic status, children had equal exposure to CSA. One possible explanation could be that we did not have large enough sample size to reach statistically significant level.

Counter intuitively, we found that uneducated women were less likely to have reported CSA. The higher prevalence of abuse reported in educated girls compared to non-educated girls was unexpected. This finding requires further investigations, as high level of education is not a common factor for CSA.37 A possible contributory factor may be the high rate of reported sexual violence in African schools.13 Although, most of the perpetrators of sexual abuse are either family members or those known to the victim, most cases of this maltreatment still takes place either on the way to school, in schools or on the way back from schools.1

Importantly, the results suggest that adolescents living in the same community tended to report CSA. It is possible that adolescents in the same community were subjected to common contextual influences.34 However, the preponderance of the variance was explained by individual, community-level SES. Almost half of the variance in the community was explained by unmeasured country effects. Similarly, variations across communities proved to be not statistically significant after controlling for the effects of unmeasured control factors. This suggests that the likelihood of reported CSA may be due to the unmeasured country-level effects. It is possible that the community-level variance was due to shared social norms. The full model was

---

Table 1: Percentage distribution of selected characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual level</td>
<td></td>
</tr>
<tr>
<td>Educated</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>763 (12.0)</td>
</tr>
<tr>
<td>No</td>
<td>5,588 (88.0)</td>
</tr>
<tr>
<td>Wealth index</td>
<td></td>
</tr>
<tr>
<td>Poorest</td>
<td>1,237 (19.8)</td>
</tr>
<tr>
<td>Poorer</td>
<td>1,313 (20.7)</td>
</tr>
<tr>
<td>Middle</td>
<td>1,410 (22.0)</td>
</tr>
<tr>
<td>Richer</td>
<td>1,315 (20.7)</td>
</tr>
<tr>
<td>Richest</td>
<td>1,056 (16.6)</td>
</tr>
<tr>
<td>Community Level</td>
<td></td>
</tr>
<tr>
<td>Place of residence</td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>4,481 (70.6)</td>
</tr>
<tr>
<td>Rural</td>
<td>1,870 (29.4)</td>
</tr>
<tr>
<td>Community SES</td>
<td></td>
</tr>
<tr>
<td>Quintile 1</td>
<td>1,569 (24.7)</td>
</tr>
<tr>
<td>Quintile 2</td>
<td>1,451 (22.8)</td>
</tr>
<tr>
<td>Quintile 3</td>
<td>1,229 (19.4)</td>
</tr>
<tr>
<td>Quintile 4</td>
<td>1,081 (17.0)</td>
</tr>
<tr>
<td>Quintile 5</td>
<td>1,021 (16.1)</td>
</tr>
</tbody>
</table>
able to explain most of the observed variations. The findings have important implications for targeting policy as well as the exploration of factors not included in the model that could explain the remaining unexplained variation.

Although this study used socio ecological framework to examine how individual and community level SES influence CSA, it is important to highlight concerns with reporting CSA. Children born to victims of CSA are at increased risks of being risks themselves. Because these children live in a violent environment, they are at risks either at the hands of their own caregivers or from the deleterious consequences of having a caregiver who suffers from the emotional, psychiatric or physical sequelae of her own childhood abuse. Ayala and colleagues also points out that domestic violence increases the probability of sexual abuse within the family. The abuse of such children in the hands of their parents has been linked to either the parents being neglectful or through recreation of environmental conditions in which abuse was allowed to persist across generations. Such situation has led to the notion that abusing parents were themselves abused and that abused and neglected children would become tomorrow’s perpetra-

Table 2: Fixed- and random-intercept parts of multilevel logistic regression of childhood sexual abuse

<table>
<thead>
<tr>
<th>Measures of association</th>
<th>OR (95% CI)</th>
<th>OR (95% CI)</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1a</td>
<td>Model 2b</td>
<td>Model 3c</td>
</tr>
<tr>
<td>Control-variable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Country</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ghana</td>
<td>0.20 (0.08 – 0.48)***</td>
<td>0.20 (0.08 – 0.47)***</td>
<td>0.20 (0.08 – 0.47)***</td>
</tr>
<tr>
<td>Liberia</td>
<td>0.03 (0.01 - 0.20)***</td>
<td>0.03 (0.01 - 0.22)***</td>
<td>0.03 (0.01 - 0.22)***</td>
</tr>
<tr>
<td>Nigeria</td>
<td>0.40 (0.26 - 0.62)***</td>
<td>0.43 (0.28 - 0.68)***</td>
<td>0.43 (0.28 - 0.68)***</td>
</tr>
<tr>
<td>Uganda</td>
<td>0.13 (0.05 - 0.32)***</td>
<td>0.12 (0.05 - 0.30)***</td>
<td>0.12 (0.05 - 0.30)***</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>0.19 (0.10 - 0.36)***</td>
<td>0.17 (0.09 - 0.34)***</td>
<td>0.17 (0.09 - 0.34)***</td>
</tr>
<tr>
<td>Individual-level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No education</td>
<td>0.36 (0.16 – 0.81)†</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wealth index</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poorest</td>
<td>1.06 (0.46 – 2.44)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poorer</td>
<td>0.84 (0.39 – 1.79)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Middle</td>
<td>0.83 (0.42 – 1.67)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Richer</td>
<td>0.88 (0.46 – 1.65)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Richest</td>
<td>1 [reference]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community-level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban (vs. rural)</td>
<td>0.67 (0.40 – 1.15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community SES*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quintile 1 (least)</td>
<td>1 [reference]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quintile 2</td>
<td>0.96 (0.56 – 1.64)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quintile 3</td>
<td>1.05 (0.59 – 1.87)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quintile 4</td>
<td>1.20 (0.62 – 2.30)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quintile 5 (most)</td>
<td>1.04 (0.46 – 2.33)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measures of variation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community-level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variance (SE)</td>
<td>0.926 (0.442)†</td>
<td>0.505 (0.370)</td>
<td>0.274 (0.345)</td>
</tr>
<tr>
<td>ICC (%)</td>
<td>21.9</td>
<td>13.3</td>
<td>7.7</td>
</tr>
<tr>
<td>Explained variation (%)</td>
<td>45.5</td>
<td>45.5</td>
<td>70.4</td>
</tr>
</tbody>
</table>

Abbreviations: OR = odds ratio, CI = confidence intervals, SE- standard error, ICC = intra-community correlation

*Model 1 = Empty model – no explanatory variables
*Model 2 = Adjusted for control variable (country as a fixed-effect)
*Model 3 = Adjusted for control-, individual- and community-level factors
*Community-SES = community socioeconomic disadvantages, quintile 1 = least disadvantaged, quintile 5 = most disadvantaged

tors of family violence. A vast proportion of sexual violence takes place within the victim’s immediate environment with majority of the perpetrators known to the victims but yet are not reported. Most sexually abused children do not tell anyone they were abused, even when directly asked by parents or other authority figures. The stigma associated with being a victim of sexual assault makes it difficult for victims or even their parents to report suspected cases. Within a family, cases of CSA may go unreported by a spouse to avoid marital separation, divorce, loss of friends, loss of job and loss of income. The secrecy and collusion within the family serves as a barrier for any family member to report the abuse. In addition to this, there are strong norms against informing on one’s family members.

Study Limitations and Strengths

Despite the contribution our study makes to the existing literature on neighbourhood effects, we are aware of certain limitations. Primarily, the variables available were restricted because the data from this study was drawn from national surveys. Although we were able to construct CSA variable and utilise some socio-demographic factors, other predictors of CSA such as family stability and marital conflict, parenting and parent-child relationships and parental adjustment were not available in the survey and so could not be included in the analysis. Further, some of these variables might have explained some associations between community and CSA. In addition, almost all of the samples included in the model were from Nigeria. It is possible that the associations may be influenced by the large number of adolescents from Nigeria. However, we found that not only Nigeria’s country dummy was associated with the likelihood of reporting CSA. As this is a cross sectional study, it is difficult to assess the direction of causality from its findings. Data was collected through self-report and because of the sensitive nature of the questions being asked, there is the likelihood that some respondents might not have disclosed their past experience(s). Therefore, it is unlikely that an exact account of the exposure to the CSA will be available. It is also feasible that the cases of CSA are underreported because of the stigma associated with sexual violence. Finally, our survey does not have data on household income. We utilised asset-based wealth index which is a proxy indicator of household economic status.

Despite these limitations, the strengths of the study are important. To the best of our knowledge, this is one of the first studies to examine the association between community SES and CSA applying a multilevel approach. It is also a large, population based study from six countries in sub-Saharan Africa with high response rates. It is a nationally representative sample with similar indicators used across regions and countries, making it possible for numerical values to be compared across the sites. More so, the data obtained from DHS was widely perceived to be of high quality based on sound sampling methodology and adherence to ethical standards of data collection including violence data. About 70% of the community variations in the reported CSA were accounted for by individual and community contextual characteristics, signifying that the models were effective in predicting the risk of CSA. Similarly, we were able to limit and avoid cohort effect and recall bias. We included only adolescents in the model. By including only respondents aged 18 or younger, we were able to improve timeliness of information gathering, such that the interval between the event (CSA) and the interview (the recall period) is as short as possible, thus reducing non-differential recall bias. Similarly, by including only permanent residents at the time of the interview, we were able to prevent cohort effect - that is, variations in the characteristics of the community over time among respondents who are defined by some common life experience or shared temporal experience.

Conclusion

This study provides evidence that likelihood of reporting CSA cuts across all individual SES as well as all community socioeconomic strata. Adolescents in the same community may be subjected to common contextual influences. Further studies are needed to explore possible effects of countries’ political, social, economic, legal and cultural factors on CSA.

Acknowledgments

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Funding: None

Competing interests: The authors declare that they have no competing interests.

Ethical approval: The surveys were approved by the ICF Macro’s Ethics Committee, USA and the National Ethics Committee in the Ministry of Health of the respective countries. Informed consent was obtained from participants before the collection of all data.
References


Social disorganization and history of child sexual abuse against girls in sub-Saharan Africa: a multilevel analysis

Ismail Yahaya1,2,3*, Olalekan A Uthman4,5, Joaquim Soares1,6 and Gloria Macassa1,6,7

Abstract

Background: Child sexual abuse (CSA) is a considerable public health problem. Less focus has been paid to the role of community-level factors associated with CSA. The aim of this study was to examine the association between neighbourhood-level measures of social disorganization and CSA.

Methods: We applied multiple multilevel logistic regression analysis on Demographic and Health Survey data for 6,351 adolescents from six countries in sub-Saharan Africa between 2006 and 2008.

Results: The percentage of adolescents that had experienced CSA ranged from 1.04% to 5.84%. There was a significant variation in the odds of reporting CSA across the communities, suggesting 18% of the variation in CSA could be attributed to community level factors. Respondents currently employed were more likely to have reported CSA than those who were unemployed (odds ratio [OR] = 2.05, 95% confidence interval [CI] 1.48 to 2.83). Respondents from communities with a high family disruption rate were 57% more likely to have reported CSA (OR=1.57, 95% CI 1.14 to 2.16).

Conclusion: We found that exposure to CSA was associated with high community level of family disruption, thus suggesting that neighbourhoods may indeed have significant important effects on exposure to CSA. Further studies are needed to explore pathways that connect the individual and neighbourhood levels, that is, means through which deleterious neighbourhood effects are transmitted to individuals.

Keywords: Childhood sexual abuse, Sub-Saharan Africa, Socio-demographic factors, Demographic and health survey, Neighborhood, Social disorganization

Background

Numerous studies from Africa and the rest of the world had shown that child sexual abuse (CSA) is a considerable public health problem [1]. However, until recently little attention has been paid to CSA in sub-Saharan Africa (SSA). Most of the peer-reviewed research on the sexual abuse of children in SSA is largely confined to the Republic of South Africa [2] while other reported studies in SSA are in the context of school. The current data on Africa from the World Health Organization Global School-based Student Health Survey estimated lifetime prevalence of sexual abuse among primary students aged between 13–15 years in the five countries surveyed in SSA to range from 9% to 33% [3]. In a cross study comparison of prevalence of CSA in South Africa, between 3.2% and 7.1% of all respondents report experiencing unwanted or forced sexual intercourse as a child [2]. In Swaziland, the prevalence of sexual violence before 18 years of age was 33.2% among participants aged 13–24 years [1]. While the understanding of the burden of sexual abuse in children and its relationship with adverse health behaviour has increased globally, such studies in children are nonexistent in Africa. In addition, the nature and causes of CSA is complicated due to many factors, including sexual behaviours.
When dealing with sexual behaviours, it is widely believed that focusing on individual levels ignores the broader social context within which sexual behaviour occurs. Previous studies that have investigated factors affecting CSA in SSA were based solely on the assessment of the impact of individual level variables [4-10]. However, other violence research has indicated the importance of community level factors as well as measures of social disorganization and experience of sexual violence [11]. It is important to examine whether this relationship is applicable to CSA. Thus, this study draws upon social disorganization theory [12] to examine and better understand community characteristics that may predict CSA. Although originally concerned with community conditions like delinquency and crime, social disorganization theory offers potentially important insights concerning how the characteristics of communities might be related to sexual violence. This study relies on a framework centred on the social disorganization theory (or model) to investigate the impact of neighborhood level factors on childhood sexual abuse. The framework conceptualises CSA as a multifaceted phenomenon based on interplay of individual, family, community and societal factors. In addition, the model takes into account measures of social disorganization and their role in influencing CSA.

Social disorganization identifies neighborhood poverty, residential instability, family disruption, population density and proximity to urban areas as key structural factors that diminish community-level self-regulatory capacity [12]. The social disorganization thesis argues that communities with strong informal social networks are able to monitor and regulate sexual violent behavior [13]. Consequently, structural factors that increase the complexity of community social organization and undermine informal social networks enhance the range of sexual violent behaviours pursued by residents [14,15]. Poverty reduces the resources necessary to sustain basic institutions like the family and organizations in neighbourhoods [16]. Social disorganization theory hypothesizes that the disruptive effects of immigration, industrialisation and urbanisation lead to changes in the social structure of neighbourhoods via ethnic diversity, residential instability and neighbourhood poverty. The resulting structural changes diminish the social cohesion of neighbourhoods and reduce the power of the social norm and the informal social control required to regulate deviant behavior. This can result in CSA. The theory proposed that high ethnic diversity gives rise to social isolation [17]. This in turn leads to structural barriers and cultural adaptations that undermine social organization. Shaw and McKay [12] also traced social disorganization to conditions endemic to the urban areas that were the only places the newly arriving poor could afford to live, resulting in a high rate of turnover in the population (residential instability). These high levels of residential turnover can disrupt existing social networks. Urbanisation has been found to be negatively associated with the coherency of the normative environment [18]. Increasing urbanisation may give rise to an environment facilitating higher levels of sexual violent activity by creating greater anonymity with minimal risk of being "found out" [18]. Non-traditional family structures, such as female-headed (matriarchal) households for example, have been linked to social disorganization. Social disorganization has received support from research conducted on extramarital sexual activity of Zambian men [13]. Research on extra-marital sex is supported by Bishai and colleagues [14] who found Ugandan men in ethnically heterogeneous communities to be more likely to report such activities.

To the best of our knowledge, there has been no multilevel study performed to date that examined the association between community-level measures of social disorganization and experience of CSA in the context of SSA.

Thus, the aim of this study is to answer the following research questions:

1. Do neighbourhoods and countries differ in terms of the risks of CSA?
2. Are neighbourhood-level measures of social disorganization associated with self-reported CSA after adjustment for individual-level variables?

Methods
The study used data from the Demographic and Health Surveys (DHS) conducted in six countries in sub-Saharan Africa (Ghana, Liberia, Nigeria, Uganda, Zambia and Zimbabwe) between 2006 and 2008. The six countries were chosen because they met the selection criteria of recent surveys during the past 10 years and the availability of data sets on sexual violence. DHS surveys were designed to collect good quality, nationally representative data on demographic and health indicators of women and members of their households. They are usually well conducted with a high response rate (average of 96%). Methods and data collection procedures have been published elsewhere [19]. Briefly, the survey utilised a two-stage cluster sampling design. The first stage involved taking up enumeration areas from census files while in the second stage, a sample of households is drawn from a current and an updated list of households within each enumeration area. Every survey is stratified by urban and rural status and additionally by country-specific geographic or administrative regions. A standardised questionnaire was administered by interviewers to all female participants aged between 15 and 49 years in the selected
households. To ensure standardisation and comparability across sites and time, DHS surveys employ intense interviewer training, standardised measurement tools and techniques, an identical core questionnaire and instrument pretesting [20]. The number of women included in the six DHS surveys ranged from 4,916 in Ghana to 33,885 in Nigeria. The DHS survey was implemented by respective national implementing agencies with technical assistance from ICF Macro International Inc (Calverton, MD).

**Outcome variable**
To be included in the analysis, the respondents were required to meet the following two criteria: The respondents must be 18 years or younger and must be principal resident at the place where the survey interview was conducted. Furthermore, for this study, CSA was defined as sexual violence on or before the age of 18 years. To assess if participants were sexually abused in childhood, all eligible women were asked the following questions: “At any time in your life, as a child or as an adult, has anyone forced you in any way to have sexual intercourse or perform any other sexual acts?” The two possible outcomes for the questions were “yes” or “no”. Respondents who said yes were then asked questions about the age at which this first happened and the person who committed the act. Respondents who gave an affirmative reply and if the violence occurred when they were under the age of 18 years, were considered as cases of CSA and coded as “1” while those who gave a negative response or if the abuse occurred after the age of 18 years, formed the other group of the dichotomy and were coded “0”. All the women who did not respond to the question were excluded.

**Independent level factors**

**Individual level factors**
The following individual-level factors were included: education (no education, primary, secondary or higher); marital status (never married, currently married and formerly married) and occupation (working or not working). DHS did not collect direct information on household income and expenditure. We used DHS wealth index as a proxy indicator for socioeconomic position. The methods used in calculating DHS wealth index have been described elsewhere [21-23]. Briefly, an index of economic status for each household was constructed using principal components analysis based on the following household variables: number of rooms per house, ownership of car, motorcycle, bicycle, fridge, television and telephone as well as any kind of heating device. From these criteria the DHS wealth index quintiles (poorest, poor, middle, rich, and richest) were calculated and used in the subsequent modelling.

**Community-level factors**

1. **Neighbourhood poverty**: percentage of households below 20% of wealth index [24].
2. **Female-headed households (family disruption)**, expressed as percentages of households headed by a female in an area. 
3. **Residential mobility/instability** was defined as the proportion of households occupied by persons who had moved from another dwelling during the previous 5 years [25,26].
4. **Place of residence** was defined as either urban or rural, as administratively defined by each country. 
5. **Population density (average household size)** was operationalised as the median household size in a community. 
6. **Ethnic diversity** - an index of ethnic diversity was created using a formula (equation 1) that captures both the number of different groups in an area and the relative representation of each group (23):

\[
\text{Ethnic diversity index} = 1 - \sum_{i=1}^{n} \left( \frac{x_i}{y_i} \right)^2 \tag{1}
\]

where:

- \( x_i \) = population of ethnic group \( i \) of the area,
- \( y \) = total population of the area,
- \( n \) = number of ethnic groups in the area

Scores can range from 0 to approximately 1. For clarity of interpretation, each diversity index is multiplied by 100; the larger the index, the greater diversity there is in the area. If an area’s entire population belongs to one ethnic group, then an area has zero diversity. An area’s diversity index increases to 100 when the population is evenly divided into ethnic groups.

Country of residence was also included as a categorical variable. The country was included as a partial control variable to control for effects of unknown factors due to potential differences across the six countries.

**Ethics**
This study was based on an analysis of existing survey data with all identifier information removed. The survey was approved by the Ethics Committee of the ICF Macro at Calverton in the USA and by the National Ethics Committees in their respective countries. All study participants gave informed consent before participation and all information was collected confidentially.

**Statistical analyses**

**Descriptive analyses**
In the descriptive statistics the distribution of respondents by key variables were expressed as percentages.
We used unadjusted logistic regression analyses to investigate the bivariate association between each variable and CSA.

**Modelling approaches**

We specified a 2-level multilevel model for binary outcome \( y_i \), reporting childhood sexual abuse or not, for adolescents \( i \) (at level 1) living in a community \( j \) (at level 2) of form:

\[
\pi_{ij} \sim \text{Bernoulli}(1, n_i)
\]

The probability of reporting CSA was related to a set of categorical predictor \( X \) and a random effect for each level by a logit-link function as:

\[
\text{logit}(\pi_{ij}) = \log \left( \frac{\pi_{ij}}{1 - \pi_{ij}} \right) = \beta_0 + \beta_1 X_{ij} + \beta_2 X_j + \mu_0_j
\]

The linear predictor on the right-hand side of the equation consisted of a fixed part \( (\beta_0 + \beta_1 X_{ij} + \beta_2 X_j) \) estimating the conditional coefficients for the exposure variables and one random intercepts attributable to neighbourhoods \( (\mu_0_j) \) assumed to have an independent and identical distribution and variance estimated at each level. We constructed two models. The first model, an empty or unconditional model without any exposure variables, was specified to decompose the amount of variance that existed between community levels. The second (full) model controlled for all the variables simultaneously.

**Fixed effects (measures of association)**

The results of fixed effects (measures of association) were shown as odds ratios (ORs) with their 95% confidence intervals (CIs).

**Random effects (measures of variation)**

The similarity between adolescents in the same community was measured using intra-community correlation (ICC). The ICC represents the percentage of the total variance in the probability of reporting CSA that is related to the area level, i.e., measure of clustering of odds of reporting CSA in the areas. The ICC was calculated by the linear threshold (latent variable method) according to the formula used by Snijders and Boskers Bosker [27]:

\[
\text{ICC} = \frac{\sigma^2_{\mu_0}}{\sigma^2_{\mu_0} + \pi^2 / 3}
\]

where \( \sigma^2_{\mu_0} \) is neighbourhood (area) variance. A high ICC in the empty model indicates high clustering CSA in the area and thus suggesting a strong area effect on CSA. A low ICC, on the other hand, expresses the existence of a weak area influence on CSA.

**Model fit and specifications**

Regression diagnostics were used to judge the goodness-of-fit of the model. They included the tolerance test for multicollinearity, its reciprocal variance inflation factors (VIF) [28,29], presence of outliers and estimates of adjusted R square of the regression model. The largest VIF

![Figure 1 Description of demographic and health surveys data 2006-2008 in Sub-Saharan Africa by country, survey year, sample size, eligible sample and reported childhood sexual abuse (CSA).](image-url)
greater than 10 or the mean VIF greater than 6, represent severe multicollinearity [30]. Regression estimates were calculated by means of the reweighted iterative generalised least square algorithm using MLwiN 2.20 [31]. In the multilevel logistic regression models, second order penalized quasi-likelihood estimation was used [32]. The statistical significance of covariates was calculated using the Wald test [31]. All significance tests were two-tailed and statistical significance was defined at the 5% alpha level.

Results
Sample characteristics
The countries, survey year and eligible samples are shown in Figure 1. The surveys were conducted between 2006 and 2008. The number of adolescents (18 years or younger) included in the study who were permanent residence of the place at the time of the survey ranged from 477 in Ghana and 2,956 in Nigeria. The number of communities sampled ranged from as few as 300 in Liberia to as many as 888 in Nigeria. The percentage of adolescents that had experienced CSA ranged from 1.04% in Liberia to 5.84% in Zambia. Table 1 shows the characteristics of the covariates and association with CSA. Almost half (47%) of the respondents included in the final pooled sample were from Nigeria. Most of the adolescents were not married (88%); had secondary or higher education (56%), and not working (68%). There was significant association between CSA, marital status, occupation and education, but not with wealth status. The test of overall differences in prevalence of reported CSA among the six countries showed that the differential in reported CSA across the countries was statistically significant (chi-squared test [degree of freedom 5] =45.2, p=0.0001).

Measures of variability (random intercept models)
The result of the random-intercept model is shown in Table 2. The empty model (null model) shows that there was a significant variation in the odds of reporting CSA across the communities (area variance $\sigma^2 = 0.74$, Table 1 Summary statistics and unadjusted odds ratios of the association between CSA and socioeconomic factors

<table>
<thead>
<tr>
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<th>p-value</th>
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<td>1.96 (1.21, 3.20)</td>
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<td>2.52 (1.63, 3.88)</td>
<td>0.001</td>
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<tr>
<td>Zambia</td>
<td>531 (8.4)</td>
<td>2.12 (1.48, 3.04)</td>
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<td>Primary</td>
<td>2053 (32.3)</td>
<td>3.28 (1.57, 6.86)</td>
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<td>Working</td>
<td>1900 (31.8)</td>
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<td>Wealth status</td>
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<tr>
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<td>1257 (19.8)</td>
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<tr>
<td>Poorer</td>
<td>1313 (20.7)</td>
<td>0.78 (0.52, 1.18)</td>
<td>0.245</td>
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<tr>
<td>Middle</td>
<td>1410 (22.2)</td>
<td>0.67 (0.44, 1.03)</td>
<td>0.067</td>
</tr>
<tr>
<td>Richer</td>
<td>1315 (20.7)</td>
<td>0.72 (0.47, 1.10)</td>
<td>0.134</td>
</tr>
<tr>
<td>Richest</td>
<td>1056 (16.6)</td>
<td>0.52 (0.32, 0.87)</td>
<td>0.012</td>
</tr>
</tbody>
</table>

Percentages may not add up to 100% because of missing values.
The intra-community correlation coefficient, implied by the intercept component variance, specified that 18% of the variation in CSA could be attributed to the community level factors. After adjusting for all the variables in the full model (Model 2), more than half (54%) of the variance in the odds of reporting CSA across communities was explained by all the variables included. The variations across communities became not statistically significant after controlling for other variables in the full model.

Measures of associations (fixed effects)
The results of fitting the model including individual- and community-level social disorganization and CSA in sub-Saharan Africa. Our results suggest that the level of family disruption in the community is associated with exposure to CSA. The associations between CSA and other measures of social disorganization were not statistically significant after adjusting for individual level factors.

Discussion
To the best our knowledge, this is the first study that examined the association between both individual-level and community-level social disorganization and CSA in sub-Saharan Africa. Our results suggest that the level of family disruption in the community is associated with exposure to CSA. The associations between CSA and other measures of social disorganization were not statistically significant after adjusting for individual level factors. Our findings are consistent with previous research carried out elsewhere, outside Africa, which had examined the association between CSA and family disruption [33-36]. There is a growing body of literature that suggests that children who experience multiple transitions in family structure may experience worse development and health outcomes compared to children raised in stable two-parent families and perhaps even worse than children raised in stable, single-parent families [34].

Table 2 Fixed- and random-intercept parts of multilevel logistic regression of childhood sexual abuse

<table>
<thead>
<tr>
<th>Measures of association</th>
<th>Empty model&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Full model&lt;sup&gt;b&lt;/sup&gt;</th>
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<tr>
<td>Country</td>
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<td>0.45 (0.16, 1.33)</td>
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<td>Ghana</td>
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<td>Zimbabwe</td>
<td>1.71 (1.14, 2.57)</td>
<td>0.009</td>
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<td>Zambia</td>
<td>2.48 (1.53, 4.02)</td>
<td>0.001</td>
</tr>
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<td></td>
<td></td>
</tr>
<tr>
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<td>1 (reference)</td>
<td></td>
</tr>
<tr>
<td>Currently married</td>
<td>2.03 (1.29, 3.19)</td>
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</tr>
<tr>
<td>Formerly married</td>
<td>3.97 (2.55, 6.24)</td>
<td>0.001</td>
</tr>
<tr>
<td>Education</td>
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<td></td>
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<tr>
<td>No education</td>
<td>0.16 (0.07, 0.39)</td>
<td>0.001</td>
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<td>Primary</td>
<td>0.84 (0.58, 1.21)</td>
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<tr>
<td>Working</td>
<td>2.05 (1.48, 2.83)</td>
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<td>Poorest</td>
<td>1.50 (0.70, 2.32)</td>
<td>0.297</td>
</tr>
<tr>
<td>Poorer</td>
<td>1.00 (0.51, 1.96)</td>
<td>0.998</td>
</tr>
<tr>
<td>Middle</td>
<td>0.82 (0.44, 1.55)</td>
<td>0.548</td>
</tr>
<tr>
<td>Richer</td>
<td>1.07 (0.61, 1.90)</td>
<td>0.807</td>
</tr>
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<td>Richest</td>
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<tr>
<td>Community-level</td>
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<tr>
<td>Average household size</td>
<td>0.94 (0.88, 1.01)</td>
<td>0.091</td>
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<tr>
<td>Ethnic diversity</td>
<td>0.90 (0.57, 1.40)</td>
<td>0.629</td>
</tr>
<tr>
<td>Poverty rate</td>
<td>0.96 (0.61, 1.51)</td>
<td>0.861</td>
</tr>
<tr>
<td>Family disruption</td>
<td>1.57 (1.14, 2.16)</td>
<td>0.006</td>
</tr>
<tr>
<td>Urban (versus rural)</td>
<td>0.82 (0.51, 1.32)</td>
<td>0.413</td>
</tr>
<tr>
<td>Residential instability</td>
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<tr>
<td>Community-level</td>
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<td></td>
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<tr>
<td>Variance (SE)</td>
<td>0.74 (0.31)</td>
<td>0.33 (0.27)</td>
</tr>
<tr>
<td>ICC (%)</td>
<td>18.3</td>
<td>9.1</td>
</tr>
<tr>
<td>Explained variation (%)</td>
<td>Reference</td>
<td>54.1</td>
</tr>
</tbody>
</table>

<sup>a</sup>Empty model – no explanatory variables.

<sup>b</sup>Full model 2 – Adjusted for control-, individual- and community-level factors.

Abbreviations: OR odds ratio, CI confidence intervals, SE standard error.

ICC intra-community correlation.
Results of this study suggests that family instability, especially family disruption (as a measure of community social disorganization) affects children as much as (or even more than) changes in family structure [34]. Unlike most previous studies that examined factors associated with CSA, we found evidence of significant geographical clustering in exposure to CSA. Respondents from the same area may be more similar to each other in relation to their exposure to CSA than to people from other areas [37]. Respondents living in the same neighbourhood tend to have similar exposure to CSA, which may be in part because people in the same neighbourhood are prone to common contextual influences.

This study has some caveats: Firstly, the cross-sectional nature of the data limits our ability to draw causal inferences. Secondly, the communities used in the analyses were administrative boundaries, which may not adequately capture the social context important for individual exposure to CSA. However, due to high community-level variance observed, the communities used seem to be appropriate to capture social context. DHS collects sexual violence data from females only. It would have been better if data for male victims were also available to enable comparisons between the two groups. Finally, we used self-reported measures, though the reliability and validity of this instrument is yet to be established. Despite these limitations, the strengths of the study are significant. It is a large, population-based study with national coverage from six countries with high response rates. The DHS have some important advantages when compared with other surveys. They are often nationally representative, allowing for conclusions that cover the entire nation. In addition, the same variable is operationalised in the same way and thereby making it possible for numerical values to be comparable across countries.

Conclusion
This study found that exposure to CSA is associated with high community level of family disruption, suggesting that neighbourhoods may indeed have important effects on exposure to CSA. Further studies are needed to investigate the pathways through which neighbourhood factors interact with individual factors to influence CSA. A better understanding of the mechanisms involved might be important for designing public health interventions aimed at reducing CSA in Sub-Saharan Africa.

Acknowledgements
The data used in this study were obtained from MEASURE DHS Archive and they were originally collected by the ICF Macro, Calvnton USA. We will like to thank ICF Macro for allowing us to make use of the data.

Authors' contributions
IF and GM were involved in the conception of the study. IF and OU set up the statistical analysis under the supervision of GM and JS. IF was involved in the drafting of the manuscripts with contributions from all the authors. All authors revised for content and style, and all have read and approved the final manuscript.

Competing interests
The authors declare that they have no competing interests.

References

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Childhood sexual abuse among girls and determinants of sexual risk behaviours in adult life in sub-Saharan Africa

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Acknowledgements: Conflict of interest statement. The authors declare that they have no conflict of interest.
Abstract

Purpose – To assess the relationship between child sexual abuse and sexual risk behaviours as well as its potential mediators.

Design – This dataset was obtained from 12,800 women between 15 and 49 years of age during the 2008 Nigerian Demographic and Health Survey. Structural equation modelling (SEM) was applied to assess the association between childhood sexual abuse (CSA) and sexual risk behaviours.

Findings – We found that CSA was directly associated with sexual risk behaviours. In addition, the association between CSA and sexual risk behaviour was also mediated by alcohol and cigarette use.

Research implication – The results show that being abused in childhood is important for the subsequent development of sexual risk behaviours in adulthood and the association is mediated by alcohol and cigarette use.

Research limitations – Only few variables were available to be used as potential mediational factors.

Social implications – These findings suggest that to reduce sexual risks, interventions to address sexual abuse needs to include other social problems (smoking, alcohol) that victims result to in order to cope with the trauma of the abuse.

Originality/value – the current study is the only one so far in Sub-Saharan Africa to have explored the relation between CSA and sexual risk behaviours using SEM.

Key words: alcohol, childhood sexual abuse, sexual risk behaviours, smoking, structural equation modelling, sub-Saharan Africa,
BACKGROUND

Childhood sexual abuse (CSA) of girls is a public health problem and an issue of great concern in sub-Saharan Africa (SSA). The World Health Organisation (WHO) Global School-based Student Survey conducted in SSA estimates the prevalence of CSA to be between 9% to 33% (Brown et al. 2009). CSA is predominantly more common among the female sex than their male counterparts and the perpetrators of this crime are usually men of an older age group (Lalor 2004). There has been well documented negative sequelae of CSA, which ranges from drug abuse, physical abuse, mental health problems, difficulties with sexual relationships and engaging in sexual risk behaviours (Browne & Finkelhor 1986; Dinwiddie et al. 2000; Fergusson et al. 1996; Fergusson et al. 1997; Peltzer et al. 2013; Senn et al. 2008). A growing number of studies indicate that those who were sexually abused in childhood often engage in behaviours (earlier age of first consensual sex, engaged in commercial sex work, higher numbers of sexual partners, unprotected sex) that carry risk for HIV and other sexually transmitted diseases (STDs) (Arriola et al. 2005; Browne & Finkelhor 1986; Thompson et al. 1997; Wyatt 1988; Zierler et al. 1991). Sexual risk behaviours lead to more problems in life, ranging from STDs including human immunodeficiency virus (HIV), infertility, and breakdown of marital homes. Knowledge of the magnitude of such problems is indeed essential for its prevention. The spread/prevention of STDs depends on an individual's assessment of the risk of infection and the subsequent judgement of whether that risk should influence sexual behaviour. To reduce the risks of STDs including HIV and its burden, it is essential that effective preventive strategies are adopted. Such measures are practical when there is an understanding of conditions such as CSA, which can either directly or indirectly influence conditions or behaviours that will increase high sexual risk behaviours.
Evidence suggests that adult sexual behaviour is influenced and predicted by the experiences during childhood and adolescent sexual development (Purcell et al. 2008). While CSA may be considered as one of many childhood and adolescent experiences that influence adult sexual behaviour, it can nonetheless precipitate rapid sexual development (Purcell et al. 2008). Miller and colleagues (Miller 1999) attributed the relationship between CSA and sexual risk behaviours to three things: the initiation of and/or increasing reliance on drug use as a method of coping with sexual abuse experience, problems with sexual adjustment that may be related to sexual risk taking, and psychopathology, which may increase the likelihood of the individual participating in sexual risk behaviours.

Of all the studies that had looked at the relationship between CSA and sexual risk behaviours, few have looked at the risky behaviours among girls from SSA (Peltzer et al. 2013; Richter et al. 2013). In addition, none of the studies in SSA have looked at the effect of mediators. Therefore, this study aims to assess the relationship between child sexual abuse and sexual risk behaviour as well as potential mediators.

Our hypotheses are as follows: (a) Women with a history of CSA will report cigarette and alcohol use; (b) Women with a history of CSA will report engaging in sexual risk behaviours, including lack of condom use with non-spousal partners, engage in extra-marital sex and have higher rates of sexually transmitted diseases and that (c) The association between history of CSA and sexual risk behaviours will be mediated by alcohol and cigarettes.
METHODS

Setting
Nigeria is located in West Africa and is bordered in the north by Niger, in the south by the Atlantic Ocean, in the west by the Republic of Benin and in the east by Cameroon. Nigeria has a total area of 923,768 square kilometres (km). It has a population of 168,833,776 according to the latest World Bank data, making it the most populous country in Africa (The World Bank Group 2013). The population is distributed as 48.3% urban and 51.7% rural and a population density of 180 people per km². Nigeria has over 500 ethnic groups with the three main ethnic groups being Hausa/Fulani, Yoruba and Igbo.

The estimated prevalence of HIV among adults between the ages of 15 and 49 years in Nigeria was 3.1% in 2012 (UNAIDS 2013), and it varies greatly by geo-political zone. Of the 25 million people with HIV in SSA, Nigeria accounts for 3.4 million (UNAIDS 2013). This makes Nigeria the second highest burden of HIV and AIDS in the world after South Africa. Females account for 1.3% of young people aged 15 to 24 living with HIV while 0.7% are male. Sexual intercourse remains the most common mode of HIV transmission.

Study design
The study is a cross-sectional design and uses data from the 2008 Nigerian Demographic and Health Survey (DHS). DHS surveys are usually well conducted with a high response rate. They are designed to collect good quality, nationally representative data on demographic and health indicators of women and members of their households in countries lacking good register data. Methods and data collection procedures have been published elsewhere (MEASURE DHS 2012). This survey used a two-stage cluster sampling design. Administratively, Nigeria is divided into 36 states and the federal capital Abuja, with each state subdivided into local government areas (LGAs). Each of the LGAs is further divided into localities. In addition, each of the localities was further divided into convenient areas.
called census enumeration areas (EAs) during the Nigerian population census in 2006. The primary sampling unit (PSU), a cluster, for the 2008 NDHS is defined on the basis of the EAs from the 2006 EA’s census frame. The sample was selected using a stratified two-stage cluster design consisting of 888 clusters, 286 in the urban and 602 in the rural areas.

The first stage involved selecting 888 clusters, otherwise known as primary sampling units. The second stage involved sampling of households from an updated list of households within each enumeration area. Within each state, the number of households was distributed proportionately among its urban and rural areas. A female participant (aged between 15-49 years) is randomly selected for the violence module. A standardised questionnaire was administered by interviewers to all female participants aged between 15 and 49 years in the selected households.

**Data collection**

Data collection procedures have been published elsewhere (National Population Commission & ICF Macro 2009). Briefly, data were collected by visiting households and conducting face-to-face interviews to obtain information on demographic characteristics, wealth, anthropometry, female genital cutting, HIV knowledge, sexual behaviour, and domestic violence.

**Ethical consideration**

This study is based on an analysis of existing survey data with all identifier information removed. The survey was approved by the Ethics Committee of the ICF Macro at Calverton in the USA and by the National Ethics Committee in the Ministry of Health in Nigeria. All study participants gave informed consent before participation and all information was collected confidentially (National Population Commission & ICF Macro 2009).
Variables

This sample was obtained from eligible women aged between 15 and 49 years who were administered the domestic violence module and completed the questions related to CSA. This subgroup was used for analysis in which CSA was the independent variable, sexual risk behaviours, comprising of lack of condom use, extramarital sex and STDs in the last 12 months, was the outcome variable, while cigarette and alcohol use were the mediators. Two latent variables (CSA, sexual risk behaviours) were included in this study. Latent variables are variables that are not directly measured but are rather inferred from directly measured variables.

Childhood sexual abuse

CSA is a latent construct and was defined as sexual violence on or before the age of 18 years. To assess if participants were sexually abused in childhood, all eligible women were asked the following questions: “At any time in your life, as a child or as an adult, has anyone forced you in any way to have sexual intercourse or perform any other sexual acts?” The two possible outcomes for the questions were “yes” or “no”. Respondents who said yes were then asked questions about the age at which this first happened and the person who committed the act. Respondents who gave an affirmative reply and if the violence occurred when they were under the age of 18 years, were considered as cases of CSA and coded as “1” while those who gave a negative response or if the abuse occurred after the age of 18 years, formed the other group of the dichotomy and were coded “0”. All women who did not respond to the question were excluded.

Cigarette use

The respondents answered questions about their tobacco use habits by identifying if they currently consumed cigarettes (yes/no).
Alcohol use

Alcohol use was defined as the act of drinking alcohol before the last sexual intercourse. The amount of alcohol consumed by the participant was not quantified. But rather, four categories were identified, namely (a) neither the respondent nor the partner consumed alcohol before the last sex, (b) the respondent consumed alcohol but the sexual partner did not, (c) the sexual partner consumed alcohol but the respondent did not, and (d) both the respondent and the sexual partner consumed alcohol.

Sexual risk behaviours

Sexual risk behaviour is a latent variable and was constructed from three variables: lack of condom use with non-spousal partner, extramarital sex and history of sexually transmitted disease in the last 12 months. We defined extramarital sex as the act of having sexual intercourse with a man other than one’s spouse or cohabitating sexual partner.

Statistical analyses

Descriptive statistics were used to describe demographic characteristics within the study sample. The correlations between variables were identified using Pearson’s product moment correlation. Following a two-step approach recommended by Anderson and Gerbing (Anderson & Gerbing 1992; Anderson & Gerbing 1998), the first step involved a confirmatory factor analysis to develop an acceptable measurement model. The measurement model defined the observed variables in terms of “true” latent variables (endogenous or exogenous) and a measurement error term. At this stage, each latent variable was allowed to correlate freely with every other latent variable. In step two, the measurement model was modified to represent the postulated causal model framework. A mediator (M) (i.e. alcohol and cigarette use) or an intervening variable is a third variable that links the independent variable (IV)
(CSA) to the dependent variable (DV) (sexual risk behaviours) (Baron & Kenny 1986). The indirect effect involves the direct effects of the IV on M and from M to DV, while the total effect is denoted as the sum of the direct effect of IV on DV and the indirect effect.

Model fit diagnosis
We conducted model testing with the Stata for Windows version 12.1. We evaluated model fit by examining the following fit indicators, using criteria suggested by Hu and Bentler (Hu & Bentler 1999). These include examination of chi-square statistics, a comparative fit index, a Tucker-Lewis index and a root mean square error of approximation. The chi-square statistics indicate the correspondence between the proposed model and data. The root mean square error approximation is a measure of the error of approximation between hypothesized model-implied covariance matrix in the sample and the population covariance matrix. The comparative fit index assessed the improvement in fit of the hypothesized model compared with a baseline model (i.e. null model), when covariances among the population are assumed to be zero. The Tucker-Lewis index corrects for model complexity, favouring parsimonious models over more complex ones. Values for the root mean square error approximation ranging from 0 to 0.05 and for comparative fit index and Tucker-Lewis index above 0.90 and 0.95, respectively, represent acceptable fit of the model.
RESULTS

Sample characteristics

The study analysed 12,800 women sampled in Nigerian DHS 2008. Table 1 shows the summary characteristics of the respondents. About 2% of the women reported a history of childhood sexual abuse. About 1.5% of the respondents reported history of STD in the last 12 months prior to the survey; 0.5% of the respondents did not use condoms in the last sexual intercourse with non-spousal partner. Thirteen per cent of the respondents reported extra-marital sex. Only one per cent of the respondents reported use of cigarette and alcohol. As shown in Table 2, all of the variables were found to be significantly and positively correlated (ranged from 0.0258 to 0.1796).

Table 1

Measurement and path models

In the measurement model, the confirmatory factor analyses indicated that the measurement model for high sexual risk behaviours had a satisfactory fit. All factor loadings were significant with values: lack of condom use ($\beta=0.61$, $p<0.0001$), extramarital sex ($\beta=0.29$, $p<0.0001$), history of sexually transmitted disease ($\beta=0.12$, $p<0.0001$).

Regarding the Path model, the final structural equation model (see Figure 1) demonstrated a good model fit to the data (RMSEA=0.025, CFI=0.958, TLI=0.896). As shown in Figure 1, the final model revealed that the women who had experienced CSA were more likely to drink alcohol and smoke cigarettes, and more likely to engage in sexual risk behaviours. Those that reported using alcohol and smoking cigarettes were also more likely to engage in sexual risk behaviours.

Table 2
Testing the mediation effect

The total effect of child sexual abuse on sexual risk behaviours was statistically significant ($\beta = .022$, $p<0.0001$), i.e. the effect we would find if there was no mediator in our model. Child sexual abuse had a significant direct effect on high sexual risk behaviours ($\beta = .020$, $p<0.0001$). The indirect effect of child sexual abuse that passes through the alternate pathway (alcohol consumption and cigarette smoking), while significant ($\beta = .002$, $p<0.0001$), it was much smaller than the direct effect. The percentage of the total effect mediated was just 7.3%. These results indicate that CSA predicted on sexual risk behaviours both directly and indirectly through the use of alcohol and cigarettes, though the effect is partially moderated.

Discussion

Main findings

This study examined the effects of history of CSA on sexual risk behaviours. Three major findings emerged from this study. First, women with a history of CSA reported using cigarettes and alcohol. This is consistent with previous studies that found that CSA is associated with alcohol and cigarette use (Malow et al. 2006b; Meade et al. 2012; Senn et al. 2008). This may further corroborate the researchers’ view that the reason for drug and alcohol use in adolescents with a history of sexual abuse is to avoid abuse specific memories and affective responses (Briere & Runtz 1991; Briere & Runtz 1993). Second, our hypothesis that women with a history of CSA were more likely to report sexual risk behaviours was confirmed. The present findings support earlier work linking CSA and sexual risk behaviours in adulthood and are in accordance with both empirical findings and theory.
It is thought that women with sexual abuse histories place themselves at HIV risk through sexual behaviours linked to beliefs about sexuality developed in response to sexual abuse (Miller 1999). While several studies have found an association between CSA and sexual risk behaviour in adulthood (Arriola et al. 2005; Miller 1999; Richter et al. 2013; Senn et al. 2006; Senn and Carey 2010), some studies have not found any association (Peltzer et al. 2013). It is difficult to know why some of these studies were not significant, but possible reasons may be because the studies were not adequately powered to detect any association, or it may have been the way CSA and sexual risk behaviours were operationalized.

Of particular interest in this study was that the association between CSA and riskier sexual behaviours was partially mediated by alcohol use and cigarette smoking. In fact, history of CSA was associated with sexual risk behaviour both directly and indirectly through drug use. Though preponderance, i.e. 93% of the total effect of the association was via direct route. The findings from this study were similar to previous studies on CSA and sexual risk behaviour (Senn et al. 2012). Many studies have shown the adverse effects of sexual abuse on later behaviours (e.g., substance abuse, alcohol, use of HIV medications). Likewise, studies have shown the adverse impacts of substance abuse on sexual risk behaviour in later life. It is also well documented that victims of CSA may have maladaptive emotional or behavioural problems like depression, which may also be further associated with sexual risk taking. While alcohol, cigarette smoking and other recreational drugs had been used as coping mechanism following traumatic effect of sexual abuse, it further impairs judgement regarding safe sexual practice (Zawacki et al. 2009). This further limits the ability to successfully negotiate condom use, increase likelihood of multiple sexual partners, which will subsequently increase the risk of exposure to sexually transmitted diseases including HIV. Findings from this study also corroborate existing knowledge regarding the association
between CSA and sexual risk behaviour in SSA. Existing research on CSA in SSA has been limited and primarily focused on cross-sectional data using logistic regression techniques. No study has attempted to utilise the SEM technique.

**Study limitations and strengths**

There are certain study limitations that should be acknowledged. Firstly, because the data was drawn from national surveys, the variables available were restricted. Other potential mediators that could have been of interest were not available in the survey and so could not be included in the analysis. The cross-sectional nature of our data limits our ability to draw causal inferences. Secondly, the way our outcome variable was constructed may influence bias in the study. In this study, HIV risk sexual behaviours were constructed from three variables (lack of condom use with non-spousal partner, extramarital sex and history of sexually transmitted disease) but they may not cover all sexual risk behaviours possible. The validity of this study may also be affected by the possible under-reporting of child sexual abuse. In our study, about 25 of the participants reported a history of CSA, compared to a minimum of 6% in population studies conducted by the WHO (Brown et al. 2009). As the data were collected through self-reporting and due to the sensitive nature of the questions being asked, there is likelihood that some respondents might not disclose their past experience. Therefore, it is likely that an exact account of the CSA will be unavailable. Although only two factors (alcohol and cigarettes) were used as meditational factors in this study, there are other potential mediators that could be used, such as drug use, assertiveness, self-efficacy, psychological symptoms (depression, post-traumatic stress disorders), and re-victimization (Malow et al. 2006a; Miller 1999) which are beyond the scope of this study.
Despite these limitations, this study makes several key contributions to the existing literature. The data from the DHS are widely considered to be of high quality based on sound sampling methodology and adherence to ethical standards of data collection. Furthermore, Demographic and Health Surveys are considered to have a high response rate. In this study, a more appropriate and recent structural equation modelling technique was used to examine the mediating effects of drug abuse and alcohol on the link between CSA and sexual risk behaviours.

**CONCLUSION**

The results from this study suggest that female respondents that experience childhood sexual abuse may subsequently develop sexual risk behaviour in adulthood and that the association is partly mediated by alcohol use and smoking. These findings highlight the need for interventions that address not only sexual abuse and risky sexual habits, but also behaviour such as smoking and alcohol use, which victims use as coping strategies following exposure to sexual violence.
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<tr>
<th></th>
<th>Number</th>
<th>Percentage</th>
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<tr>
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<td>224</td>
<td>1.7</td>
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<tr>
<td>No</td>
<td>12,577</td>
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<tr>
<td><strong>Sexually transmitted diseases</strong></td>
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<td></td>
</tr>
<tr>
<td>Yes</td>
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</tr>
<tr>
<td>No</td>
<td>12,603</td>
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<tr>
<td><strong>Lack of condom use</strong></td>
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</tr>
<tr>
<td>Yes</td>
<td>60</td>
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</tr>
<tr>
<td>No</td>
<td>12,740</td>
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<tr>
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<td></td>
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<tr>
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<td><strong>Alcohol or cigarette use</strong></td>
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<tr>
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</tr>
<tr>
<td>No</td>
<td>12,658</td>
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Table 2: Pearson’s correlations between study variables

<table>
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<th>Sexually transmitted diseases</th>
<th>Lack of condom use</th>
<th>Extramarital sex</th>
<th>Alcohol or cigarette use</th>
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<td>0.0360***</td>
<td>0.1796***</td>
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<td><strong>Alcohol or cigarette use</strong></td>
<td>0.0372***</td>
<td>0.0352***</td>
<td>0.0692***</td>
<td>0.1229***</td>
<td>1</td>
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</table>

**P<0.001, ***p<0.0001
FIGURE

Figure 1: Model pathway of the association between child sexual abuse and sexual risk behaviours

![Diagram showing the association between child sexual abuse and sexual risk behaviours](image)

RMS/IC: 0.03

CTI = 0.356

TLI = 0.03

$\chi^2 = 100; p < 0.001$
References


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