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Mediating effects of psychological resilience and self-esteem on the association between early childhood adversity and depressive symptoms among adolescents in Nigeria

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Declarations

Competing of interest: The authors have declared that they have no competing or potential conflicts of interest.

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ABSTRACT

Background: Individuals who experience early childhood adversities are at risk of developing mental health challenges including depression. Psychological resilience and self-esteem can ease the impact of these childhood adversities on mental health. There are limited studies that have evaluated these associations. This study aimed to determine the mediating effects of psychological resilience and self-esteem on the association between early childhood adversity and depressive symptoms among adolescents in Nigeria.

Methods: This cross-sectional study collected data on early childhood adversity, depressive symptoms, psychological resilience, and self-esteem from adolescents 13 years and older between September and October 2020 using an online platform. Multivariate linear regression analysis was conducted to determine the predictors of depression among independent variables (adverse childhood experiences, psychological resilience, and self-esteem), while adjusting for age, education level completed, and sexual identity (heterosexual, sexual minority individuals). Mediation path analyses were also conducted to determine the total, direct, and indirect effects of early childhood adversity on depressive symptoms with psychological resilience and self-esteem as mediators.

Results: There were 1321 complete responses, of which 767 (58.1%) reported depressive symptoms. Depressive symptoms ($B: 0.28, p < 0.001$) were significantly positively associated with early childhood adversity, while psychological resilience significantly mediated the total effect of early childhood adversity on depressive symptoms. The total effect was 0.946 ($p < 0.001$), the direct effect was 0.846 ($p < 0.001$) and the indirect effect was 0.101 ($p < 0.001$).

Conclusion: Targeting efforts to build psychological resilience may reduce the risk of depressive symptoms among adolescents who grow up in an environment like Nigeria where the risk of experiencing early childhood adversity is high.

Keywords: Early childhood adversity, depressive symptoms, psychological resilience, and self-esteem

INTRODUCTION

Early childhood adversities are untoward events experienced during childhood and are associated with physical and (or) mental health difficulties such as depression and low self-esteem, in later life (Boullier & Blair, 2018; Kalmakis & Chandler, 2015; Lew & Xian, 2019; Oral et al., 2016). Depression and low self-esteem have long-term implications for the well-being of affected individuals (Lamers-Winkelmann et al., 2012).

A global study on adult psychopathology reported that early childhood adversities are strongly related to all classes of disorders across the life span in high- and low-income countries (Kessler et al., 2010). Only two (South Africa and Nigeria) out of the 21 countries included in this study were from Africa. A more recent systematic review and meta-analysis that looked at the effect of multiple early childhood adversities reported that the presence of multiple early childhood experiences significantly increased the risk of physical and mental health challenges among the participants of the studies included in the review (Hughes et al., 2017). In the study, not less than 57% of 252 467 participants reported at least one early childhood adversities, while 13% reported at least four. None of the studies were from a low-income country. The prevalence of early childhood adversity is very high in low and middle-income countries (Benjet, 2010; Hillis et al., 2016; Ramiro et al., 2010). Nigeria, a low-middle-income country also has a high prevalence of early childhood adversity (Agbaje et al., 2021; Folayan et al., 2020a; Oladeji et al., 2010) with about 6 in 10 children experiencing at least one form of violence in childhood; and 1 in 6 adolescents aged 13 to 17 years experiencing two or more types of violence in 2014 (National Population Commission of Nigeria et al., 2015). This has been attributed to child poverty and deprivation that is prevalent in many parts of the country (Ogwumike & Ozughalu, 2018). Compared to the rest of the world, there is still a dearth of studies exploring early childhood adversities and related factors among populations in low- and middle-income countries.

One of the potential aftermaths of early childhood adversities is depression. Depression has been reported to found to be significantly associated with clinical depression in the adults and the elderly (Lee et al., 2023; Liu, 2017), and among college students (Mall et al., 2018). Among other mental health challenges, depression remains a common outcome among different populations as presented by the findings of systematic reviews that have explored the associations between depression and early childhood adversities across diverse populations (Juwariah et al., 2022; McKay et al., 2022). However, not all individuals who have experienced early childhood adversities will present with mental health problems. On one hand, psychological resilience - the ability of an individual to retain or regain optimal mental health and functioning after experiencing adversities - can mitigate the adverse impact of early childhood adversities on mental health (Bellis et al., 2018; Ross et al., 2020; Sciaraffa et al., 2018). On the other hand, childhood adversities may be associated with diminished resilience (Beutel et al., 2017). Thus, one mechanism for the association between childhood adversities and mental health problems is through diminished resilience. Resilience has been shown to be associated with mental health challenges. A recent review concluded that the strong associations between resilience and mental health challenges among children and adolescents deserve a prominent role in research (Mesman et al., 2021). In a meta-analysis, resilience was also found to significantly mediate the associations between trauma and depression, with no differences observed between low or high reports of resilience regarding symptoms of depression among individuals who have experienced trauma (Watters et al., 2021). In a more recent study among a nationally representative sample of children in China, the experience of abuse was found to moderate the relationship between resilience and depression (Wen et al., 2023). These studies were conducted mainly among populations from high-income countries. Self-esteem can also similarly mediate the severity of the associations between early childhood adversity, and the associations between early childhood adversity and depression (Kim et al.,

2021). Among young people, low self-esteem is associated with depression (Nguyen et al., 2019) and can mediate the impact of parental and peer support on depression among adolescents (Chang et al., 2018). Similarly, low self-esteem contributes significantly to anxiety disorders among adolescents who identify as sexual minorities (Jones et al., 2017).

Mental health disorders associated with early childhood adversities may be detected early during adolescence (Patel et al., 2007). A few studies conducted in Nigeria had identified an association between early childhood adversities and poor mental health in young people (Agbaje et al., 2021; Edet et al., 2022). There are however, no studies that had determined the association between early childhood adverse events with poor mental health among sexual minority individuals. These sexual minority individuals are adolescents who identify their sexual orientation as being other than heterosexual orientation. Due to the criminalization of same sex relationships, and the social stigma related with their status, these sexual minority individuals in Nigeria face persistent discrimination and persecution which are components of minority stress (Makanjuola et al., 2018; Oginni et al., 2018; Ogunbajo et al., 2021). They also have physical and mental health difficulties (Ogunbajo et al., 2021) which are often poorly addressed because of the challenges with access to health and social services (Epprecht, 2012; Sekoni et al., 2016). The discriminatory anti-same-sex act that criminalizes relations with same-sex practicing individuals makes access to health care and justice challenging for sexual minority individuals (Arimoro, 2019).

Sexual minority individuals are at high risk of early childhood adversities such as childhood sexual and physical assault and emotional maltreatment (McCabe et al., 2020; Oginni et al., 2022; Rothman et al., 2011; Stoddard et al., 2009). Also, greater exposure of sexual minority individuals to these adversities in childhood explained between 10–20% of the relative excess of mental health associated problems in sexual minority young people compared to heterosexuals (McLaughlin et al., 2012). Although the body of literature on the disparities in

childhood abuse between heterosexual and sexual minority individuals is growing, the body of evidence is still sparse with fewer evidence if any from Africa, and none from Nigeria. Therefore, this study aimed to determine the association between adverse childhood experiences, and depressive symptoms in a sample of heterosexual and sexual minority adolescents in Nigeria, and to examine the mediating effect of psychological resilience and self-esteem on this association. We hypothesized that adverse childhood experiences would be positively associated with depressive symptoms among these adolescents; and that psychological resilience and self-esteem will mediate the association between depressive symptoms and adverse childhood experiences.

METHODS

Ethical considerations: Ethical approval was obtained from the Health Research Ethics Committee of the Institute of Public Health at Obafemi Awolowo University in Ile-Ife, Nigeria (IPHOAU/12/1571). Study participants were required to read the information about the research and give their consent before proceeding to complete the remaining sections of the instrument by ticking a checkbox. A waiver for parental consent for adolescents 13-17 years old was obtained for this non-intrusive sexual and reproductive health research in line with the national guidelines on sexual and reproductive health research conducted with adolescents (FMOH, 2014). All study participants were offered compensation for internet data of 100 naira -approximately \$0.27.

Study design, setting, and population: The data for this study was extracted from the database of a cross-sectional study on the sexual, oral, mental, and general health of adolescents, young people and adults in Nigeria. The study recruited a cross-national sample of participants 13 years and above between the 16th of September and the 31st of October 2020. There were no exclusion criteria. For this study, the data of adolescents aged 13 to 19 years, were extracted for analysis.

Sample size: The sample size was calculated based on a prevalence of 67.3.2% experience of childhood adversity by adolescents in Nigeria (Edet et al., 2022), using a desired precision of estimate of 0.05 with a confidence level of 95% for an infinite population size (Pourhoseingholi et al., 2013). The pre-survey minimum sample size for this study was set at 10 valid respondents per each age group for each of the 36 States in Nigeria population group in each of the target states. It corresponds to a minimum sample size of 2520 participants.

The study was conducted during the COVID-19 pandemic when there were containment measures such as transport limitation and social distancing. The study thus, took cognisance of the possibility for missing responses in the absence of guidance, support and motivation for survey response and increased the sample size by 10% to 2772 (Mirzaei et al., 2022). From the statistical modelling perspective, we tried to have a minimum of 10 participants with complete responses per each of the dependent variables for the study enabling us to perform regression analyses with a minimum probability level (p-value) of 0.05 (VanVoorhis & Morgan, 2007).

Study instrument: The study questionnaire contained validated instruments for collecting survey variables. The questionnaire was first reviewed by the study team members which included sexual minority individuals. The instrument was then pre-tested with 18 persons to ensure language sensitivity and appropriateness of content. The questionnaire was shortened by removing sections perceived not to be relevant for the study. This was important to shorten the time for filling the questionnaire. The questionnaire was uploaded to an online survey conducting platform (SurveyMonkey). The survey was administered in English.

Study procedures: The study adopted a convenience sampling approach. Twenty-three peer educators and six study staff of a non-governmental organization shared the survey link with their networks of sexual minorities and heterosexuals. Participant recruitment was boosted through respondent-driven sampling, where initial participants were encouraged to share the survey link with contacts in their countries. The survey link was also posted on social media

(Facebook, Twitter, and Instagram) and the network email lists and WhatsApp groups. Data collection was supported by providing an open link in the offices of the non-governmental organisation and its partners throughout the country to enable target populations with low literacy fill the study questionnaire with support from the peer educators.

Data Variables

Dependent variable

Depressive symptoms: The level of depressive symptoms was measured with the nine-item Patient Health Questionnaire (PHQ-9). Each of the items of this widely used instrument has a range of scores from "0" (not at all) to "3" (nearly every day). The PHQ-9 evaluates the severity of depressive symptoms and is useful in monitoring the response of patients to treatment. Possible scores range from 0 to 27 (Adewuya et al., 2009). Among Nigerian young adults, a one-month test-retest reliability of 0.89 had been documented (Loto et al., 2010). For this study, Cronbach's alpha was 0.93.

Independent variables

Childhood adversity: Childhood adversity was measured with the 10- item Adverse Childhood Experience scale (Felitti et al., 2019). The scale provides a measure of cumulative life stress experienced during childhood. Five of the ten items inquire about personally experienced events: physical abuse, verbal abuse, sexual abuse, physical neglect, and emotional neglect, while five inquire about untoward events that occur in other family members: a parent who's an alcoholic, a mother who's a victim of domestic violence, a family member in jail, a family member diagnosed with a mental illness, and the disappearance of a parent through divorce, death, or abandonment. The response to each of the 10 questions is either 'yes' or 'no,' with possible scores of 0 to 10. The higher the score the more adverse experiences the child has faced. The instrument has been used in Nigeria for a previous study (Folayan et al., 2020b) among a sample of children. It has good psychometric properties, with a high correlation

between mental and physical health measures and childhood trauma inventories. For this study, the Cronbach's alpha of the scale was 0.90.

Psychological resilience: Psychological resilience was assessed using the 10-item Connor-Davidson psychological resilience scale. The items are rated on a five-point Likert scale ranging from 0 ("Not true at all") to 4 ("True nearly all the time"). Possible scores thus range from 0 to 40 with higher scores representing higher psychological resilience. The Cronbach's alpha of the items of the scale was 0.81 for a population of nurses in Nigeria (Aloba et al., 2016). For this study, the Cronbach's alpha of the scale was 0.87.

Self-esteem: Self-esteem was assessed using the 10-item Rosenberg self-esteem scale (Kim et al., 2021). The scales measure global self-worth by measuring both positive and negative feelings about oneself. It is a unidimensional scale with 10 items answered using a 4-point Likert scale format ranging from strongly agree (4) to strongly disagree (1). Five of the items have positively worded statements and five have negatively worded ones. The scores for all ten items are summed and the scores were kept on a continuous scale. Total scores range from 10 to 40, with higher scores representing lower self-esteem. The scale has good psychometric properties with test-retest correlations scores ranging from 0.82 to 0.88, and Cronbach's alpha ranging from 0.77 to 0.88 (Chang et al., 2018; Nguyen et al., 2019). The instrument had demonstrated satisfactory reliability and construct validity (Adewuya et al., 2009; Okwaraji et al., 2016) with a Cronbach's alpha of 0.84 for a population of adolescents in Nigeria (Okwaraji et al., 2016). For this study, the Cronbach's alpha of the scale was 0.81.

Confounders

Sociodemographic variables: The sociodemographic variables were age at last birthday (in years) and education level completed (no formal education, primary, secondary, and tertiary). These were asked using single questions with the participants indicating their age and educational level appropriately.

Sexual identity: Information on sexual identity (heterosexual, gay, lesbian, bisexual, prefer not to say) was extracted for this study analysis. Sexual minority individuals were respondents who self-identified as gay, lesbian, and bisexual. Individuals who preferred not to say their sexual identity (N=38) were not included in the data analysis.

Data analysis: Descriptive statistics were calculated as means and standard deviations or as frequencies and percentages. Two multiple linear regression models were developed to determine the associations between the dependent variables (depressive symptoms and early childhood adversity) and the independent variables (sexual identity, psychological resilience, and self-esteem). The models were adjusted for age and highest level of education level.

Regression coefficients and their 95% confidence intervals (CI) were calculated.

Mediation path analyses were conducted with each model consisting of explanatory, mediation, and outcome variables. We used maximum likelihood estimation and estimated means and intercepts. Bootstrapping was used to generate 95% bias-corrected confidence intervals and standard errors using 500 bootstraps. Standardized estimates (β) were calculated for total, direct and indirect effects of early childhood adversity on depressive symptoms with psychological resilience and self-esteem as mediators. The model was considered to have a good fit if the chi-square test was not statistically significant: the root mean square error of approximation was < 0.05 , the comparative fit index was > 0.90 , and the Tucker-Lewis index was > 0.90 . Significance was set at the 5% level. The IBM Statistical Package for Social Sciences, software version 23 was used for statistical analysis while direct, indirect, and total mediation effects were estimated with IBM SPSS AMOS of the SPSS version 23. Significance was set at $< 5\%$.

RESULTS

The sample consisted of 1321 adolescents with a mean (standard deviation) age of 17.11 (1.60) years were analysed. The mean (standard deviation) score for depressive symptoms was 6.93

(6.04), 19.94 (7.17) for psychological resilience, 14.90 (1.86) for self-esteem and 2.97 (3.41) for early childhood adversity. There were 767 (58.1%) heterosexual and 554 (41.9%) sexual minority participants (333 (25.2%) gays, 124 (9.4%) lesbians, and 97 (7.3%) bisexuals).

As shown in table 1, There are significantly positive associations between depressive symptoms and early childhood adversity ($r = 0.49$; $p < 0.05$). Higher levels of early childhood adversity were associated with being younger ($r = -0.12$; $p < 0.05$) and lower resilience ($r = 0.22$; $p < 0.05$).

Table 1: Correlations showing associations between all the continuous variables

Variables	(1)	(2)	(3)	(4)	(5)
(1) Age in years	1.000				
(2) Self-esteem	0.009 (0.733)	1.000			
(3) Depressive symptoms	-0.115* (0.000)	0.018 (0.504)	1.000		
(4) Resilience	0.105* (0.000)	0.005 (0.865)	-0.312* (0.000)	1.000	
(5) Early childhood adversity	-0.116* (0.000)	0.015 (0.585)	0.490* (0.000)	-0.215* (0.000)	1.000

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

As shown in Table 1, the multivariate linear regression model for the association between depressive symptoms and adverse childhood experiences and explained 38.4% of the variance. Depressive symptoms were significantly and positively associated with early childhood adversity (B: 0.63, $p < 0.05$).

Table 1: Multiple linear regression analysis showing factors associated with early depression among heterosexual and non-heterosexual adolescents in Nigeria (N=1321)

Variables	Total	Depressive symptoms Mean (SD):6.93 (6.04) B (95% CI)	P-value
Age - mean (SD)	17.11 (1.60)	-0.20 (-0.37 – 0.03)	0.024
Sexual identity			
Heterosexual - n (%)	767 (58.1)	1.00	-
Sexual minority individuals -n (%)	554 (41.9)	3.36 (2.81 – 3.91)	<0.05
Educational status			
No formal education -n (%)	76 (5.8)	1.00	-
Primary education -n (%)	60 (4.5)	-1.10 (-2.67 – 0.47)	0.169
Secondary education -n (%)	865 (65.5)	-1.10 (-2.19 – -0.01)	0.049
Tertiary education -n (%)	320 (24.2)	-3.09 (-4.31 – -1.86)	<0.05
Resilience - mean (SD)	19.94 (7.18)	-0.10 (-0.13- -0.06)	<0.05
Self-esteem - mean (SD)	14.90 (1.86)	0.02 (-0.05 - -0.09)	0.611
Adverse Childhood Experiences- mean (SD)	2.97 (3.38)	0.63 (0.55 - 0.70)	<0.05
R Square		0.384	-
Adjusted R		0.291	-
F Change		(8,1312) = 109.93	<0.05

As shown in Figure 1, psychological resilience significantly mediated the total effect of early childhood adversity on depressive symptoms. The magnitude of the total effect was 0.946 ($p<0.001$), direct effect was 0.846 ($p<0.001$) and indirect effect was 0.101 ($p<0.001$). Self-esteem had no significant effect on the association between early childhood adversity and depressive symptoms

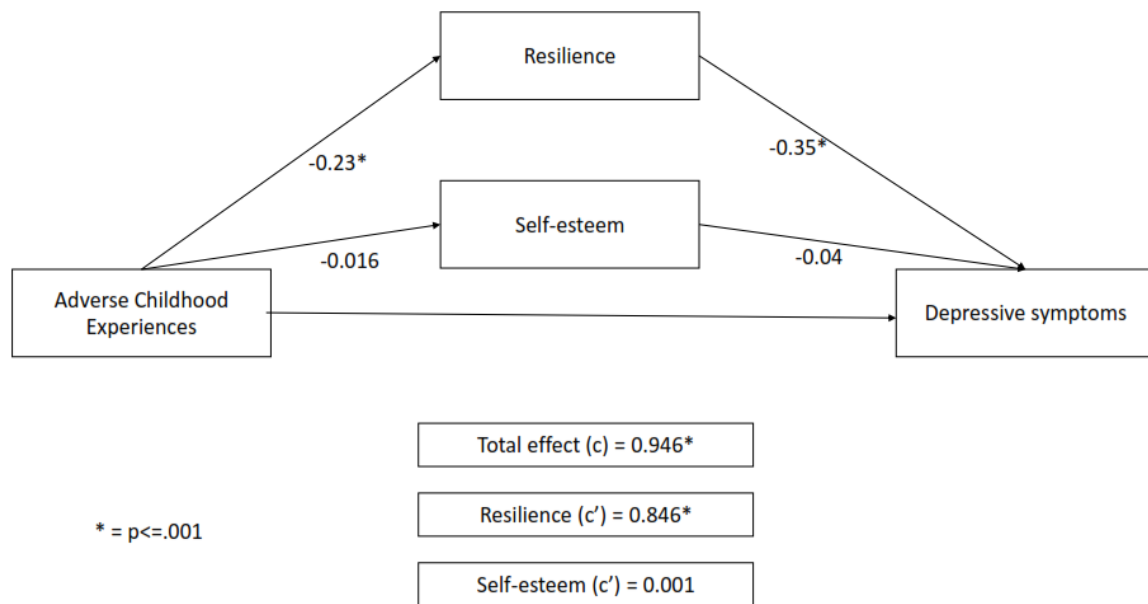


Figure 1: Mediation analysis models showing the direct and indirect effect of resilience and self-esteem on the associations between early childhood adversity and depressive symptoms.

DISCUSSION

We found that the severity of depression increased as the number of adverse childhood experiences of adolescents increased. Also, psychological resilience and self-esteem were not significantly associated with adverse childhood experiences. Psychological resilience, however, mediates the association between early childhood adversity and depressive symptoms. The findings partially supported the study hypotheses.

The study is one of the few studies that has explored the association between early childhood adversity and psychological wellbeing of adolescents in Africa. It provides evidence of the

multidimensional risk factors and the relationships between risk factors for depression among adolescents in Nigeria. Also, the large national sample size allows for robust statistical analysis. However, the cross-sectional design of the study limits the ability to infer causality. The measures were also self-reported with a risk for social desirability bias. We however, used validated instruments into measure the constructs in this study thereby minimizing the risk for bias reporting. Also, we relied on a convenience sample which limits the generalizability of the study finding. We also combined gay/lesbian and bisexual populations to preserve statistical power, though the literature showing that many health risk indicators differ between gay/lesbian and bisexual groups (Blosnich & Bossarte, 2012; Fredriksen-Goldsen et al., 2010). Nevertheless, the study provides some important findings that are important for managing mental health issues among adolescents in Nigeria.

Our study found an association between adverse childhood experiences and depressive symptoms like previous findings (Ångerud et al., 2018; Zare et al., 2018). Experiencing adverse childhood experiences can create a cascade of neurobiological reactions that can further lead to chronic stress (Kirlic et al., 2020). Early experiences of childhood adversities results in functional and structural changes neural changes and cognitive deficits, leading to a heightened predisposition for mental health problems (Ritchie et al., 2009). Chronic stress increases the risks for physical and mental health challenges, including depressive illness (Oshri et al., 2019). Resilience is, however, able to buffer the effects of childhood adversity on distress and reduce the risk for poor mental health that results from experiencing childhood adversity (Beutel et al., 2017; Yang & Clum, 2000). Though self-esteem contributes to the development of psychological resilience, self-esteem was not associated with adverse childhood experiences, nor did it mediate the association between depressive symptoms and adverse childhood experiences. In this study population, therefore, attention should be paid to building psychological resilience to mitigate the impact of adverse childhood experiences on mental

health. Studies are also needed to understand the complex relationship between self-esteem, psychological resilience, and adverse childhood experiences.

A secondary finding of importance was the non-significant associations between sexual identity and adverse childhood experiences which differed from prior findings: sexual minority individuals experience more early childhood adversities than heterosexuals (Hughes et al., 2010; Molnar et al., 2001; Rothman et al., 2011). The risk for childhood adversities in early life by sexual minority individuals may be because of the gender nonconforming behaviors which are often recognized by adults before a child is aware of their sexual identity (Saltzburg, 2004). The association between gender nonconforming behaviors and sexual orientation may be less in a society like Nigeria where there is low awareness about the diversity in sexual identity. This low awareness about the diversity in sexual identity also reduces the risk of children and young persons identifying as a sexual minority individual at an early age. While there are multiple risk factors for adverse childhood experiences in Nigeria, the study results indicates that sexual identity may not be one of the risk factors. However, there is a need to proactively prevent this risk in a population where the level of homophobia is high (Freude & Waites, 2022) with dire consequences as tough as killing sexual minority individuals (Makofane et al., 2014).

CONCLUSION

Adverse childhood experience was associated with depressive symptoms among adolescents in Nigeria. This association is mediated by psychological resilience. Investing in efforts that builds the psychological resilience of adolescents growing up in an environment where the risk for experiencing childhood adverse events is high may reduce their risk for depressive symptoms.

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