Original Research

Applying Structural Equation Modeling to Measure Violence Exposure and Its Impact on Mental Health: Malawi Violence Against Children and Young Women Survey, 2013

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Abstract

This study examines exposure to multiple forms of violence among Malawian children and youth and their association with mental health outcomes. The Malawi Violence Against Children and Young Women Survey was conducted among a nationally representative sample of males and females aged 13 to 24 years (*n* = 2,162) in Malawi in 2013. The experience of sexual, physical, and emotional violence prior to age 18 and during the past 12 months and associated health outcomes were ascertained using a comprehensive

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interview. Latent factors of sexual violence, physical violence, and emotional violence as well as psychological distress were constructed. We examined whether the experience of violence was related to psychological distress after controlling for age and gender. Violence exposure prior to age 18 (early life) and during the past 12 months (proximal) were valid indicators for a latent factor representing overall lifetime violence exposure. Females were more likely to experience sexual violence, whereas males were more likely to experience physical violence. Experience of any type of violence decreased with age whereas experience of psychological distress increased with age. Current psychological distress was directly associated with exposure to sexual and emotional violence recently or during childhood. Exposure to multiple forms of violence during lifetime was related to two to seven folds higher odds of experiencing psychological distress compared with those who had never experienced violence. Future intervention strategies should address three forms of violence against children simultaneously in light of the associated adverse mental health outcomes.

Introduction

Violence against children is highly prevalent around the globe and is a global public health concern. Violence against children can be physical, sexual, or emotional and can be repetitive (Hillis, Mercy, Amobi, & Kress, 2016; Hillis, Mercy, & Saul, 2017; United Nations Secretary-General's Study, 2006; U.S. National Center for Injury Prevention and Control & Prevention Institute, 2014). These three forms of violence are interrelated and often combine to cause a wide range of adverse health effects (Ford, Elhai, Connor, & Frueh, 2010). Physical effects broadly include injury, chronic pain, disability, sexual and productive health problems, and chronic health problems. Mental and behavioral effects may be insidious but long-lasting (Font & Maguire-Jack, 2016; Kessler et al., 2010; Mandelli, Petrelli, & Serretti, 2015; Norman et al., 2012) and can take the form of psychological distress, anxiety, low energy, social and developmental difficulties, and conduct problems (Schaaf & McCanne, 1998).

Globally, we are now addressing the issue of violence against children. One such endeavor is the Violence Against Children Survey (VACS) as part of the Together for Girls partnership. Together for Girls is a global public–private partnership dedicated to ending violence against children. The partnership uses the VACS to conduct national surveys to document the magnitude and

impact of violence against children, supporting a coordinated response to strengthen violence prevention, and lead global efforts to promote evidence-based solutions. Current results based on the data released from eight countries in Africa, Asia, and the Caribbean indicate the prevalence of each form of violence varies from country to country and from males to females. Nonetheless, striking overlaps of prevalence patterns occur across physical, sexual, and emotional violence (Schaaf & McCanne, 1998; Turner, Finkelhor, & Ormrod, 2010). Not only are those who are victims of one form of violence likely to experience other forms of violence, but different forms of violence also share common consequences as well as common risk or protective factors (Felitti et al., 1998; Hillis et al., 2017; U.S. Center for Disease Control & Prevention, 2014). Evidence suggests that exposure to multiple types of victimization leads to a higher risk of additional victimization and more traumatic psychological effects (Appleyard, Egeland, van Dulmen, & Sroufe, 2005; DeHart & Moran, 2015; Finkelhor, Ormrod, Turner, & Hamby, 2005).

There are prominent gaps in the research literature pertaining to the interconnections between different types of violence (poly-victimization) and their individual and aggregate impact on health and behavioral outcomes. Most studies on poly-victimization have been conducted in developed countries. Telephone interview with caregivers and children have been the primary mode of data collection (Finkelhor, Turner, Ormrod, & Hamby, 2010). If children or adults were interviewed, most measures focus on past-year or lifetime prevalence, without detailed information on occurrence of violence over the life span. As a comparison, VACS probes exposure to three types of violence directly from children and young adults through face-to-face interview. Event-history methods are used to probe the timing of the first and most recent time of certain type of exposure and overall frequencies of that type of exposure. This allows researchers to examine the co-occurrence of multiple types of violence and evaluate their cumulative impacts on life or health outcomes.

In this study, we attempted to apply structural equation modeling (SEM) to demonstrate interconnection of three types of violence exposure and their associations with mental health outcomes while adjusting for age and sex. In addition, we used ordinal logistic regression to examine whether poly-victimization to violence is associated with exacerbated psychological distress among children and young adults in a dose-response manner.

Method

Overview of Malawi VACS

The Malawi 2013 Violence Against Children and Young Women Survey was the first national survey of violence against children in the Republic of

Malawi and was implemented during September and October of 2013. We will refer to this subsequently in this article as the Malawi VACS. Malawi VACS was a nationally representative household survey of females and males 13 to 24 years of age based on a multistage cluster design. The standard procedures for VACS implementation was published elsewhere (Chiang et al., 2016). In the first stage, a total of 212 enumeration areas (EAs) were selected with probability proportional to size stratified by region (North, Central, and South). In the second stage, a fixed number of 30 households were selected using equal probability systematic sampling. In the last stage, one eligible respondent (female or male depending on the selected EA) was randomly selected from the list of all eligible respondents 13 to 24 years of age in each household and administered the questionnaire. For EAs containing greater than 250 households, segmentation was done to obtain a sample of geographic areas that were of suitable size for the field teams. A total of 2,162 interviews including 1,029 females and 1,133 males were completed (response rate was 83.4% and 84.4%, respectively). The calculation of response rate integrated household- and individual-level response rates (2014). About 59% ($n = 1,265$) of respondents were 13 to 18 years old and 41% ($n = 897$) were 19 to 24 years old. The survey included a short questionnaire for an adult in the household to build rapport with the family and to determine current socioeconomics of the household (e.g., education attainment, household income, wealth and residential conditions). The comprehensive individual questionnaire was administered to a primary respondent randomly drawn from the eligible individuals of the household. The interview lasted 30 to 90 min depending on the respondent's individual experience. The following topics were included: demographics; relationships with parents; family, friends, and community support; school experiences; sexual behavior and practices; physical, emotional, and sexual violence; circumstances around the perpetration of violence; current health status and risk behaviors; and utilization and barriers to health services after experiencing violence. The questionnaire was developed with standardized and previously tested survey methods (Department of Health, 1998; Eaton et al., 2006; Jewkes et al., 2006). Survey questions were further modified to align with cultural attitudes, behaviors, and terminology in the Republic of Malawi. Measures of different types of violence were based on the definitions in the World Report on Violence and Health (Krug, Mercy, Dahlberg, & Zwi, 2002). The final report can be found at http://www.togetherforgirls.org/country-partners/malawi/. Due to the age grouping difference, the data presented in this report may not accord with the country report.

Measures

Experience of sexual, physical, and emotional violence. The respondent was considered to have been exposed to sexual violence if he or she reported any of the following experiences during his or her lifetime: (a) unwanted sexual touching ("Has anyone touched you in a sexual way without your consent, but did not try to force you to have sex?"), (b) attempted unwanted sex ("Has anyone tried to make you have sex against your will but did not succeed?"), (c) physically forced sex ("Have you been physically forced to have sex against your will and sexual intercourse was completed?"), (d) pressured sex ("Has someone pressured you to have sex when you did not want to, and sex happened?"), and (e) noncontact sexual violence/exploitation ("Have you ever participated in a sex photo or video, or shown your sexual body parts in front of a webcam, whether you wanted or not?"). Physical acts of violence include being punched, kicked, whipped, or beaten with an object; choked, smothered, tried to drown, burned, scalded intentionally; or used or threatened with weapons such as a knife. In this survey, the respondent was specifically asked about whether he or she experienced any physical acts of violence perpetrated by (a) intimate partners—husband, boyfriend, or romantic partners; (b) peers—people the same age as the respondent not including a romantic partner, husband, or boyfriend/girlfriend, which includes siblings, schoolmates, neighbors, or strangers the respondent may or may not have known; (c) parents or adult caregivers and other adult relatives; and (d) adults in the community—adults such as teachers, police, employers, religious or community leaders, or neighbors.

Emotional violence is defined as a pattern of verbal behaviors over time or an isolated incident that is not developmentally appropriate and supportive and that has a high probability of damaging a child's mental health, or his or her physical, mental, spiritual, moral, or social development. In this survey, we specifically asked the respondent whether he or she experienced emotional acts of violence perpetrated by parents or caregivers: (a) If someone ever told the respondent that he or she was not loved, or did not deserve to be loved; (b) if someone ever said they wished the respondent had never been born or were dead; and (c) if someone ever ridiculed the respondent or put them down (for example, if someone ever said that the respondent was stupid or useless).

If a respondent reported that he or she experienced any form of violence, he or she was subsequently queried about the age at the first incident ("How old were you the first time . . . ?") and whether the first or most recent incident happened within the past 12 months ("Did this happen to you within the

past 12 months?"). Based on the responses to these follow-up questions, experiences of sexual, physical, and emotional violence during the respondent's lifetime, prior to age 18 and during the past 12 months, were created.

Assessment of psychological distress. The Kessler 6 (K6) scale was originally developed to screen for serious mental illness (Kessler et al., 2003). It has demonstrated excellent internal consistency and reliability across different cultures and ethnic groups. It consists of six questions about how frequently a person has experienced depressive and anxiety symptoms in the past 30 days. Response categories are based on a 5-point Likert-type scale ranging from 0 (*none of the time*), 1 (*a little of the time*), 2 (*some of the time*), 3 (*most of the time*), to 4 (*all of the time*). In structural equation modeling, we treated each item in the K6 as the indicator for a latent factor as "psychological distress." A higher factor score thus reflects a high level of psychological distress. Alternatively, we calculated the sum of the scores from six questions ranging from 0 (*indicating no distress*) to 24 (*indicating severe distress*). People who scored 0 to 4 were defined as having no psychological distress, scores of 5 to 12 indicated mild to moderate psychological distress, and scores 13 or higher indicated severe distress (Prochaska, Sung, Max, Shi, & Ong, 2012). In this study, this three-category variable was used in proportional odds logistic regression to demonstrate dose–response relationship between exposure to multiple forms of violence and extent of psychological distress.

Statistical Analysis

Mplus (Version 7; Muthén & Muthén, 1998-2014) was used for SEM analysis. The analysis was performed from 2015 to 2016. Mplus can properly use weights and clusters in the analytic procedures to accommodate the multistage cluster sampling design of Malawi VACS. As the data contain dichotomous and ordinal variables, we applied the WLSMV estimator. WLSMV is an abbreviation for "weighted least squares parameter estimates with standard errors and a mean- and variance-adjusted chi-square test statistic that use a full weight matrix" (Muthén & Muthén, 1998-2014). The WLSMV approach is preferred when estimating models with any combinations of dichotomous, ordinal, or continuous outcome variables and a small sample size (Kline, 2015; Muthén & Muthén, 1998-2014). We speak of a "statistically significant finding," if we can reject the null hypothesis at least at the 5% level.

A set of analyses was performed to probe whether age group and gender moderate the relationship between each violence exposure and psychological distress. We found no evidence of moderation, so age group and gender were included as covariates in the following analyses.

The SEM model building process was organized by research questions with several steps.

1. Confirmatory factor analysis (CFA) was used to establish statistically accepted measurement models. The three latent factors of sexual, physical, and emotional violence were constructed by the exposure to the respective form of violence prior to age 18 and during the past 12 months. Two time frames served as repeated measurements (past and recent) to reduce measurement error for each type of violence exposure. We also created a latent construct of psychological distress using the K6 scale. The creation of latent factors enabled us to reveal a more robust association between the exposure and outcome of interest.

2. We examined whether sexual, physical, and emotional violence were associated with psychological distress simultaneously. A Multiple Indicators Multiple Causes (MIMIC) model was further constructed to include age group (19-24 years vs. 13-18 years) and gender in the model to tease out the potential confounding effects of age and gender. MIMIC models represent a useful alternative to a multiple-group CFA and can be used to investigate manifest (observed) variables as predictors of latent (unobserved) variables (Kline, 2015; Muthén & Muthén, 1998-2014). It contains both associations among latent variables, represented by single-headed arrows, and correlational or bi-directional relationships among several of the residuals. These are represented by the dual-headed arrows in the diagrams.

The following fit information was used to evaluate the model fit. The ratio of chi-square value to degree of freedom was used as characteristics of model fit. A ratio of less than 3 indicates an acceptable model fit (Schermelleh-Engel, Moosbrugger, & Müller, 2003). A comparative fit index (CFI) value of .95 or higher suggests good fit (Hu & Bentler, 1999). The root mean square error of approximation (RMSEA) less than .06 indicates adequate model fit. The Tucker–Lewis Index (TLI) above the .95 threshold denotes satisfactory model fit. The weighted root mean square residual (WRMR) is well suited for categorical data because it incorporates the asymptotic variances into the computation (Finney & DiStefano, 2006). Values below 1 have been recommended (Yu & Muthen, 2002). The factor loadings are analogous to Pearson's *r*. The squared factor loading is the percent of variance in that indicator variable explained by the factor.

Standardized regression coefficients were presented for effect illustration unless otherwise indicated (Kim & Feree, 1981). The regression coefficients were explained as the effect of a covariate variable on the latent variables

while holding the other covariates constant. Standardized estimates were used to evaluate the relative contributions of each predictor variable to the outcome.

The total effects are equal to the direct effects plus the indirect effects (Bollen, 1987). The direct effects are those influences unmediated by any other variable in the model. Indirect effects are mediated by at least one inter-vening (mediating) variable. They are determined by subtracting the direct effects from the total effects. The direct and indirect effects of age and gender were examined.

SAS-Callable versions SUDAAN Release 11 (http://www.rti.org) was used to conduct descriptive statistical analysis and proportional odds cumulative logistic regression. The dummy variable (1/0) for whether a respondent has experienced each form of violence was summed to create a composite score for multiple exposure for each time frame (lifetime, prior to age 18 and during the past 12 months). Proportional odds logit models were constructed in SUDAAN to quantify the dose–response rela-tionship between clustering of violence exposure (none, one type, two or more types) and psychological distress (none, moderate, serious) in the past 30 days.

Results

About 29%, 70%, and 34% of Malawians aged 13 to 24 years reported experiencing sexual violence, physical violence, and emotional violence during their lifetime, respectively (Table 1). Only 22% had never experi-enced any type of violence. Thirty-nine percent experienced only one type of violence. Prevalence of multiple violence exposure was 39% among Malawian children and youth aged 13 to 24 years. In other words, about four out of 10 violence victims had experienced more than one type of vio-lence. Over one third of Malawians ages 13 to 24 years reported experienc-ing either moderate (28.2%) or serious psychological distress (6.1%) in the past 30 days.

Results From Measurement Models

CFA indicated that two indicators for each violence factor (exposure prior to age 18 and during the past 12 months) were appropriately loaded on the respec-tive violence factor (Figure 1). All the factor loadings are greater than 0.7. Therefore, at least half of the variance in the indicator was explained by the relevant factor. The CFA model fit the data well, $\chi^2(6) = 18.03$, RMSEA = .030, CFI = .996, TLI = .990, WRMR = 0.620. Three factors were significantly inter-correlated (correlation coefficients ranging from 0.430 to 0.608).

Table 1. Weighted Statistics for Victimization to Violence and Psychological Distress Among Malawian Children and Youth by Sex and Age Group.

	Total Weighted % (SE)	Males Weighted % (SE)		Females Weighted % (SE)	
		13-18 Years	19-24 Years	13-18 Years	19-24 Years
Sexual violence					
Lifetime	28.5 (1.8)	17.8 (2.3)	24.9 (2.6)	35.4 (3.5)	34.2 (2.7)
Prior to age 18	22.8 (1.6)	17.8 (2.3)	15.9 (2.3)	35.4 (3.5)	22.7 (2.1)
In the past 12 months	16.3 (1.1)	12.9 (1.9)	12.3 (1.9)	25.8 (2.4)	15.0 (1.7)
Physical violence					
Lifetime	69.7 (1.9)	84.1 (2.1)	73.2 (2.9)	67.5 (3.9)	57.5 (3.1)
Prior to age 18	62.8 (2.3)	84.1 (2.1)	64.6 (3.0)	66.8 (4.1)	42.4 (4.0)
In the past 12 months	35.9 (1.7)	59.5 (2.9)	26.4 (2.5)	40.9 (5.2)	22.3 (2.4)
Emotional violence					
Lifetime	33.5 (1.7)	36.2 (3.2)	38.0 (2.7)	34.0 (3.9)	27.2 (2.9)
Prior to age 18	28.9 (1.5)	35.7 (3.2)	28.5 (2.3)	34.0 (3.9)	20.2 (2.4)
In the past 12 months	19.5 (1.2)	25.8 (2.9)	17.9 (2.1)	22.7 (2.6)	13.7 (1.8)
Number of types of violence experienced (lifetime)					
0	21.6 (1.6)	12.7 (1.8)	20.2 (2.9)	22.8 (3.2)	28.5 (2.6)
1	38.7 (1.3)	48.3 (2.8)	35.8 (2.6)	34.2 (2.7)	37.2 (2.0)
2	26.3 (1.5)	27.0 (2.6)	31.6 (2.6)	26.3 (4.5)	21.4 (2.0)
3	13.4 (1.3)	11.9 (2.1)	12.4 (2.0)	16.7 (3.7)	13.0 (1.6)
Psychological distress[a]					
None	65.7 (1.4)	69.4 (2.1)	61.9 (3.2)	70.1 (2.8)	62.6 (2.5)
Mild to moderate	28.2 (1.5)	23.9 (2.2)	32.5 (2.7)	26.1 (2.6)	29.6 (3.4)
Serious	6.1 (0.7)	6.7 (1.7)	5.6 (1.2)	3.7 (1.4)	7.8 (1.5)

[a]Kessler-6 consists of six questions about how frequently the depressive and anxiety symptoms a person has experienced in the past 30 days. Response categories are based on a 5-point Likert-type scale ranging from 0 (*none of the time*), 1 (*a little of the time*), 2 (*some of the time*), 3 (*most of the time*), to 4 (*all of the time*). The sum of the scores from six questions in Kessler-6 range from 0 (*indicating no distress*) to 24 (*indicating severe distress*). People who scored 0-4 are defined as having no psychological distress, scores of 5-12 indicate mild to moderate psychological distress, and scores 13 or higher indicate severe distress.

The K6 scale was validated into one common factor for psychological distress. The factor loadings ranged from 0.704 to 0.817. This measurement model showed good fit, $\chi^2(9) = 52.03$, RMSEA = .047, CFI = .988, TLI = .980, WRMR = 0.767.

Results From the MIMIC Model

The MIMIC model showed good fit, $\chi^2(64) = 105.71$, RMSEA = .017, CFI = .992, TLI = .989, WRMR = 0.833 (Figure 2). The structural MIMIC model included
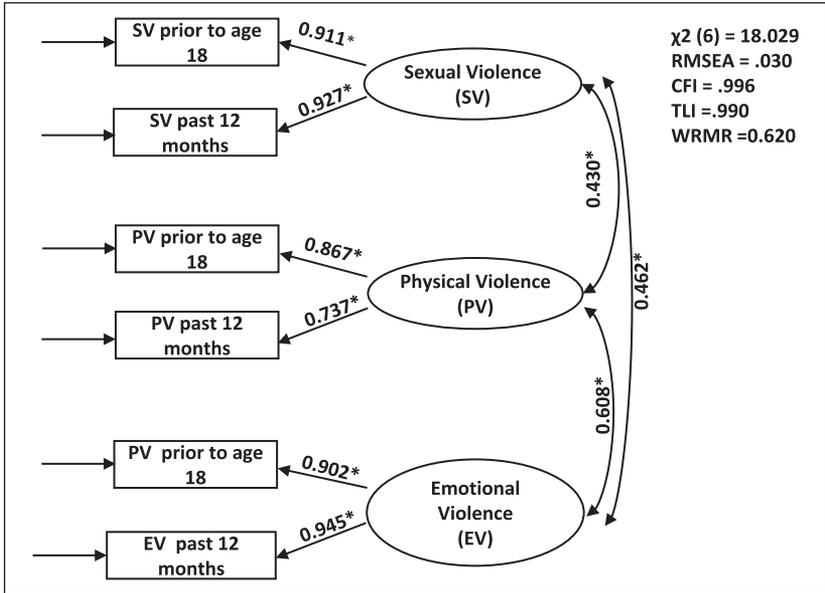
Figure 1. CFA model of the violence (three factors intercorrelated).
Note. Standardized factor loadings (left) and correlation coefficients (right) are shown in the graph. CFA = confirmatory factor analysis; SV = sexual violence; PV = physical violence; EV = emotional violence; RMSEA = root mean square error of approximation; CFI = comparative fit index; TLI = Tucker–Lewis index; WRMR = weighted root mean square residual.
*p < .05.

standardized regression coefficients from each covariate considered in the model and the identified factors. Sexual (standardized $b = 0.19$, $p < .05$) and emotional violence (standardized $b = 0.31$, $p < .05$) exposure were directly associated with psychological distress whereas physical violence (standardized $b = 0.087$, $p > .05$) did not have a significant, direct effect on psychological distress. Rather, physical violence was indirectly associated with psychological distress through its intercorrelation with sexual violence ($r = .46$) and emotional violence ($r = .59$). Overall, 7%, 21%, 4%, and 23% of the variance in sexual violence, physical violence, emotional violence, and psychological distress factors were explained, respectively, by the MIMIC model.

Effects of Potential Confounders

Gender had no significant effects on psychological distress and emotional violence. Males were more likely to report physical violence, whereas
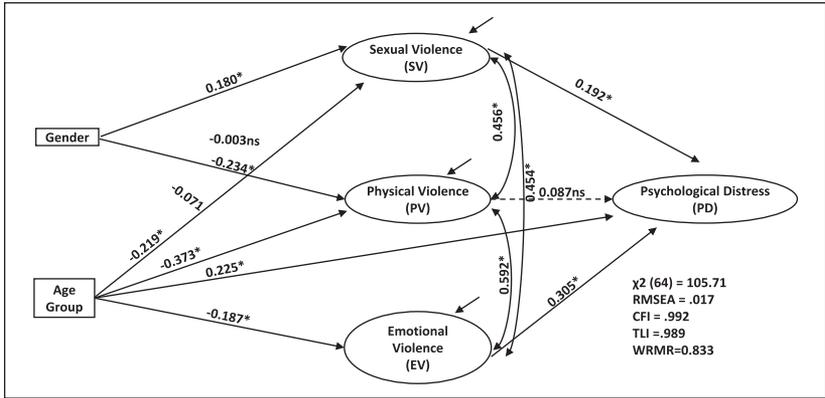
Figure 2. Final MIMIC model.
Source. Malawi Violence Against Children Survey (VACS), 2013.
Note. Standardized path coefficients and correlation coefficients are shown in the graph. Dotted lines indicate nonsignificant regression coefficients. Gender: 1 = male, 2 = female; age group: 1 = 13-18 years of age, 2 = 19-24 years of age. RMSEA = root mean square error of approximation; CFI = comparative fit index; TLI = Tucker–Lewis index; WRMR = weighted root mean square residual.
*p < .05.

females were more likely to report sexual violence. Older individuals experienced higher level of psychological distress than younger ones (the direct effect of age group on psychological distress was $b = 0.225$ ($p < .05$). On the contrary, older respondents reported less occurrence of sexual violence, physical violence, and emotional violence. Therefore, the indirect effects of age on psychological distress through sexual violence, physical violence, and emotional violence were negative ($b = -0.132$, $p < .05$). Thus, the total effect of age on psychological distress was only 0.093 ($p < .05$).

Dose–Response Relationship

Score tests for the proportional odds assumption were nonsignificant and evidenced that the logit surfaces are parallel and that the odds ratios can be interpreted as constant across all possible cut points of the ordinal scale of psychological distress (none, mild to moderate, serious). Proportional odds logistic regression modeling revealed significant linear trends between clustering of violence exposure (measured in lifetime, prior to age 18 or past 12 months) and recent psychological distress after adjustment for age and gender ($p < .001$; Table 2). The association was much stronger for exposure to

Table 2. Proportional Odds Logit Models Regressing Psychological Distress[a] on Number of Types of Violence Exposure by Time Frame.

Number of Types of Violence Exposure	Odds Ratio (95% CI)[b]
Lifetime	
Zero	1.00
One	1.52 [0.99, 2.31]
Two or more	**4.55 [2.98, 6.95]**
Prior to age 18	
Zero	1.00
One	**1.53 [1.04, 2.24]**
Two or more	**3.68 [2.66, 5.09]**
During the past 12 months	
Zero	1.00
One	**2.33 [1.57, 3.19]**
Two or more	**4.57 [2.99, 6.97]**

[a]A three-category dependent variable is used: 0 = no distress, 1 = mild to moderate distress, 2 = severe distress.
[b]The estimates were obtained after adjustment for age and gender.
Boldface indicates statistical significance (p < .05).

two or more forms of violence during the past 12 months (adjusted odds ratio [AOR] [95% CI] = 4.57 [2.99, 6.97]) than that for only one form of exposure (AOR [95% CI] = 2.33 [1.57, 3.19]).

Discussion

The VACS provided evidence of pervasiveness of violence against children in all of the countries that have implemented the survey. This study demonstrated the following: (a) the past and recent exposure of violence were highly correlated, (b) the overlap (clustering) of three forms of violence exposure was common, and (c) exposure to any form of violence was associated with higher score of psychological distress directly or indirectly through associating with other forms of violence. These results were consistent with the literature (Chan, 2013; Finkelhor, Ormrod, & Turner, 2007, 2009; Ford et al., 2010; Segura, Pereda, Guilera, & Abad, 2016; Soler, Kirchner, Paretilla, & Forns, 2013)

The prevalence estimates for violence exposure were consistently lower among the older age groups than among the younger age groups across all time frames (lifetime, prior to age 18, in the past 12 months) and all types of violence. On one hand, the risk of violence exposure and poly-victimization

may indeed decrease with age (Dong, Cao, Cheng, Cui, & Li, 2013); on the other hand, the lower prevalence estimates on exposure prior to age 18 may represent an underestimation of the real burden due to memory decay or reinterpretation of the childhood experiences (Fan et al., 2016).

The findings that girls were more likely to experience sexual violence and boys were more likely to experience physical violence were consistent with reports from African and Western countries (Finkelhor et al., 2010; Turner et al., 2010; U.S. Centers for Disease Control and Prevention, 2015). However, some reports from Asian cultures showed gender equivalence or even higher prevalence of sexual victimization among boys (Chan, Yan, Brownridge, & Ip, 2013; Dong et al., 2013). Higher stigma with sexual victimization among girls may contribute to the lower disclosed rate and spurious gender difference in those reports.

The phenomenon that the older group manifested higher rates of psychological distress than the younger age group among Malawian adolescents and young adults was consistent with the age effects revealed from national surveys from Western countries (Keyes et al., 2014). The inherent time frame of the outcome of our interest (psychological distress during the past 30 days) was relatively proximal compared with the violence exposure we probed (prior to age 18 and past 12 months). The significant dose–response relationship corroborated with the direct associations between violence victimization and psychological distress revealed by prospective and retrospective studies (Connolly & Beaver, 2014; Ebesutani, Kim, & Young, 2014; Kessler et al., 2010; Norman et al., 2012).

We created latent factors for both exposure and outcome variables in our SEM to adjust for the effects of measurement error and mitigate its undesirable consequences. The proposed structural equation model only accounted for 23% of the variance in psychological distress. This indicated that a fairly large amount of variance in psychological distress was left unexplained by the proposed model. Nonetheless, the current study was merely an example of the SEM application in this field. SEM can be a powerful tool to illustrate the complex interrelationship between exposures and the profound adverse effects of violence victimization on the major facets of children's health and life. A variety of externalizing (e.g., aggression and behavioral problems) and internalizing consequences (e.g., depression, anxiety, low self-esteem, cognitive difficulties, social competence problems) can be considered simultaneously in the SEM.

The prevalence of poly-victimization involving different forms of violence reflects a sober reality that all forms of violence may share common risk factors such as poverty, low education resources, unsafe community, deficiency in legal systems, values and norms that do not protect children,

poor parenting, and life skills, and so on (Aho, Gren-Landell, & Svedin, 2016; Felitti et al., 1998; Finkelhor et al., 2007; Ford et al., 2010; Turner et al., 2010). Centers for Disease Control and Prevention (CDC) is promoting a crosscutting approach to address preventing multiple forms of violence (Chiang et al., 2016). Furthermore, the World Health Organization (WHO), along with UNICEF, the World Bank, the U.S. CDC, and PEPFAR (President's Emergency Plan for AIDS Relief), and other global organizations have led efforts to publish *INSPIRE: Seven strategies for Ending Violence Against Children*, as a comprehensive solution for linking violence against children data to sustainable action (WHO, 2016). INSPIRE strategies cross health, social services, education finance, and justice sectors (Implementation and enforcement of laws, Norms and values, Safe environments, Parent and caregiver support, Income and economic strengthening, Response and support services, Education and lifeskills) to provide the best available evidence to prevent violence against children around the world. All these efforts were aimed to advance the call-to-action proposed in the United Nations 2030 Sustainable Development Goals—to end all forms of violence against children (United Nations, 2015). In primary care settings, individuals should be screened for adverse childhood experiences including exposure to violence during their life course. This will help caregivers, individual themselves, and the health care professionals gain better understanding of many health problems and positively influence these health outcomes (Kalmakis & Chandler, 2015; Monnat & Chandler, 2015).

The present study has several limitations. First, we only included direct exposure to physical, sexual, or psychological abuse and did not include witnessing violence in the family or community. Children witnessing violence have been found to display greater levels of depression and other adverse effects especially when witnessing co-occurs with direct abuse (Kolbo, 1996; Margolin & Gordis, 2000). Witnessing of violence can be easily incorporated into an expanded SEM model. Second, we used early life exposure and the past 12-month exposure to construct the latent factor representing a lifetime exposure of violence in SEM based on the nature of high correlations between remote and recent exposure. Although this approach was used to avoid the potential overlap of prior-to-age-18 exposure and past 12-month exposure, the overlap may still exists for some of those younger than 18 years at interview whose only lifetime exposure occurred during the past 12 months. Third, emotional violence may be underestimated because we only assessed emotional violence from the caregivers. We did not consider possible emotional violence from other perpetrators like from schoolteachers and other community members. Fourth, only three out of the 2,162 respondents in our sample responded "yes" to the noncontact sexual exploitation question. Our

ability to measure it accurately is still in question. Fifth, we only considered age and gender as the potential confounders when we illustrated the application of SEM. Nevertheless, a preliminary analysis indicated that education attainment and a composite score of socioeconomic status did not appear to be related to major health outcomes. Future researchers should feel free to expand the model, but bear in mind that more covariates may cause instability in the model (Kline, 2015), and consequently, larger sample sizes may be needed for more complex models.

Implications

Due to the clustering nature of violence victimization and their relation to adverse health consequences, they should be assessed together in public health surveillance and individual screening. In clinical settings and counseling practices, if one type of victimization is disclosed, the others should be probed as well. The structural equation models used in this study can be expanded to include more behavioral and physical outcome domains. Common roots of the violence should be addressed in comprehensive health promotion programs to reduce the exposure and mitigate the adverse effects of violence victimization.

Authors' Note

Authors' Contributions

A.Z.F. contributed to the conception and design of the study, data analysis, and interpretation of the results and drafted the manuscript. H.K. and J.M. contributed to conception and design. S.G., N.W.K., and M.S. contributed to interpretation of the results and critically revised the manuscript. All authors read and approved the final manuscript.

Declaration of Conflicting Interests

Funding

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