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HIV AND CHILDHOOD SEXUAL VIOLENCE: IMPLICATIONS FOR SEXUAL RISK BEHAVIORS AND HIV TESTING IN TANZANIA

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Prior research has established an association between sexual violence and HIV. Exposure to sexual violence during childhood can profoundly impact brain architecture and stress regulatory response. As a result, individuals who have experienced such trauma may engage in sexual risk-taking behavior and could benefit from targeted interventions. In 2009, nationally representative data were collected on violence against children in Tanzania from 13–24 year old respondents ($n = 3,739$). Analyses show that females aged 19–24 ($n = 579$) who experienced childhood sexual violence, were more likely to report no/infrequent condom use in the past 12 months (AOR = 3.0, CI [1.5, 6.1], $p = 0.0017$) and multiple sex partners in the past 12 months (AOR = 2.3, CI [1.0, 5.1], $p = 0.0491$), but no more likely to know where to get HIV testing or to have ever been tested. Victims of childhood sexual violence could benefit from targeted interventions to mitigate impacts of violence and prevent HIV.

In Sub-Saharan Africa, there are parallel epidemics of HIV and sexual violence affecting young women and children. In this region, young women aged 15–24 years old are three to six times more likely to be HIV positive than young men in the same age cohort (World Health Organization, 2009). The adult HIV prevalence rate in Tanzania is 5% with a significantly higher rate among women (6%) than

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among men (4%) (Tanzania Commission for AIDS, Zanzibar AIDS Commission, National Bureau of Statistics, Office of the Chief Government Statistician & ICF International, 2013). In terms of sexual violence, the World Health Organization (WHO) estimated that globally in 2002 alone about 150 million girls experienced some form of sexual violence (Andrews, Corry, Slade, Issakidis, & Swanston, 2004). A meta-analysis of 331 samples world-wide found a global prevalence rate of 18.0% for childhood sexual violence among females (Stoltenborgh, van Ijzendoorn, Euser, & Bakermans-Kranenburg, 2011). In a national study of violence against children in Tanzania, 27.9% of females experienced sexual violence in childhood (United Nations International Children's Emergency Fund-Tanzania, Centers for Disease Control and Prevention & Muhimbili University, 2011).

A growing body of evidence has established an association between sexual violence and increased vulnerability to HIV infection (Baral et al., 2012; Dunkle et al., 2004; Jewkes, Dunkle, Nduna, & Shai, 2010; Machtinger, Wilson, Haberer, & Weiss, 2012; Maman, Campbell, Sweat, & Geilen, 2000). Penetrative vaginal and anal sexual violence may lead to direct transmission of HIV through exposure to sexual secretions and/or blood, especially when there is physical trauma associated with the intercourse (The Center for Health and Gender Equity, 1999; Kim, Martin, & Denny, 2003). Young girls are more biologically vulnerable to HIV infection from forced intercourse due to immature reproductive and immune systems such as the vaginal mucosa not being fully developed to form an effective barrier (Cates & McPheeters, 1997; Centers for Disease Control and Prevention, 2004).

In addition to the immediate risks of childhood sexual violence, many studies have established a strong association between experiences of childhood sexual violence and later engagement in sexual risk-taking behaviors such as having multiple sexual partners, inconsistent condom use, and participation in intergenerational and transactional sex (Bensley, Van Eenwyk, & Wynkoop Simmons, 2003; Felitti et al., 1998; Lalor & McElvaney, 2010; Roemmele & Messman-Moore, 2011; Senn & Carey, 2010; Wilson & Widom, 2008). Severe or recurrent exposure to stress during childhood, such as sexual violence victimization, can profoundly impact brain circuits and hormonal systems that regulate stress, leading to alterations in the brain architecture and damaged stress regulatory response (Adler & Ostrove, 1999; Heringa et al., 2013; McEwen & Seeman, 1999; National Scientific Council on the Developing Child, 2014). As a result, individuals may be more likely to engage in alcohol or drug abuse as a coping strategy and these behaviors in turn may contribute to sexual risk-taking behavior and HIV risk.

Additionally, research has established that traditional gender norms such as child marriage may place youth, especially young girls, at an increased risk of exposure to childhood sexual violence as well as contexts where sexual risk-taking is not something easily negotiated due to these power dynamics and gender norms (Campbell et al., 2008). Women who are HIV positive are more likely to have experienced childhood sexual violence than the general population (Koenig & Clark, 2004). While this body of research that establishes these associations between childhood violence and negative outcomes has been critical in establishing an association between violence and sexual risk-taking, many studies are often qualitative in nature and limited in scope due to small sample size. Few studies have established this association at a population level.

Research has established both direct and indirect pathways between childhood sexual violence and HIV infection (Jewkes et al., 2010). HIV transmission can occur through penetrative sex that is either coercive or forced (Gray et al., 2001). A meta-

analysis of observational studies on the risk of HIV-1 transmission in male to female exposure per vaginal sex act found a pooled estimate of 0.076% per sex act and for receptive anal sex found a pooled estimate of 1.69% per sex act (Boily et al., 2009). Although risk may be higher in cases of sexual violence due to trauma in the genital tract, particularly of children, it is still arguably more likely that the association is driven by the indirect pathways where victims of childhood sexual violence may be more likely to demonstrate prolonged phases of high-risk sex behaviors later in life.

In 2009, the Government of the United Republic of Tanzania partnered with the United Nations International Children's Emergency Fund (UNICEF)-Tanzania, the US Centers for Disease Control and Prevention (CDC), and key stakeholders through the Multi-Sectoral Task Force (MSTF) to collect nationally-representative data on violence against children. The final report from this study provides comprehensive descriptive analyses on the prevalence of violence against children, as well as risk and protective factors, service-seeking behaviors and further contextual information (United Nations International Children's Emergency Fund-Tanzania et al., 2011). This paper seeks to address two key questions: (1) are Tanzanian females who have experienced sexual violence in childhood more likely to engage in high-risk sexual behaviors in early adulthood, and (2) are Tanzanian females who have experienced sexual violence in childhood more or less likely to know about and utilize HIV testing services?

METHODS

STUDY DESIGN AND PARTICIPANTS

The Tanzania Violence Against Children Survey was a national, cross-sectional household survey of children and young adults aged 13 to 24 years old. The sampling frame consisted of enumeration areas (EAs) used in the 2002 national population census by the Government of the United Republic of Tanzania. This was the most reliable and recent population sampling frame at the time of the study. To allow for implementation of unequal probability of sample selection in different regions and subgroups, the frame was stratified by region (Mainland Tanzania and Zanzibar) and by sex. Utilizing a three-stage cluster and split-sample design, the study ensured that geographically diverse EAs were included and that males and females were not interviewed in the same EA. Fifty EAs were randomly assigned to each of the four regions by sex: females in mainland Tanzania, males in mainland Tanzania, females in Zanzibar, and males in Zanzibar. The survey was conducted in mainland Tanzania and Zanzibar where interviews in Kiswahili were administered from November 6 through December 9, 2009. Overall, interviews were completed in 199 of the 200 EAs sampled: 49 female EAs on Mainland Tanzania, 50 male EAs on Mainland Tanzania, 50 female EAs on Zanzibar and 50 male EAs on Zanzibar. One sampled EA was inaccessible due to weather and resulting road access and three EAs were interrupted due to weather or security concerns for the field staff.

In total, a nationally-representative sample of 3,739 interviews were completed between the four sample groups: 908 females on mainland Tanzania, 891 males on mainland Tanzania, 1,060 females on Zanzibar, and 880 males on Zanzibar. The overall response rate ranged from 91.1% to 93.8% across the four groups. Across the dataset, there was minimal missing data in individual variables. Most of the analysis variables used in the current study had less than 1.2% of respondents with a missing value (range = 0–4.3%). Data screening showed that there was no par-

ticular pattern in missing data. Therefore, the missing mechanism was assumed to be missing at random and no imputation was carried out.

PROCEDURES

Muhimbili University recruited interviewers with post-secondary education and a research background with preference given towards those with prior experience in a sensitive subject matter such as gender-based violence or HIV. Applicants were also screened to ensure appropriate recruitment by language skills and cultural context. CDC, UNICEF and Muhimbili University led a 13-day training that covered methodology, ethics and study procedures and provided interviewers with practical sessions to allow familiarization with the consents process, data collection tools and study protocols.

The study was reviewed and approved by two Institutional Review Boards (IRBs) in Tanzania; the Muhimbili University IRB and the Zanzibar Ministry of Health and Social Welfare. The study was also reviewed and approved by the CDC IRB. Prior to the administration of the national household survey, a pilot study was conducted. Findings from the pilot study were used to refine the survey instrument, fielding operations, and follow-up procedures for respondent support. The study followed documented ethical and safety procedures to ensure the rights and safety of each respondent. Every respondent provided verbal consent. Consent was additionally obtained from heads of household for dependent respondents. However, the study was described to heads of household in general terms to avoid any unintentional consequences of retribution against the respondents by parents who may have been or known the perpetrator of violence against the respondent. This study procedure was in accordance with the recommended protections outlined in the WHO guidelines on ethics and safety in studies on violence against women (WHO, 2001). In addition, all interviews were conducted in private spaces to ensure privacy and reduce the risk of nondisclosure.

MEASURES

The Tanzania Violence Against Children survey assessed a wide range of violence victimization experiences, risk-taking behaviors, demographic and religious information of the study population, and socioeconomic characteristics of the households. Survey questions were designed to collect data for three time frames: lifetime experience, victimization prior to turning age 18, and experience in the 12 months prior to the study interview.

Any Childhood Sexual Violence. The focus of the current study and the factor that has been found to be associated with sexual risk-taking behaviors in adolescence and adulthood was assessed by asking if the respondents had experienced at least one incident of the four types of sexual acts against their will before the age of 18: *unwanted sexual touching* (How many times in your life has anyone touched you in a sexual way against your will, but did not try to force you to have sex?), *attempted unwanted intercourse* (How many times in your life has anyone tried to make you have sex against your will, but did not succeed?), *physically forced intercourse* (How many times in your life has anyone physically forced you to have sexual intercourse against your will?), and *coercive intercourse* (How many times in your life has anyone pressured you to have sexual intercourse when you didn't want to?). A victim of childhood sexual violence should be interpreted as an individual who had experienced at least one of these four types of victimization prior to age 18.

Two sexual risk-taking behaviors were examined: whether respondents had multiple (i.e., more than 1) sex partners in the past 12 months, and no/infrequent use of condoms in the past 12 months with partners other than their husbands. The other two outcomes of interest concern the study population's HIV/AIDS testing knowledge and testing behaviors: whether they knew where to get an HIV test and if they ever had an HIV test. Note that each of the four outcomes of interest and the childhood sexual violence variables were transformed into dichotomous variables (either does or does not have that specific experience).

STATISTICAL ANALYSIS

In this analysis we focused on 19–24 year old females because of their substantially higher levels of sexual violence than males in Tanzania and also because they are at higher risk of HIV infection. Moreover, the circumstances under which girls and boys in Tanzania experience sexual violence and HIV acquisition differ substantially and thus conclusions and recommendations may need to be tailored by gender (United Nations Development Fund for Women, 2001). Additionally, we only included 19–24 year old females in our analysis because we were interested in the ways that exposure to sexual violence during childhood influenced later risk-taking behaviors and knowledge and use of HIV testing services. Otherwise, we would not be able to temporally separate measures of sexual risk-taking from experiences of childhood sexual violence. Females 18 years of age or younger were excluded, because sexual risk taking behaviors over the past 12 months may include sexual experience or sexual violence that occurred prior to turning 18. Finally, the analyses only included sexually active 19- to 24-year-olds, because they were at highest risk for HIV infection ($n = 579$).

To produce estimates that are representative of the study population in Tanzania, sampling weights were developed. The weights account for different sampling rates across regions and by sex, for the varying selection probabilities of households in sampled EAs, and for the individual in a sampled household. Additionally, the weights adjust the sample to reflect the population distribution of demographic characteristics using benchmark counts for Tanzania for the purpose of correcting for both coverage and nonresponse errors. Statistical inferences were made based on weighted analyses, where complex sample design features described above were taken into account. All analyses were conducted using SAS 9.3 and SUDAAN (11.0.0, SAS-Callable, 32 bit version).

As prevalence of childhood sexual victimization was estimated using a sample of the study population in Tanzania, the reliability of an estimate was measured by its relative standard error (RSE), an estimate-specific statistical property. The RSE was calculated for all prevalence estimates in this study. If the RSE of an estimate was greater than 30%, the estimate was considered not reliable and therefore not reported. Additionally, consideration was also given to the numerator case count. If an estimate is obtained based on a numerator less than or equal to 20, the estimate is also not reported. When comparing outcome measures across subgroups, a statistically significant difference is established when the calculated p -value of Chi-square test is less than alpha of 0.05.

We began our analysis by examining the bivariate relationships between childhood sexual violence and the outcomes of interest (no or infrequent condom use in the past 12 months; multiple sex partners in the past 12 months; knowledge of HIV

testing services; and ever tested for HIV). We then identified variables, based on a theoretical basis and knowledge from prior studies that could potentially confound the relationship between exposure to childhood sexual violence and each of these outcomes. Prior studies suggest that religion, marriage, pregnancy, and household socioeconomic indicators could potentially confound the associations between exposure to childhood sexual violence and these outcomes. Previous research, for example, indicates that Muslim identity may be a protective factor in some contexts (Brodish, 2013; Hazarika, 2012; Kagee, Toefy, Simbayi, & Kalichman, 2005). The population of Tanzania is predominantly Christian, Muslim and Indigenous (Central Intelligence Agency, 2014). For religion, the responses were grouped into three categories: Christian, Muslim, and other (with Muslim as the referent group in the multivariate analysis). Catholics and Protestants were collapsed into the larger category of Christians due to limited sample size. Although we collected data on education, we did not include this variable in analysis due to homogeneity in the sample around educational achievement.

Prior research also demonstrates an association between wealth and violence, as well as HIV testing knowledge and behaviors (Nicole, Bula, Gaydosh, Zeev, Thornton, & Yeatman, 2009; Nuwaha, Kabatesi, Muganwa, & Whalen, 2002; Tanzania Commission on AIDS et al., 2013). As family wealth could be a factor influencing an individual's developmental experiences in terms of living environment, social interactions, and financial means for accessing preventive services, an array of aspects for measuring household assets was used to construct a three-category household wealth indicator for this study. The wealth index was created by using a methodology created by the Demographic and Health Surveys (DHS). We ran factor analyses on key wealth indicators to create a composite measure. The weighted composite measure was then used to divide individuals into different wealth groups: the lowest one-third, the middle one-third, and the highest one-third of socioeconomic status in the study's measurement scale. Pregnancy is also highly associated with HIV testing knowledge and behavior, because Prevention of Mother to Children Transmission (PMTCT) is a strategic focus in HIV prevention in Tanzania and throughout the region. The majority of health facilities in Tanzania that offer antenatal care, offer PMTCT services, including routine HIV testing (97%) and the majority of women attend at least one antenatal visit during a pregnancy (Tanzania Ministry of Health and Social Welfare, 2011). Finally, marriage has been associated with higher HIV prevalence (Nuwaha et al., 2002; Santelli et al., 2013). Because of this, married couples have been targeted for Couples HIV Testing and Counseling (CHTC) sessions, which are often strategically located at PMTCT clinics. Given this push to counsel married couples in these clinics, marriage may be associated with higher HIV testing knowledge and behavior (WHO, 2012a).

Multivariable logistic regression was used to examine the associations between childhood sexual violence and the outcomes of interest while controlling for the potential confounders. The strength of the relationship between experiencing (or the lack of) childhood sexual violence and a risk-taking behavior or a HIV knowledge/behavior practice in the study population was measured by the odds ratio, the ratio of odds of experiencing an outcome between the exposed (experienced childhood sexual violence) and the unexposed groups (did not experience childhood sexual violence).

TABLE 1. Descriptive Information of the Study Population, Tanzania, 2009

	<i>n</i>	Weighted %
Age		
19–20 years old	188	34.9
21–22 years old	180	34.2
23–24 years old	211	30.9
Religion		
Muslim	350	37.2
Christian	182	52.0
Other	43	10.7
Family Wealth		
Lowest Third	227	37.4
Middle Third	177	33.0
Highest Third	175	29.7
Ever Married		
Yes	391	46.9
Ever Pregnant		
Yes	488	78.8

Note. A stratified design was used to calculate estimates in Zanzibar and Mainland Tanzania. In order to get reliable estimates, approximately equal numbers of female respondents were surveyed in Zanzibar, 1,121 females, and Mainland Tanzania, 952 females, even though the population of Zanzibar is substantially smaller than Mainland Tanzania, 0.7 million females in Zanzibar vs. 22.3 million females in Mainland Tanzania according to the most recent census. This can cause substantial differences between raw totals and weighted totals.

RESULTS

Close to 35% of the females analyzed were between age 19 and 20 years old, slightly more than one third (34.9%) were between 21 and 22 years old, and a little less than one third (30.9%) were 23 or 24 years old (Table 1). The proportion of females who reported being Christian was over 50% and the proportion of Muslim was 37.2%. Nearly half reported ever being married, whereas slightly less than one in four reported ever being pregnant. The prevalence of sexual violence during childhood among these 19–24-year-old females was 26.1%.

There were significant bivariate associations between childhood sexual violence and having had multiple sexual partners in the past 12 months, as well as not using or infrequently using condoms when having sexual intercourse with partners other than live-in partners and husbands in the past 12 months (Table 2). More females who experienced child sexual violence reported no/infrequent condom use in the past 12 months, compared to those females who did not experience childhood sexual violence (46.1% vs. 24.4%, respectively; $p < 0.01$). The prevalence of having multiple partners was about 90% higher among females who reported experiencing sexual violence before age 18 compared to females without experiences of sexual violence before age 18 (36.1% vs. 19.0%, respectively; $p = 0.03$).

Approximately 17% of the study population who experienced childhood sexual violence reported having had no knowledge of HIV testing services, compared to about 21% females in the same age group without the experience of childhood sexual violence victimization (Table 2). The difference in these prevalence estimates is not statistically significant ($p = 0.4510$). Additionally, there is no evidence to conclude that the proportion ever having been tested for HIV among females aged 19–24 with

TABLE 2. Estimates of Prevalence of Risk Factors Among Those With and Without Experience of Childhood Sexual Violence, Tanzanian Sexually Active Females 19–24 years old, 2009

	No Experiences of Childhood Sexual Violence	Experienced Childhood Sexual Violence
	Weighted % [95% CI]	Weighted % [95% CI]
No or Infrequent Condom Use in Past 12 Months	24.4 [18.7, 31.2]	46.1 [33.3, 59.5]
Multiple Sex Partners in Past 12 Months	19.0 [13.7, 25.8]	36.1 [24.0, 50.2]
No Knowledge of HIV Testing Services	20.9 [15.7, 27.3]	16.9 [9.9, 27.2]
Never Tested for HIV	30.4 [24.0, 37.7]	29.9 [20.2, 41.8]

childhood sexual violence experience was statistically different from that of females of the same age cohort who did not report childhood sexual violence (29.9% and 30.4%, respectively; $p = 0.9369$).

To test the robustness of these bivariate associations, multivariable logistic regression analyses were performed to examine the effect of childhood sexual violence and last year risk-taking sexual behaviors while simultaneously controlling for ever having been married, ever having been pregnant, religious denomination, and a composite measure of family wealth. The association between childhood sexual violence and past 12-month no/infrequent condom use was statistically significant. Table 3 shows that when simultaneously controlling for these covariates, women aged 19–24 who experienced any childhood sexual violence were three times more likely to report low condom use compared to women in the same age cohort, but did not report experiencing childhood sexual violence. Adjusted odds ratio (AOR) = 3.0, 95% Confidence Interval (CI) [1.5, 6.1], $p < 0.01$.

Table 4 shows that when controlling for all of these covariates, the association between childhood sexual violence and past 12-months multiple sexual partners among women age 19–24 years of age was of borderline significance (AOR = 2.3, CI [1.0, 5.1], $p = 0.0491$).

Finally, we found that controlling for the four covariates did not alter the relationship between exposure to childhood sexual violence and knowledge about or utilization of HIV testing services. Family wealth, however, was found to be significantly associated with both knowledge of HIV services and HIV testing behavior. A person in the lowest third of the wealth index was more than four times more likely to report not knowing where to go for HIV testing services (AOR = 4.4, CI [1.3, 14.8], $p = 0.05$) and less likely to report that they have been tested for HIV (AOR = 3.6, CI [1.43, 9.27], $p = 0.02$) compared to those females in the highest third of the family wealth measure.

DISCUSSION

This study shows that females age 19–24 years old who experienced childhood sexual violence are more likely to engage in sexual risk-taking behaviors in young adulthood—specifically, low condom use and multiple sex partners, both in the past 12 months. These associations persist even when the models control for the demographic variables of ever married, never pregnant, religion, and wealth, although the association between childhood sexual violence and multiple partners was of borderline statistical significance. The association between a history of childhood sexual violence and sexual risk-taking behaviors among young adult Tanzanian females is

TABLE 3. Association Between Childhood Sexual Violence Experience and Low Condom Use in the Past 12 Months, Tanzania, 2009

Outcome: No or Infrequent Condom Use in the Past 12 Months	Adjusted Odds Ratio [95% CI]	<i>p</i> -value
Any Childhood Sexual Violence	3.0 [1.5, 6.1]	0.002
Ever Married	0.2 [0.1, 0.4]	0.00
Never Pregnant	0.7 [0.3, 1.6]	0.35
Religion*		1.00
Other Religion	1.0 [0.2, 4.2]	
Christian	1.0 [0.4, 2.4]	
Family Wealth**		0.19
Lowest	1.6 [0.7, 3.4]	
Medium	2.3 [0.9, 5.5]	

Note. *Reference group is Muslim. **Reference group is wealthiest third.

consistent with research that has been done in other geographic and cultural contexts (Bensley et al., 2003; Felitti et al., 1998; Lalor & McElvaney, 2010; Roemmele & Messman-Moore, 2011; Senn & Carey, 2010; Wilson & Widom, 2008).

Those females who experienced childhood sexual violence were statistically no more or less likely to know where to go for HIV testing services or to ever have been tested for HIV; both prevalence estimates were arguably low regardless of history of childhood sexual violence. This is cause for concern because children exposed to sexual violence are, as demonstrated in this paper and elsewhere, clearly at high risk for sexual risk-taking behaviors and HIV. Consequently, one would hope that those children exposed to sexual violence as well as children with other types of risk factors for HIV would be more likely to understand where to go for HIV testing and to receive testing services. While a history of childhood sexual violence is not associated with HIV Testing and Counseling (HTC) knowledge or uptake, family wealth was strongly associated. Previous research indicates that HTC knowledge and testing rates are associated with wealth and socioeconomic status in a variety of contexts (Helleringer, Kohler, Frimpong, & Mkandawire, 2009) and has been confirmed in several national surveys in Africa (Central Statistical Office, Ministry of Health, Tropical Diseases Research Center and University of Zambia, & Macro International Inc., 2009; National Statistical Office & ICF Macro, 2011; Obermeyer et al., 2013; Uganda Ministry of Health, 2011). For example, the 2011/2012 Tanzania AIDS Indicator Survey (Tanzania Commission for AIDS Commission, National Bureau of Statistics, Office of the Chief Government Statistician, & ICF International, 2013) found that 83.8% of females in the lowest wealth quintile knew where to go for HIV testing compared to 93.0% in the highest wealth quintile, and 53.4% of females in the lowest quintile had ever been tested for HIV compared to 69.6% in the highest quintile. Structural barriers, such as the cost and location of HTC services may begin to explain why the poorest have lower knowledge and uptake of HTC services (Helleringer et al., 2009; Santelli et al., 2013; WHO, 2012b).

We acknowledge that the study is subject to some limitations. This study likely underestimates the true prevalence of sexual violence due to challenges with disclosure on such a sensitive topic (Palermo, Bleck, & Peterman, 2014) and possible impacts of recall bias, particularly if the violence occurred at a very young age in childhood (Williams, 1994). Further, analysis was limited to the first and most recent incident of sexual violence. If an individual experienced more than one incident of a particular type of sexual violence, we did not collect the data on these additional

TABLE 4. Association Between Childhood Sexual Violence and Multiple Sexual Partners in the Past 12 Months, Tanzania, 2009

Outcome: Multiple Sexual Partners in the Past 12 Months	Adjusted Odds Ratio [95% CI]	<i>p</i> -value
Any Childhood Sexual Violence	2.3 [1.0, 5.1]	0.05
Ever Married	0.7 [0.4, 1.4]	0.30
Never Pregnant	1.5 [0.5, 4.4]	0.42
Religion		0.42
Other Religion	0.5 [0.1, 2.3]	
Christian	0.7 [0.3, 1.4]	
Family Wealth		0.68
Lowest	1.5 [0.6, 4.0]	
Medium	1.6 [0.5, 4.5]	

incidences and would not be able to detect associations with HIV risk behaviors or HIV testing behaviors. Finally, this analysis is limited to HIV risk behaviors and testing behaviors in the past 12 months. It is possible that individuals engaged in risk behaviors or sought HIV testing outside of this timeframe, but we only collected data on the past 12 months.

CONCLUSION

Females who experience sexual violence in childhood in Tanzania are at risk for HIV in both the immediate and long term. According to the 2013 Adolescent HIV Guidelines from WHO (2013), adolescents often have less access to HIV services; and even when services are available, girls face considerable barriers. The framework recommends targeted, adolescent-friendly approaches to HTC, particularly in the context of the global epidemic where young people are often at highest risk (World Health Organization, 2012b). Given the substantial exposure to childhood sexual violence among girls in Tanzania and other African countries (Reza et al., 2007; United Nations International Children Fund-Kenya, Centers for Disease Control and Prevention, & Kenya National Bureau of Statistics, 2012; Zimbabwe National Statistics Agency, United Nations International Children's Emergency Fund-Zimbabwe & Collaborating Centre for Operational Research and Evaluation, 2011), and since these girls are more likely to engage in sexual risk-taking behavior as they mature, it is important for HTC campaigns to include targeted outreach and messaging for children and adolescents, particularly high-risk youth. Similarly, screening for sexual violence in routine healthcare for children and adolescents in Tanzania (e.g., well child visits and immunizations) should be considered. Children who screen positive for childhood sexual violence could benefit from additional services such as psychosocial support as well as targeted interventions aimed to mitigate sexual risk-taking behaviors.

Comprehensive sexuality education (CSE) may be an important prevention opportunity for both violence and HIV. A meta-analysis of 22 health education programs across low, middle, and high income countries, found that those programs that addressed gender and violence were significantly more likely to succeed in reducing STIs or unintended pregnancy (Haberland, 2015). In partnership with UNESCO, the Tanzania Institute of Education has prioritized CSE by investing in a needs as-

assessment, curriculum development, and teacher training. Violence is a topic in both the primary and secondary curriculums.

Intervening early with children who are exposed to sexual violence could help to mitigate the psychological processes that lead to sexual risk-taking behaviors and protection from recurring violence. There is clinical evidence that cognitive-behavioral therapy (CBT) can be effective for reducing mental health symptoms in survivors of sexual violence (Nishith, Nixon, & Resick, 2005; Ougrin, 2011; Resick & Schnicke, 1992; Resick et al., 2008). Additionally, one such CBT intervention worked with HIV-positive women with a history of childhood sexual violence, demonstrating a significant decrease in sexual risk behaviors and an increase in treatment adherence (Wyatt et al., 2004). Although there has been minimal research applying these cognitive therapy interventions in low-income settings, researchers in Democratic Republic of the Congo have successfully adapted and implemented a group psychotherapy model that was administered by community-based health workers, showing reduced mental health symptomology and increasing general functioning (Bass et al., 2013). This type of program could be implemented in Tanzania and elsewhere through the community health or social welfare platforms with adaptation to meet the unique needs of children. In sum, sexual violence among female children is increasingly recognized as an important risk factor for sexual risk-taking behaviors and HIV. Efforts should now be made to reflect this knowledge in policies and programs designed to achieve an HIV-free generation.

REFERENCES

- Adler, N. E., & Ostrove, J. M. (1999). Socioeconomic status and health: What we know and what we don't know. *Annals of the New York Academy of Sciences*, 896, 3–15.
- Andrews, G., Corry, J., Slade, T., Issakidis, C., & Swanston, H. (2004). Child sexual abuse. In M. Ezzati, A. D. Lopez, A. Rodgers, & C.J.L. Murray (Eds.), *Comparative quantification of health risks: Global and regional burden of disease attributable to selected major risk factors* (pp. 1851–1940). Geneva, Switzerland: World Health Organization. Retrieved from http://whqlibdoc.who.int/publications/2004/9241580348_eng_Volume2.pdf
- Baral, S. B., Beyrer, C. B., Muessig, K., Poteat, T., Wirtz, A. L., Decker, M. R., . . . Kerrigan, D. K. (2012). Burden of HIV among female sex workers in low-income and middle-income countries: a systematic review and meta-analysis. *Lancet Infectious Disease*, 12, 538–549.
- Bass, J. K., Annan, J., McIvor Murray, S., Kaysen, D., Griffiths, S., Cetinoglu, T., . . . Bolton, P. A. (2013). Controlled trial of psychotherapy for Congolese survivors of sexual violence. *New England Journal of Medicine*, 368, 2182–2191.
- Bensley, L., Van Eenwyk, J., & Wynkoop Simmons, K. (2003). Childhood family violence history and women's risk for intimate partner violence and poor health. *American Journal of Preventive Medicine*, 25, 38–44.
- Boily, M. C., Baggaley, R. F., Wang, L., Masse, B., White, R. G., Hayes, R. J., & Alary, M. (2009). Heterosexual risk of HIV-1 infection per sexual act: Systematic review and meta-analysis of observational studies. *Lancet Infectious Disease*, 9, 118–129.
- Brodish, P. H. (2013). An association between ethnic diversity and HIV prevalence in Sub-Saharan Africa. *Journal of Biosocial Science*, 45, 853–862.
- Campbell, J. C., Baty, M. L., Ghandour, R. M., Stockman, J. K., Francisco, L., & Wagman, J. (2008). The intersection of intimate partner violence against women and HIV/AIDS: A review. *International Journal of Injury Control and Safety Promotion*, 15, 221–231.
- Cates, W., & McPheeters, M. (1997, March 25). *Adolescents and sexually transmitted diseases: Current risks and future consequences*. Presented at the Workshop on Adolescent Sexuality and Reproductive Health in Developing Countries: Trends and Interventions, National Research Council, Washington, DC.
- Centers for Disease Control and Prevention. (2004). *Sexually transmitted disease surveillance*. Atlanta, GA: U.S. Department of Health and Human Services, CDC.

- Center for Health and Gender Equity. (1999). *Population reports: Ending violence against women*. Baltimore, MD: Johns Hopkins University School of Public Health. Retrieved from <https://www.k4health.org/sites/default/files/L%2011.pdf>
- Central Intelligence Agency. (2014). *CIA world fact book: Tanzania*. Washington, DC: Central Intelligence Agency. Retrieved from <https://www.cia.gov/library/publications/the-world-factbook/geos/tz.html>
- Central Statistical Office, Ministry of Health, Tropical Diseases Research Centre, University of Zambia, & Macro International Inc. (2009). *Zambia Demographic and Health Survey 2007*. Calverton, MD: CSO and Macro International Inc. Retrieved from [http://dhsprogram.com/pubs/pdf/FR211/FR211\[revised-05-12-2009\].pdf](http://dhsprogram.com/pubs/pdf/FR211/FR211[revised-05-12-2009].pdf)
- Dunkle, K. L., Jewkes, R. K., Brown, H. C., Gray, G. E., McIntyre, J. A., & Harlow, S. D. (2004). Gender-based violence, relationship power, and risk of HIV infection in women attending antenatal clinics in South Africa. *Lancet*, *363*, 1415–1421.
- Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., ... Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) Study. *American Journal of Preventive Medicine*, *14*, 245–258.
- Gray, R. H., Wawer, M. J., Brookmeyer, R., Sewankambo, N. K., Serwadda, D., Wabwire-Mangen, F., . . . Rakai Project Team. (2001). Probability of HIV-1 transmission per coital act in monogamous, heterosexual, HIV-1-discordant couples in Rakai, Uganda. *Lancet*, *357*, 1149–1153.
- Haberland, N. (2015). The case for addressing gender and power in sexuality and HIV education: A comprehensive review of evaluation studies. *International Perspectives on Sexual and Reproductive Health*, *41*, 31–42.
- Hazarika, I. (2012). Risk factors for HIV-1 infection in India: Evidence from the National Family Health Survey. *International Journal of STD and AIDS*, *23*, 729–735.
- Helleringer, S., Kohler, H. P., Frimpong, J. A., & Mkandawire, J. (2009). Increasing uptake of HIV testing and counseling among the poorest in sub-Saharan countries through home-based service provision. *Journal of Acquired Immune Deficiency Syndromes*, *51*, 185–193.
- Herringa, R., Birn, R. M., Ruttle, P. L., Burghy, C. A., Stodola, D. E., Davidson, R. J., & Essex, M. J. (2013). Childhood maltreatment associated with altered fear circuitry and increased internalizing symptoms by late adolescence. *Proceedings of the National Academy of Sciences USA*, *110*, 19119–19124.
- Jewkes, R. K., Dunkle, K., Nduna, M., & Shai, N. (2010). Intimate partner violence, relationship power inequity, and incidence of HIV infection in young women in South Africa: A cohort study. *Lancet*, *376*, 41–48.
- Kagee, A., Toefy, Y., Simbayi, L., & Kalichman, S. (2005). HIV prevalence in three predominantly Muslim residential areas in Cape Town metropole. *South African Medical Journal*, *95*, 512–516.
- Kim, J. C., Martin, L. J., & Denny, L. (2003). Rape and HIV: Post-exposure prophylaxis: Addressing the dual epidemics in South Africa. *Reproductive Health Matters*, *11*, 101–112.
- Koenig, L. J., & Clark, H. (2004). Sexual abuse of girls and HIV infection among women: Are they related? In L. J. Koenig, L.S. Doll, A. O’Leary, & W. Pequegnat (Eds), *From child sexual abuse to adult sexual risk: Trauma, revictimization, and intervention* (pp. 69–92). Washington, DC: American Psychological Association.
- Lalor, K., & McElvaney, R. (2010). Child sexual abuse, links to later sexual exploitation/high-risk sexual behavior, and prevention/treatment programs. *Trauma Violence & Abuse*, *11*, 159–177.
- Machtiger, E. L., Wilson, T. C., Haberer, J. E., & Weiss, D. S. (2012). Psychological trauma and PTSD in HIV-positive women: A meta-analysis. *AIDS & Behavior*, *16*, 2091–2100.
- Maman, S., Campbell, J., Sweat, M. D., & Gielen, A. C. (2000). The intersections of HIV and violence: Directions for future research and interventions. *Social Science & Medicine*, *50*, 459–478.
- McEwen, B. S., & Seeman, T. (1999). Protective and damaging effects of mediators of stress. Elaborating and testing the concepts of allostasis and allostatic load. *Annals of the New York Academy of Sciences*, *896*, 30–47.
- National Scientific Council on the Developing Child. (2014). *Excessive stress disrupts the architecture of the developing brain*. Working Paper 3. Retrieved from <http://developingchild.harvard.edu/resources/wp3/>
- National Statistical Office & ICF Macro. (2011). *Malawi demographic and health survey 2010*. Zomba, Malawi and Calverton, MD: NSO and ICF Macro. Retrieved from <http://dhsprogram.com/pubs/pdf/FR247/FR247.pdf>
- Nicole, A., Bula, A. L., Gaydos, E., Zeev, K., Thornton, R. L., & Yeatman, S. E. (2009). Increasing the acceptability of HIV counseling and testing with three C’s: Convenience, confidentiality and credibility. *Social Science & Medicine*, *68*, 2263–2270.

- Nishith, P., Nixon, R. D., & Resick, P. A. (2005). Resolution of trauma-related guilt following treatment of PTSD in female rape victims: A result of cognitive processing therapy targeting comorbid depression? *Journal of Affective Disorders*, *86*, 259–265.
- Nuwaha, F., Kabatesi, D., Mukanwa, M., & Whalen, C. C. (2002). Factors influencing acceptability of voluntary counselling and testing for HIV in Bushenyi district of Uganda. *East African Medical Journal*, *79*, 626–632.
- Obermeyer, C. M., Neuman, M., Hardon, A., Desclaux, A., Wanyenze, R., Ky-Zerbo, O., . . . Namakhoma, I. (2013). Socio-economic determinants of HIV testing and counselling: A comparative study in four African countries. *Tropical Medicine and International Health*, *18*, 1110–1118.
- Ougrin, D. (2011). Efficacy of exposure versus cognitive therapy in anxiety disorders: Systematic review and meta-analysis. *BMC Psychiatry*, *11*, 200.
- Palermo, T., Bleck, J., & Peterman, A. (2014). Tip of the iceberg: Reporting and gender-based violence in developing countries. *American Journal of Epidemiology*, *179*, 602–612.
- Resick, P. A., Galovski, T. E., O'Brien Uhlmansiek, M., Scher, C. D., Clum, G. A., & Young-Xu, Y. (2008). A randomized clinical trial to dismantle components of cognitive processing therapy for posttraumatic stress disorder in female victims of interpersonal violence. *Journal of Consulting and Clinical Psychology*, *76*, 243–258.
- Resick, P. A., & Schnicke, M. K. (1992). Cognitive processing therapy for sexual assault victims. *Journal of Consulting and Clinical Psychology*, *60*, 748–756.
- Reza, A., Breiding, M. J., Blanton, C., Mercy, J. A., Dahlberg, L. L., Anderson, M., & Bamrah, S. (2007). *Violence against children in Swaziland: Findings from a national survey on violence against children in Swaziland, May 15 – June 16, 2007*. Atlanta, GA: Centers for Disease Control and Prevention.
- Roemmele, M., & Messman-Moore, T. L. (2011). Child abuse, early maladaptive schemas, and risky sexual behavior in college women. *Journal of Child Sexual Abuse*, *20*, 264–283.
- Santelli, J. S., Edelstein, Z. R., Mathur, S., Wei, Y., Zhang, W., Orr, M. G., . . . Serwadda, D. M. (2013). Behavioral, biological, and demographic risk and protective factors for new HIV infections among youth in Rakai, Uganda. *Journal of Acquired Immune Deficiency Syndromes*, *63*, 393–400.
- Senn, T. E., & Carey, M. P. (2010). Child maltreatment and women's adult sexual risk behavior: Childhood sexual abuse as a unique risk factor. *Child Maltreatment*, *15*, 324–335.
- Stoltenborgh, M., van Ijzendoorn, M. H., Euser, E. M., & Bakermans-Kranenburg, M. J. (2011). A global perspective on child sexual abuse: Meta-analysis of prevalence around the world. *Child Maltreatment*, *16*, 79–101.
- Tanzania Commission for AIDS, Zanzibar AIDS Commission, National Bureau of Statistics, Office of the Chief Government Statistician, & ICF International. (2013). *Tanzania HIV/AIDS and Malaria Indicator Survey 2011–2012*. Dar es Salaam, Tanzania: TACAIDS, ZAC, NBS, OCGS, and ICF International.
- Tanzania Ministry of Health and Social Welfare. (2011). *Tanzania PMTCT Report*. Dar es Salaam, Tanzania: Tanzania Ministry of Health and Social Welfare. Retrieved from <http://pmtct.or.tz/pmtct-tanzania/pmtct-intanzania>
- Uganda Ministry of Health. (2011). *Uganda AIDS Indicator Survey 2011*. Calverton, MD: Uganda MOH and Macro International Inc. Retrieved from <http://measuredhs.com/pubs/pdf/AIS10/AIS10.pdf>
- United Nations Development Fund for Women. (2001). *Turning the tide: CEDAW and the gender dimensions of the HIV/AIDS pandemic*. New York: United Nations Development Fund for Women.
- United Nations International Children's Emergency Fund-Kenya, Centers for Disease Control and Prevention, & the Kenya National Bureau of Statistics. (2012). *Violence against children in Kenya: Findings from a 2010 national survey*. Nairobi, Kenya: United Nations Children's Fund Kenya Country Office, CDC, and the Kenya National Bureau of Statistics.
- United Nations International Children's Emergency Fund-Tanzania, Centers for Disease Control and Prevention, & Muhimbili University. (2011). *Violence against children in Tanzania: Findings from a national survey, 2009*. Dar es Salaam, Tanzania: United Nations International Children's Emergency Fund.
- Wyatt, G. E., Longshore, D., Chin, D., Carmona, J. V., Loeb, T. B., Myers, H. F., . . . Rivkin, I. (2004). The efficacy of an integrated risk reduction intervention for HIV-positive women with child sexual abuse histories. *AIDS & Behavior*, *8*, 453–462.
- World Health Organization. (2001). *Putting women first: Ethical and safety recommendations for research on domestic violence against women*. Geneva, Switzerland: World Health Organization.
- World Health Organization. (2009). *Violence against women and HIV/AIDS: Critical intersections*. Information Bulletin Series, 1. Geneva, Switzerland: World Health Organization.

- World Health Organization. (2012a). *Guidance on couples HIV testing and counselling including antiretroviral therapy for treatment and prevention in serodiscordant couples: Recommendations for a public health approach*. Geneva, Switzerland: World Health Organization.
- World Health Organization. (2012b). *Service delivery approaches to HIV testing and counselling (HTC): A strategic HTC programme framework*. Geneva, Switzerland: World Health Organization.
- World Health Organization. (2013). *HIV and adolescents: Guidance for HIV testing and counselling and care for adolescents living with HIV: Recommendations for a public health approach and considerations for policy-makers and managers*. Geneva, Switzerland: World Health Organization.
- Williams, L. M. (1994). Recall of childhood trauma: A prospective study of women's memories of child sexual abuse. *Journal of Consulting and Clinical Psychology, 62*, 1167–1176.
- Wilson, H. W., & Widom, C. S. (2008). An examination of risky sexual behavior and HIV in victims of child abuse and neglect: A 30-year follow-up. *Health Psychology, 27*, 149–158.
- Zimbabwe National Statistics Agency (ZIMSTAT), United Nations International Children's Emergency Fund-Zimbabwe, & the Collaborating Centre for Operational Research and Evaluation (CCORE). (2011). *National baseline survey on life experiences of adolescents*. Harare, Zimbabwe: Zimbabwe National Statistics Agency.