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Abstract: The study's aim was to examine the relationship between ACEs and associated correlates among adolescents at a rural private high school in Kenya. An analytical cross-section research design was used, 595 adolescents aged between 13-18 years were selected. Stratified random and simple random sampling method were used in attaining the sample size. Socio-demographic questionnaires, the ten-short version of ACE and Strengths and Difficulties (SDQ) questionnaires were used in data collection. Descriptive and inferential statistics were used to compute data. Bivariate analysis using chi square found that ACEs were significantly associated with emotional and behavioural problems and this was statistically significant at $P<0.05$. Multivariate analysis revealed that form one and two students were at higher risk of having ACEs. Higher ACEs risk was also found among children living in single parent family organization. Being Muslim, exhibiting normal emotional and peer problems were found to be protective factors as they were associated with lower levels of ACEs. This study was limited to one sub county school and therefore the study findings cannot be generalised to the whole country. Future studies can target students from high economic backgrounds, urban areas to assess the prevalence of ACEs and impacts on its associated correlates.

Keywords: ACEs, Emotional and Behavioral Problems, Student

Introduction

Adverse childhood experiences (ACEs), potentially traumatic events, have been reported in all nations and from all socio-economic backgrounds (World Health Organization, 2015). ACEs comprise of physical, emotional, and sexual abuse, physical and emotional neglect, family dysfunctions such as substance abuse, parental divorce or separation, and domestic violence which are directed to a minor (Isohookana, Riala, Hakko, & Räsänen, 2012). A combination of different risk factors across individual, family background, socio-economic and parental background have been found to be associated with one or more ACEs (Thornberry, Matsuda, Greenman, et.al, 2014). Studies have shown that ACEs are associated with stress reactions, emotional and behavioral problems among children and adolescents (Hunt, Slak & Berger, 2017; Moore, & Ramirez, 2016; Bethell, Davis, Gombojav, et.al., 2017). Emotional problems comprise anxiety, depression, and social interaction difficulties while behavioural problems include conduct problems and attention hyperactivity disorders (Saleem & Mahmood, 2013). Previous studies have found that ACEs negatively contribute to poor health outcomes, drug abuse, suicide, depression, obesity, poor physical health, lower educational attainment, impulsivity and aggression, poverty and employment (Metzler, Merrick, Klevens, et.al, 2017; (Perez, Jennings, Piquero, & Baglivivo, 2016). The prevalence of ACEs has been found to be higher among disadvantaged populations such as families experiencing drugs misuse, parental incarceration and the homeless (Roos, Mota, Afifi, et al., 2013). A systematic review of literature has showed that individuals who experienced four or more ACEs in childhood were at greater risk of health problems such as mental illness and self-harm (Hughes, Bellis, Hardcastle, et al., 2017).

Most ACE studies in Kenya have focused on measuring the prevalence of specific adverse experiences and their relationship to mental health on special population such as children or adolescents affected by HIV/AIDS, children staying in care centres, sexually abused hospitalized children and adolescents, child labourers and orphans (Benjet, 2010). A study conducted by Nyagwencha, Munene, James, Mewes and Barke (2018) among 232 adolescents aged 13-18 years in charitable institutions in Nairobi Kenya found that 63.2% had experienced neglect and abuse. Magai and Koot (2019) study in rural Central Kenya among adolescents aged 6-18 years revealed that emotional-behavioral problems in Kenya were highly prevalent. In a longitudinal study conducted by Mutavi and colleagues (2018) at Kenyatta National Teaching and Referral hospital and Nairobi Women's hospital among children who had reported sexual harassment, found that sexually abused adolescents were twice likely to develop depressive symptoms unlike non-abused adolescents (Mutavi,

Obondo, Kokonya, Khasakala, Mbwayo et al, 2018). A replication study by Karsberg and Elklit (2012) on 477 rural Kenya high school students aged 13-20 years found that most of the students had been exposed to ACEs either directly or indirectly boys (96.3%) and girls (91.8%). Of the total respondents 34.5% met the criteria for PTSD. From the above cited past studies, limited research has been conducted in Kenya among vulnerable adolescents in rural private high schools on ACEs and its correlates and this study sought to fill this gap.

Methods

Study Design and Study Population

The study design was cross-sectional. The study population comprised of 595 students in a rural private high school located in Kiambu Sub-County. The students, both boys and girls, were aged between 13 years and 18 years, were in form 1 to form 4 (grade 9 to 12) who were a representative of all ethnic groups in Kenya and from vulnerable family backgrounds that were faced by parental separation, parental death, domestic violence, neglect and some orphaned. Some of the students have experienced emotional/physical neglect due to poverty and some sexual and physical abuse. All the students are on full scholarship for the four years in high school. Exclusion criteria was for those students above 18 years.

Measures

a). Socio-demographic information: The researchers developed the social demographic questionnaire that captured participants age, sex/gender, level of education, religious affiliation, place of residence and family set-up.

b). Short Screening ACE Questionnaire: ACEs were collected by a 10-item screening version of the ACE that covers 10 dimensions with single-item questionnaire developed by Felitti, Anda, Nordenberg, Williamson, Spitz, & Edwards (1998). The scale was used to assess sexual and physical abuse, physical and emotional neglect, domestic violence, parental separation and parental death. The respondents scored on four-point likert scale that comprised of: Never = 0; Once = 1; Two times= 2; Three times 3; Four or more times =4. Each ACE was evaluated separately followed by total ACE score whereby each affirmative answer is worth one point thus the total score could vary from 1 (least exposed to ACEs)-7 points (exposed to all ACEs). High scores of ACEs represent high risk of emotional-behavioural problems. An ACE score of 4 and above reflected an abnormal case.

c). Strengths and Difficulties Questionnaire (SDQ)

The Strength and Difficulties Questionnaire (SDQ) youth version, developed by Goodman Robert (2002) was used for measuring emotional and behavioural problems was also used. Though the version has been developed for the 11 to 17 years, it has also been used for youth up to 18 years with good results (Bøe, Hysing,, Skogen, & Breivik, 2016; Arman, Amel, & Maracy, 2013). In assessing psychiatric problems among Japan children and adolescents SDQ was found to have a sensitivity of 85% and specificity of 80% (Suzuki, & Kita, 2016). In a study cross-sectional conducted among 137 adolescent form 1-3 students in Nairobi Kenya aged 14-19 years the SDQ was found to have a confidence level of 95% and a precision of 5% (Wambua, Obondo, Bifulco & Kumar, 2018).

The questionnaire consists of 25 items with 5 subscales of 5 items each assessing emotional problems, peer problems, conduct problems, hyperactivity problems and prosocial behaviour. The items on the SDQ were scored on three-point likert scale that comprise of: Not true = 0; somewhat true = 1; and certainly true = 2 for each of the five scales the score ranges from 0-10 if all the five items were completed. To calculate total difficulties, summaries for emotional problems, conduct problems, hyperactivity and peer problems are added up and rounded to the nearest whole number after recording the reversed items. A higher score on prosocial subscale reflects strengths. Scores for prosocial behaviour range from 6-10-normal; 5-borderline; 0-4-abnormal. A higher score on the other four subscales indicates difficulties. Scores for total difficulties range from 0-15-normal; 16-19-borderline and 20-40 abnormal (a higher score reflects more problems). For our analysis, we combined normal and borderline to form normal while the abnormal remained abnormal. If we had combined borderline and normal to form abnormal, we would have inflated the prevalence of abnormal than the prevalence found of emotional and behavioural prevalence found in the country.

Data Collection Procedure

The school principal was approached in order to explain the aim of the study and plan on when final data collection was to be conducted. After permission was granted by the head teacher, a day was chosen when the researcher assembled all students in the school hall and explained the nature of the study. This was done in an afternoon after the lessons. Those students who felt that they wanted to participate in the study and were within the age range of up to 18 years remained in the hall and the rest were free to leave. Those who were left were given the assent document to read and the researcher answered any question that arose.

Confidentiality, volunteerism, and anonymity were emphasized. Study numbers were used instead of names. In order to offer help to students who would be identified as requiring counseling or mental health services, each participant was allocated a number and their names written separately on a foolscap. The names were kept safely by the researcher in a locker to uphold confidentiality. Counseling psychology university students from different universities on practicum acted as research assistants and were trained on data collection process. The assistants distributed questionnaires and remained in the hall to maintain order among the students while they responded to the questions. Research assistants reminded the students to respond to all the items. Two cartons were placed at the front of the hall for the students to drop their completed questionnaires. No student could leave with the questionnaire whether answered or unanswered from the hall. Once all the students completed filling and dropping their questionnaires in the boxes, the interns carried the boxes and handed them over to the researcher who was not be in the room during the exercise but outside for any consultation.

Human Subject Protection

Participants were given full information about the study, risks, or benefits of taking part in the study in order to make an informed choice of either participating or not participating. They were given freedom to decline, to participate or withdraw from the study at any time. For the participants less than 18 years the school principal consented on their behalf. The school is a boarding school and since the study was not invasive, the school principal consented for them as the guardian while they are in school. Those who agreed to participate signed the assent/consent form as a proof of their willingness and not coercion from the researcher. All respondents were treated fairly by being given an opportunity to participate in the study and none received special treatment from the researcher.

Data Analysis

Both descriptive and inferential statistics were done. In descriptive statistics totals and percentages were used while in inferential statistics, chi square tests and multivariate analysis were done. Data was cleaned and analysed using SPSS version 21. Results were presented in tables.

Results

A total of 622 self-administered questionnaires were given out. Of the 622 returned questionnaires, nine were returned unanswered (1.4%), another 9 were spoilt while 9 (1.4%) others were students above 18 years. A total of 595 (96.9%) questionnaires were analyzed. The mean of adverse events experienced by students was 4.01 (95% CI 3.86 - 4.16) and SD 1.891. The Cronbach alpha of the Short Screening ACE Questionnaire was .78 while that of the SDQ was .75

Social Demographic Characteristics

The socio demographic characteristics of respondents included in the analysis are shown in Table 1**.** Most of the respondents (62.4%) were aged between 16-18 years and only 37.6% were aged between 13 and 15 years. With regards to gender, the respondents were distributed equally with male forming 50.1% and female 49.9%. In terms of level of education, form four group were the least 10.9%. Those with both parents were equal to those who lived with a single parent, while half of the participants belonged to the protestant religion.

At the bivariate level using the chi square test comparing ACE and social demographic characteristics, different constituents of emotional and behavioural problems and finally emotional and behavioural problems or total difficulties, the following were found to be associated with ACEs and were statistically significant at P<0.05: level of education, p=0.031, religion p <0.001, family organization, p <0.001, emotional problems p <0.001, conduct problems p=0.001, Hyperactivity problems p=.004, Peer problems p <0.001 and finally Total difficulties p <0.001 **(**Table 2).

We then carried out multivariate analysis to find out the variables associated with ACEs. There was evidence of association between ACEs and level of education. Form fours was the reference group. The odds of having higher ACEs risks among form ones was 2.873 (95% CI 1.500 – 5.503), P 0.001. Among the form twos odds of having higher ACEs risks was 2.048 (95% CI 1.070 - 3.920), P=.030. Finally, among the form threes odds of having higher ACEs risks was 2.410 (95% CI 1.249 -4.647), P=.009. There was also evidence of association between higher risks of ACEs and certain family organizations. For children living with both parents, the odds of having higher ACEs risks was 3.719 (95% 1.718 - 8.048), P=.001. For the children living with single parents, the odds of having higher ACEs risks was 6.494, (95% 2.985 - 14.130), P<.001. The odds of having higher ACEs risks

among children living with their grandparents was 5.692 (95% CI 1.870-17.320), P=.002. Living in an orphanage was the reference. There were protective factors identified. Being a Muslim follower was associated with lower levels of high-risk ACEs, odds .154 (95% CI .067-.352), P<0.001. Students with normal emotional problems were also associated with lower risks of ACEs odds .599 (95% CI .318 -1.131), P=.114. Having normal peer difficulties was associated with lower levels of ACEs with odds of having high risk ACEs being .331 (95% CI .145 -.754), P=.008.

Discussion

The current study sought to find out the if the students at a rural private high school in Kenya suffered any ACEs and also find out its correlates. Bivariate analysis using chi square test found that ACEs correlated to emotional behavioral problems or total difficulties (p <0.001). These findings are corroborating with those of De Boer, van Oort, Donker, Verheij, and Boon (2012) study conducted among UK inpatient adolescents that revealed an association between abuse and emotional-behavioural problems. There was an association between ACEs and level of education p=0.031. (Table 2)

At the multivariate level the odds of having higher ACEs risks was among form ones (P 0.001) and form twos (P=.030). These group comprised of student who were on their onset of adolescent (13-15 years). These group of students might be still experiencing some form(s) of abuse and genuinely reported about it. Since they have been in school lesser years, they might not have benefitted from various interventions set up by the school unlike their counterparts in form three and four. These findings were consistent with those from a previous study conducted in Western region of Kenya, whereby 67% of adolescents had prior experience of abuse before admission to a learning institution (Morantz, Coleb, Ayaya, Ayuku, & Braitstein, 2014). Similar findings have also been reported by (Bakoula et.al., 2010; Armand et al., 2012) who found emotional-behavioral problems, total difficulties and hyperactivity to be higher among younger adolescents. Other studies have found that externalizing problems (hyperactivity problems) decrease with age (Merikangas et al., 2012). However, current findings are inconsistent with Lien, Green, Welander-Vatn and Bjertness (2011) Norway study that found lower emotional-behavioural problems scores among younger adolescents and higher emotional-behavioural problems scores among older participants. In a Swiss epidemiological study among adolescents aged 11-16 years old, older adolescents (16 years) presented with higher ADHD, externalizing behaviors than younger ones (León, Felipe, Polo, Fajardo, 2015). Despite experiencing the many ACEs those with

good friends, less emotional problems such as anxiety and depression were at lower risk of ACEs (1-3 score).

Single parenthood has been found to be a risky factor for maltreatment of children (WHO, 2013). In a UK cohort study of more than 14,000 respondents revealed an association between family organization with high child maltreatment among single parents and reordered (with step-parent) (Pelton, 2015). Other previous studies have found similar relationships for instance a study by Atwoli, Ayuku, Hogan, et al (2014) found increased abuse among children who were facing parental separation. Current study findings were in agreement with the above studies. Multivariate analysis found that the odds of having higher ACEs risk was higher among children living with single parents (6.494, P<.001) followed by those in both parent family set up (3.719, P=.001). The current study could not ascertain whether living with one parent was the actual risk factor for ACEs or whether poverty since all participants came from poor backgrounds. Meinck, Cluver, Boyes, and Ndhlovu (2015) found that risk of abuse among 13-19-year olds was extreme poverty, inconsistence discipline, family conflict and living with caregivers. Inconsistent discipline and poverty among single parent family structure might have contributed to the significant levels in the current study. However, current findings are inconsistent with other previous studies that found the relationship between ACEs and total difficulties to be high among orphaned adolescents (Biswas & Rao, 2011; Seyf Hashemi et al., 2012; Rahman, Mullick, & Pathan, 2012; Sg, Kumar, Ramgopal, & Dandona, 2016; Simsek, Erol, Oztop & Münir (2010).

A study by McCormick, Wesley & Carroll, Timothy & Sims et.al. (2018) bivariate correlations showed significant relationship between ACEs and all religious/spiritual struggles among young people with prior ACEs. Findings from the current study revealed a significant relationship between ACEs and religion (p <0.001). Being Muslim was associated with lower levels of high-risk ACEs, odds (.154, P<0.001). Muslim communities seem to provide friendship, support and opportunities for development that help children build resilience and protect them from negative impacts of ACEs. These findings corroborate with those of Fischer; Peter & Ai; Amy & Aydin; Nilüfer & Frey; Dieter & Haslam (2010) that found both Muslims and Christians are disposed to ACEs but each religious identity provide different coping strategies. Fischer et.al. (2010) study hypothesized that when confronted with a stressful life event, Muslims were more likely to adopt interpersonal (collective) coping strategies (such as seeking social support or turning to family members), while Christians were more likely to engage intrapersonal (individualistic) coping mechanisms, such as cognitive restructuring or reframing the event.

Conclusion

Child and adolescent abuse are common in most countries although its prevalence vary from one country to the other. The study provided evidence that there is an association between ACEs and its associated correlates. Students who were in lower forms, single parent families were at higher risk for ACEs however those from Muslim religion, who had normal peer and emotional problems were at a lower risk for ACEs. It is important to note that many children and adolescents are exposed to various ACEs while in reality ACEs can be easily prevented. There is need for schools, health sectors and families to adopt strategies that can help reduce the prevalence of ACEs among children. This study was conducted in one sub county and among adolescents from vulnerable background thus the results cannot be generalized to the whole country. Future studies can target students from high economic backgrounds, urban to assess the prevalence of ACEs and impact on its associated correlates.

Ethics

The study was approved by Tangaza University Ethical and Research Committee and National Commission for Science Technology and Innovation.

Conflict of Interest

The authors declare that there is no conflict of interest associated with this publication.

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Table 1: Socio-Demographic Characteristics of the Respondents

Variable		Frequency	Valid Percent
Age group	13-15 years	224	37.6
	16-18 years	371	62.4
	Total	**595**	**100**
Gender	male	298	50.1
	female	297	49.9
	Total	**595**	**100**
Form	form 1	183	30.8
	form 2	184	30.9
	form 3	163	27.4
	form 4	65	10.9
	Total	**595**	**100**
Religion	Catholic	129	21.7
	Protestant	294	49.4
	Muslim	52	8.7
	Other religion	120	20.2
	Total	**595**	**100**
Place of Residence	Rural	372	62.5
	Urban	223	37.5
	Total	**595**	**100**
Family organization	Both parents	259	43.5
	Single parent	257	43.2
	Stepparent	9	1.5
	Grandparent	27	4.5
	Orphanage	43	7.2
	Total	**595**	**100**

Table 2: Bivariate analysis of factors associated with ACEs

Variables	Total %	ACEs		Chi-Square Test		
		Low Risk (1-3 score)	High Risks (4-10)	X^2Value	df	P value.
Age						
13-15	224(37.6)	92(41.1)	132(58.9)	.384	1	0.535
16-18	371(62.4)	162(43.7)	209(56.3)			
Gender						
Male	298(50.1)	132(44.3)	166(55.7)	.630	1	0.428
Female	297(49.9)	122(41.1)	175(58.9)			
Level of Education						
Form 1	183(30.8)	68(37.2)	115(62.8)	8.910	3	**0.031**
Form 2	184(30.9)	79(42.9)	105(57.1)			
Form 3	163(27.4)	69(42.3)	94(57.7)			
Form 4	65(10.9)	38(58.5)	27(41.5)			
Religion						
Catholics	129(21.7)	54(41.9)	75(58.1)	31.384	3	**<0.001**
Protestant	294(49.4)	116(39.5)	178(60.5)			
Muslim	52(8.7)	41(78.8)	11(21.2)			
Others	120(20.2)	43(35.8)	77(64.2)			
Residence						
Rural	372(62.5)	152(40.9)	220(59.1)	1.357	1	P=0.244
Urban	223(37.5)	102(45.7)	121(54.3)			
Family Organization						
Both Parents	259(43.5)	127(49.0)	132(51.0)	24.578	4	**<0.001**
Single Parents	257(43.2)	84(32.7)	173(67.3)			
Stepparents	9(1.5)	5(55.6)	4(44.4)			
Grandparents	27(4.5)	10(37.0)	17(63.0)			
Living in Orphanage	43(7.2)	28(65.1)	15(34.9)			
Emotional problems						
Normal	513(86.2)	237(46.2)	276(53.8)	18.742	1	**<.001**
Abnormal	82(13.8)	17(20.7)	65(65)			
Conduct Problems						
Normal	520(87.4)	235(45.2)	285(54.8)	10.566	1	**.001**
Abnormal	75(12.6)	19(25.3)	56(74.7)			
Hyperactivity Problems						
Normal	559(93.9)	247(44.2)	312(55.8)	8.463	1	**.004**
Abnormal	36(6.1)	7(19.4)	29(80.6)			
Peer problems						
Normal	536(90.1)	244(45.5)	292(54.5)	17.736	1	**<.001**
Abnormal	59(9.9)	10 (16.9)	49(83.1)			
Emotional and Behavioural problems (Total Difficulties)						
Normal	538(90.4)	248(46.1)	290(53.9)	26.654	1	**<.001**
Abnormal	57(9.6)	6(10.5)	51(89.5)			

Table 3 Multivariate analysis Results

Variable	ACEs Low Risk (1-3 score)	High Risks (4-10)	OR	95 %CL		P Value
				Lower	Upper	
Level of education						
Form 1	68(37.2)	115(62.8)	2.873	1.500	5.502	**.001**
Form 2	79(42.9)	105(57.1)	2.048	1.070	3.920	**.030**
Form 3	69(42.3)	94(57.7)	2.410	1.249	4.647	**.009**
Form 4	38(58.5)	27(41.5)	**Reference**			
Religion						
Catholics	54(41.9)	75(58.1)	0.695	.398	1.214	0.201
Protestant	116(39.5)	178(60.5)	.866	.537	1.397	0.555
Muslim	41(78.8)	11(21.2)	.154	.067	.352	**<0.001**
Others	43(35.8)	77(64.2)	**Reference**			
Family Organization						
Both parents	127(49.0)	132(51.0)	3.719	1.718	8.048	**.001**
Single parent	84(32.7)	173(67.3)	6.494	2.985	14.130	**<.001**
Stepparent	5(55.6)	4(44.4)	2.305	.466	11.399	.306
Grandparent	10(37.0)	17(63.0)	5.692	1.870	17.320	**.002**
Living in orphanage	28(65.1)	15(34.9)	**Reference**			
Emotional Problems						
Normal	247(44.2)	312(55.8)	.440	.225	.858	**.016**
Abnormal	7(19.4)	29(80.6)	**Reference**			
Conduct Problems						
Normal	235(45.2)	285(54.8)	.599	.318	1.131	.114
Abnormal	19(25.3)	56(74.7)	**Reference**			
Hyperactivity Problems						
Normal	235(45.2	285(54.8)	.448	.168	1.198	.110
Abnormal	19(25.3)	56(74.7)	**Reference**			
Peer Problems						
Normal	244(45.5)	292(54.5)	.331	.145	.754	**.008**
Abnormal	10 (16.9)	49(83.1)	**Reference**			
Emotional and Behavioural problems (Total Difficulties)						
Normal	248(46.1)	290(53.9)	.428	.145	1.267	.125
Abnormal	6(10.5)	51(89.5)	**Reference**			