Prevalence of Suicidal Behavior among Adolescents with Depressive Disorders and Posttraumatic Stress in Informal Settlements of Nairobi, Kenya

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Abstract

Suicide is one of the top causes of death among adolescents and young adults aged 15 to 29 years old, ranking second globally. Suicidal behavior (SB) tends to be common among psychiatric patients, making it a complex mental health problem. High suicide rates have been recorded among adolescents, hence the need for this study. The objectives for this study were to establish the prevalence of suicidal behavior, determine the prevalence of SB among adolescents with Depressive Disorders (DD) and/or Post-Traumatic Stress Disorders (PTSD) and relate the prevalence of SB to socio-demographic characteristics of adolescents in informal settlements of Nairobi. Understanding the prevalence of SB is critical in suicide prevention effort. A total of 1,040 high school students in Nairobi, Kenya participated in the study. Data was collected by use of a socio-demographic questionnaire and three standardized psychological tests; SBQ-R for assessing suicidal behavior, BDI-II for DD and PCL-5 for PTSD. Data from the cross-sectional study was analyzed using SPSS version 24 software. The results indicated 21.5% overall prevalence of SB, 17.0% PTSD comorbid with SB, 16.6% DD with SB and 15.0% DD with PTSD and SB among the 1,040 adolescents from informal settlements of Nairobi. The prevalence was significantly higher (p<0.01) among female respondents in comparison to males. The high rates of SB among high school adolescents with DD and PTSD imply a need for relevant psychological assessments and interventions in non-clinical settings.

Key words: suicidal behavior, prevalence, depressive disorders, post-traumatic stress disorders, socio-demographic characteristics, adolescents.

Introduction and Background

Suicidal behavior (SB) is a global problem that has been in existence from time immemorial, as depicted in Biblical characters and in ancient Greek literature (Laios, Tsoukalas, Kontaxaki, Karamanou, & Androutsos, 2014; Mathew 27:5). SB is defined as any intentional action by a person which is likely to cause their death. It includes suicidal ideations, plans and executions

(McKinnon, Gariépy, Sentenac, & Elgar, 2016). Suicidal plans and attempts are a precursor to eventual death by suicide and thus needs to be assessed early, with intentions of intervening and ultimately preventing suicide. Psychiatric disorders tend to increase the susceptibility to SB. About 90% of suicidal cases are associated with psychiatric disorders (Arsenault-Lapierre, Kim, Turecki, 2004; Cavanagh, Carson, Sharpe, & Lawrie, 2003; Phillips, 2010). Hence, individuals with multiple suicide attempts tend to have more psychiatric disorders with greater levels of comorbidity (Nock, Hwang, Sampson, & Kessler, 2010; Osváth, Kelemen, Erdös, Vörös, & Fekete, 2003).

 World Health Organization (WHO) indicated that globally suicidal deaths account for 1.4% of all deaths with cases of suicidal attempts being 20 times much higher than actual suicides (WHO, 2019). According to WHO (2018), the highest suicide rates per country were reported in Lithuania, a country in Eastern Europe, followed by Russia also in Eastern Europe, the third was Guyana in South America, and the fourth in South Korea in Asia, each at 31.9, 31, 29.2 and 26.9 suicides per 100,000 people respectively. These statistics indicate that SB is a global concern and cuts across all cultural and regional boundaries. Suicide occurs throughout the lifespan, however, the Institute of Health Metrics and Evaluation (IHME, 2016) reported higher prevalence among adolescents and the youth, causing about 8.64% of deaths. It is estimated that for every adolescent who commits suicide, there are 400 more attempting to commit suicide (Cutler, Glaeser, & Norberberg, 2001). This may indicate that there is a high number of high school, college and university students with high levels of stress and low coping ability leading to despair (Schwartz, 2006).

A higher prevalence of SB ranging from 11% to 47.5% was established among adolescents in diverse settings (IHME, 2016; Korb & Plattner, 2014; Palmier, 2011; Van Niekerk et al., 2012). According to Muehlenkamp, Claes, Havertape, and Plener (2012) the global prevalence of SB among adolescents was 18.0%. In a study conducted among high school students aged 15-16 years from 17 European countries, 10.5% were found to have attempted suicide and 7.4% had frequent suicidal thoughts (Kokkevi, Rotsika, Arapaki, & Richardson, 2012). A cross-sectional epidemiological study of 1180 adolescents and young adults in Germany established the prevalence of suicidal ideation to be at 10.7%, suicidal plans at 5.0%, and suicidal attempts at 3.4% (Voss et al., 2019). Voss and colleagues noted higher incidences of SB among females

when compared to males. In Canada 8.1% adolescents had suicidal ideations and 4.1% had actually attempted suicide (Georgiades et al., 2019). The one-year mean prevalence of SB in China was found to be 17.2% in school-based surveys of adolescents aged 12–18 years (Liu, Huang, & Liu, 2018).

In regard to gender, more females compared to males have been found to present with SB. An ongoing longitudinal study among 11 831 Chinese adolescents established the lifetime prevalence of suicidal thoughts, plans, and attempts to be higher for females (23.5%, 10.7%, 4.6%) than for males (17.6%, 8.9 %, 3.4%) respectively (Liu, Chen, Liu, Wang, & Jia, 2019). Likewise, in Malaysia a study of school-going adolescents aged 16-17 years (n=2789) found the prevalence of female adolescents to be higher than that of males. The study also established a 6.2% prevalence of suicidal ideation (Chan et al., 2016). This indicates that the prevalence of SB may differ from region to region. However, the prevalence of females has consistently been found to be higher in comparison to that of males.

Although suicide cases have been noted in all regions of the world, over 79% of global suicides occurred in the low- and middle-income countries (WHO, 2019). In Africa, suicidal deaths were estimated to be over 34,000 annually (Mars, Burrows, Hjelmeland, & Gunnell, 2014). According to Mars et al. (2014), the numbers in Africa were a poor estimate since data was unavailable in more than two-thirds of the countries. However, there are still a few studies in Africa that have focused on SB. In Nigeria, a study of 1429 youths aged 10 to 17 years old estimated a prevalence of over 20% on suicidal ideation and approximately 12% on suicidal attempts (Omigbodun, Dogra, Esan, & Adedokun, 2008). Higher prevalence was established among females in Nigeria compared to males. It was also notable that more older adolescents than the younger ones presented with SB (Ojuade, Munene, & Mbutu, 2018). Other studies (Boeninger, Masyn, Feldman, & Conger, 2010; Burrows & Laflamme, 2008; Cash & Bridge, 2009; Glenn et al., 2019; Thompson & Light, 2011) have also indicated greater prevalence of SB among older adolescents in comparison to younger ones. Therefore, while SB is highly prevalent among adolescents of all ages, it seems to increase with age.

A comparison of the prevalence of SB across African countries indicated higher rates on suicidal ideations (47.5%) and attempts (28.7%) in Botswana, while SB in general was high at 32.3% in

South Africa (Korb & Plattner, 2014; van Niekerk, Scribante, & Raubenheimer, 2012). Another study estimated the prevalence of SB among students to range from 19.6% in Uganda to a high of 31.9% in Zambia (Swahn, Bossarte, Elimam, Gaylor, & Jayaraman, 2010). It therefore appears that despite the fact that suicidality has been understudied in Africa, there is still some substantial evidence to suggest higher rates of suicide in Africa compared to higher-income countries in America and Europe (Georgiades et al., 2014; Kann et al., 2014; Kokkevi et al., 2012; Liu et al., 2018; Voss et al., 2019). A study by Palmier (2011), which ranked the prevalence of SB among adolescents in sub-Saharan Africa, found its highest rates in Zambia (31.9%), followed by Kenya (27.9%), Botswana (23.1%), Uganda (19.6%) and Tanzania (11.2%) in that order. The ranking indicates a high prevalence of suicidality in Kenya which was ranked second in sub-Saharan Africa. It is therefore obvious from the foregoing that the high rates of SB among adolescents in developing countries necessitate effective intervention measures.

In Kenya, there has been an increase on suicidal deaths, with reported cases rising from about 265 to 421 between the year 2008 and 2017 (WHO, 2018). Mutisya (2016) noted that just like in most African countries, it was hard to establish the actual prevalence of suicidal deaths or attempts, since national records depended on the few cases reported in health centers and police stations. However, from the scanty records used by WHO (2018), Kenya was ranked at position 162 among 183 countries on the rates of suicide. Other studies (Jenkins et al., 2015; Palmier, 2011) estimated the prevalence of SB in Kenya to be 24.1% among adults and 27.9% among adolescents. This indicates that although in the low and middle income countries SB is highly prevalence in the general population, it is much higher among the adolescents.

Focusing on SB among persons who are depressed and have experienced trauma, studies (Alix, Cossette, Hébert, Cyr, & Frappier, 2017; Barbosa et al., 2014), have established that many individuals who experienced trauma in form of physical, emotional and sexual abuse were likely to have attempted suicide more times than the general population. This category of persons who are highly likely to present with PTSD tend to display self-destructive and impulsive behaviors including multiple suicide attempts (Foa, Keane, & Friedman, 2000). A study by Jeon et al. (2014) found PTSD to be a comorbidity that showed the highest odds ratio with suicidal attempts in respondents who had experienced serious trauma. Persons with PTSD are likely to present with

multiple psychiatric disorders as they struggle to cope with trauma. Suicidal patients often meet the criteria for both PTSD and DD since they are frequently comorbid (Stevens et al., 2013). Consequently, more cases of suicidal attempts have been reported among respondents with comorbid PTSD and DD (Oquendo, Baca-Garcia, Mann, & Giner, 2008). Therefore, it is not surprising that SB is highly prevalent among psychiatric patients presenting with DD and PTSD.

Studies in Kenya have established SB to be highly associated with DD as well as PTSD among adults' and students' population (Khasakhala et al., 2013; Ndetei et al., 2007; Ongeri et al, 2018; Othieno, Okoth, Peltzer, Pengpi, & Malla, 2015). The findings of a study among university students in Kenya, revealed that existence of a history of physical abuse and DD was one of the risk factors for suicidality (Othieno et al., 2015). The researcher did not find a study in Kenya focusing on the prevalence of SB among adolescents with DD and PTSD in the informal settlements. Since SB is a precursor to suicide, understanding its prevalence and the associated mental disorders is crucial in suicide alleviation effort, hence, the need for this study.

Methodology

A descriptive cross-sectional design was adopted in the current study. The study was conducted in four high schools located in informal settlements of Nairobi County. Nairobi County is one of the 47 counties in the Republic of Kenya and holds the capital city. Nairobi County was purposefully selected since it has a large cosmopolitan population thus, a good representative for generalization to other counties in Kenya. According to the Ministry of Education, Science and Technology (MEST), Nairobi County has a total of 235 secondary schools, comprising 77 public secondary schools and 158 private secondary schools. The secondary schools in the county have a total enrollment of 69,934 students; 44,981 in public schools and 24,953 in private schools (MEST, 2014). The respondents from all classes; forms 1, 2, 3 and 4, who were present and gave their assent were included in the study.

The sampled secondary schools had a total population of 2516 students. The schools were purposively selected since they were mixed-day secondary schools located in the informal settlements of Nairobi County. Most of the students in the mixed-day schools located in informal settlements are from low socio-economic backgrounds characterized by; lack of basic

needs, insecurity, rape, easy access to drugs and alcohol as well as prostitution (Onyango & Tostensen, 2015). Due to the difficulties faced, these students are at a high risk of developing PTSD and DD.

The researcher developed socio-demographic questionnaire was used to capture the age, gender, religion, types of caregivers, year of study and economic status of the respondents. The standardized tests used comprised the Suicide Behavior Questionnaire-Revised (SBQ-R) which assesses suicidal tendencies, PTSD Checklist for DSM-5 (PCL-5) for screening PTSD and Beck's Depression Inventory second edition (BDI-II) for assessing levels of DD. Previous studies have proved the validity and reliability of these tests. The SBQ-R validity and reliability has been ascertained in measuring the risk for SB across varied non-clinical and clinical sample of psychiatric inpatient adolescents, high school students and undergraduates (Osman et al., 2001; Shakeri et al., 2015). In these studies, the Receiver Operating Characteristic (ROC) analyses showed the most appropriate cut-off scores to be 7 for non-clinical samples, and 8 for clinical samples. Consequently, in the current study SBQ-R cut-off score of ≥7 was considered.

A good BDI-II reliability has been established among adolescents and young adults with a coefficient alpha coefficient (α=.92) and an average inter-item correlation of .35 (Beck, Steer, Ball, & Ranieri, 1996; Osman, Barrios, Gutierrez, Williams, & Bailey, 2008). According to Beck, Steer and Garbin (1988), BDI-II demonstrates good psychometric properties, hence it is a valid measure of depression symptoms. When tested among the adolescent population, PCL-5 showed a good internal consistency (α = .91), test–retest reliability (r = .61), and concurrent, convergent, and discriminant validity with the Harvard Trauma Questionnaire (r = .69) as reported by Ghazali and Chen (2018). The study by Ghazali and Chen (2018) further indicated that a PCL-5 cut-off score of ≥33 is feasible as evidenced by the receiver operating characteristic curve and kappa coefficient analysis. The PCL-5≥33 score was therefore used as the cut-off for the current study.

Data collected was coded, entered, cleaned and analyzed using the Statistical Package for the Social Sciences (SPSS) version 24. The descriptive and inferential statistics were generated and a chi-square test of independence was used to determine statistical association. A p-value of less or equal to 0.05 ($p \leq 0.05$) was considered statistically significant. Informed consent was sought

from relevant school authority figures who represented parents and further informed assent was given by the respondents themselves. Respondents' confidentiality and anonymity was ensured in data handling, analysis and publication of the research findings. The study was approved by the Daystar University Ethics Review Board (DU-ERB).

Results

A total of 1,040 respondents aged between 14-22 years old were enrolled for the study. The numbers, percentages and statistical tests of the respondents who presented with clinically significant levels of SB alone as well as SB combined with DD and PTSD separately and in combination were used to determine their prevalence.

Table 1: Prevalence of SB, PTSD and DD by Socio-Demographic Characteristics

Socio demographic factors	SB		SB and PTSD		SB and DD		SB, PTSD and DD	
	n (%)	Sig	n (%)	Sig	n (%)	Sig	n (%)	Sig
Overall	224(21.54)		175(16.96)		172(16.63		154(15.0)	
Age in years								
14-16	117(20.1)	0.23	90(15.5)	0.2	87(15)	0.13	78(13.5)	0.16
17-22	107(23.4)		85(18.8)		85(18.7)		76(16.8)	
Gender								
Male	88(17.5)	<0.01	61(12.3)	<0.01	64(12.8)	<0.01	55(11.1)	<0.01
Female	136(25.4)		114(21.4)		108(20.2)		99(18.6)	
Caregiver								
Complete family	106(19.6)	0.17	83(15.5)	0.34	81(15.2)	0.13	72(13.5)	0.11
Non-family	42(26.4)		32(20.3)		35(22)		32(20.3)	
Single Parent or Sibling	76(22.3)		60(17.7)		56(16.4)		50(14.8)	
Religious affiliation								
Catholic	66(23.1)	0.57	50(17.7)	0.53	46(16.3)	0.68	43(15.3)	0.73
Muslim	13(19.1)		11(16.2)		10(14.7)		10(14.7)	
Other	24(16.7)		17(11.9)		19(13.2)		16(11.2)	
Pentecostal	82(22)		66(17.7)		65(17.5)		57(15.3)	
Protestant	38(23.2)		30(18.4)		31(19)		27(16.7)	
Number of rooms								
1 Room	102(20.9)	0.86	83(17.2)	0.77	78(16.1)	0.76	71(14.7)	0.76
2-3 Rooms	95(21.8)		70(16.2)		72(16.6)		63(14.6)	
4+ Rooms	27(23.1)		22(19)		22(19)		20(17.2)	
Year of study								
Form 1	77(21.8)	0.53	53(15.2)	0.26	54(15.4)	0.19	46(13.2)	0.12
Form 2	66(19.7)		54(16.2)		50(14.9)		44(13.2)	
Form 3	58(21.8)		48(18.2)		48(18.3)		46(17.6)	
Form 4	23(27.1)		20(23.8)		20(23.8)		18(21.4)	

Table 1 presents the overall prevalence of SB, SB with DD, SB with PTSD, and SB with DD and PTSD as well as the prevalence in the different socio-demographic characteristics. The results of chi-square tests are also presented indicating the statistical significance of the association between socio-demographics and the investigated disorders.

Table 1 reveals that out of the 1,040 respondents 224 met the criteria for SB, resulting into a prevalence of 21.5% in SB. The respondents who presented with SB as well as PTSD were 175,

culminating into a prevalence rate of 17%, which was very close to that of DD comorbid with SB (16.6%, n=172). The prevalence of the 3 disorders combined, SB, PTSD and DD, stood at 15.0% (n=154). This implies that a higher number of the respondents had SB alone in comparison to SB and its comorbidities. However, a substantial number (15%) presented with the 3 disorders. This is a high number considering that they were in a non-clinical setting.

Table 1 further indicates data from the respondents' socio-demographic characteristics of age, gender, year of study, religious affiliations, ethnic group, type of caregiver and housing set-up in relationship to presentation of the disorders. Focusing on gender, a higher prevalence of females in comparison to males was observed on SB alone and across its different combinations. The prevalence of SB in females was 25.4% (n=136) and that of males 17.5% (n=88). In the comorbid SB and PTSD, the prevalence of female was significantly higher (21.4%) than that of males (12.3%). Similarly, SB with DD was higher among females (20.2%) in comparison to males (12.8%), and DD comorbid with SB and PTSD was still much higher in females (18.6%) than in males (11.1%). There was a statistically significant difference on the gender presentation of SB and its different comorbidity combinations at p<0.01. The study therefore indicates that female adolescents are more vulnerable to the development and expression of SB alone and in its related disorders DD and PTSD compared to males.

Although the other socio-demographic characteristics did not indicate statistically significant association (p>0.05) with SB alone and in its comorbidities, some key aspects were observed and are worth noting. There was a higher percentage of older adolescents aged 17-22 years who presented with SB (23.4%) in comparison to the younger adolescents aged 14-16 (20.1%). The older adolescents were also more in the combination of SB and DD, SB and PTSD as well as in SB, DD and PTSD (18.7%, 18.8%, 16.8%) respectively when compared to younger adolescents who were at (15%, 15.5%, 13.5%) respectively. The study therefore, reveals that older adolescents had a higher prevalence of the disorders investigated in comparison to younger adolescents.

The association between caregivers of the study participants and the presence of these disorders was also assessed. Table 1 indicates that participants who lived with non-family members had a higher prevalence of SB, at 26.4%, followed by those who lived with single parents or siblings

(22.3%) and the least affected respondents were those who lived with a complete family (19.6%). A similar trend is observed in the presentation of SB with DD and PTSD separately and jointly where higher prevalence rates were noticeable among respondents living with a non-family guardian, followed by those with single parents and a lower prevalence on those who lived with complete families. Therefore, the study findings imply that participants living with guardians or non-immediate family members had the highest prevalence for each of the disorders, followed by those who lived with single parents or siblings and lastly those who lived with both parents. This may infer that living in a complete family of both parents and siblings provided psychosocial support for reduction of SB.

Table 2: Multivariate Analysis of Socio-Demographics Factors and Suicidal Behavior

Socio-demographic factors	Suicidal Behavior OR (95% CI)	P value
Age in years		
14-16	Ref*	
17-22	1.334(0.906, 1.965)	0.144
Number of rooms in their house		
1 Room	Ref*	
2-3 Rooms	1.075(0.777, 1.485)	0.662
4+ Rooms	1.19(0.712, 1.947)	0.496
Gender		
Male	Ref*	
Female	1.674(1.222, 2.304)	0.001
Year of study		
Form 1	Ref*	
Form 2	0.801(0.538, 1.188)	0.271
Form 3	0.81(0.506, 1.29)	0.378
Form 4	0.848(0.436, 1.623)	0.623
Care giver		
Complete family	Ref*	
Non-family	1.381(0.902, 2.09)	0.132
Single Parent or Sibling	1.173(0.833, 1.645)	0.359
Religious affiliation		
Catholic	Ref*	
Muslim	0.788(0.386, 1.515)	0.491
Other	0.709(0.413, 1.187)	0.201
Pentecostal	0.938(0.646, 1.366)	0.738
Protestant	1.046(0.655, 1.656)	0.847

In Table 2, logistic regression was used on multiple socio-demographic variables to find out which ones were related with respondents' exhibition of SB. Findings in Table 2 present the odds ratio, their 95% confidence intervals and a p-value to indicate how each socio-demographic factor related with SB after other socio-demographic factors were controlled. The odds of SB for females was OR=1.674, implying that female respondents were 1.67 times more likely to present with SB than their male counterparts. Unlike other socio-demographic aspects, there was a significant difference (p=0.001) between gender and SB. The odds of suicidal behavior for older adolescents were OR=1.334. Therefore, the older adolescents were 1.33 times more likely to present with SB than the younger adolescents. The findings of this study further revealed that the following demographic factors; age, caregiver, year of study and religion were not significantly

associated (p>0.05) with SB. Therefore, while gender influences, these other factors do not necessarily influence SB.

In determining the prevalence of suicidal plans and suicidal attempts, data from the overall study population that was screened for SB was divided into two groups. Those who met the criteria for being diagnosed with SB, DD and PTSD were categorized as *pathological* whereas, those who did not meet the criteria for the three disorders were categorized as *non-pathological*, as indicated in Table 3. The respondents' response to SBQ-R question 1 were categorized into '*no SB'* for those who had none or just brief thoughts, '*Suicidal plan'* for those who planned at least once with or without intent and '*suicidal attempt'* for those who have ever attempted suicide with or without intent. The SBQ-R question 3 was used to assess the respondents' behavior in disclosing their suicidal intent.

Table 3: The Prevalence of Respondents Suicidal Ideations, Plans and Attempts

Suicide categories	Overall		Non-pathological		Pathological	
	n	%	N	%	N	%
No SB, plan and attempt						0
No SB	859	82.6	834	88.3	25	26
Plan	131	12.6	82	8.7	49	51
Attempt	50	4.8	28	3	22	22.9
Respondents' Disclosure						
Didn't disclose	903	86.9	84.8	89.9	55	57.3
Disclosed once	105	10.1	75	8	30	31.3
Disclosed more than once	31	3	20	2.1	11	11.5

Table 3 indicates that overall, only a small percentage of the participants had suicidal plans (12.6%) or had attempted suicide (4.8%). The majority (88.3%) of non-pathological respondents had no SB or had just brief ideations which were categorized as no SB and only a few of them had suicidal plans (8.7%) or had attempted suicide (3%). Nevertheless, in the pathological group, slightly more than half of the respondents (n=49, 51%) had suicidal plans and a good number had attempted suicide (n=22, 22.9%). The findings therefore reveal that only a few respondents had suicidal plans or had attempted suicide in the general population. However, the respondents who had the three disorders, namely the

pathological group, presented with higher levels of suicidal tendencies in the form of suicidal plans and attempts in comparison to the non-pathological ones.

In regard to the respondents' disclosure of their SB, the findings show that a majority (86.9%) of respondents did not disclose. Most (88.9%) of the non-pathological group did not disclose, which may be an indication that they did not have suicidal tendencies since 88.3% did not meet the criteria for SB. In the pathological group, more than half (n=55, 57%) of the participants didn't disclose, whereas, a good number (n=30, 31.3%) disclosed once and only a few of them (n=11, 11.5%) disclosed more than once. The findings reveal that most of the suicidal adolescents hardly disclose their SB. However, a substantial number of those at risk did disclose or seek help but non-persistently.

Table 4: Association between Suicide Plan and Attempt and Likelihood of Suicide Attempt (SA)

Suicide ideation, plan and attempt	SA Likely		SA Unlikely		Chi-square
	n	%	n	%	P value
No/ brief Ideation	16	1.863	843	98.14	<0.001*
Plan	19	14.62	111	85.39	
Attempt	16	32.65	33	67.35	

Table 4 shows a cross tabulation of SBQ-R question 1 on SB categories with question 2 on likelihood of attempting suicide. A chi-square test of ($p<0.001$) reveals a significant association between SB categories and likelihood of attempting suicide. The majority (98%) of the respondents with no SB and those with suicidal plans (85%) were unlikely to attempt suicide. It is worth noting that from among the respondents who had attempted suicide, a high percentage (32.65%) as well as those who had suicidal plans (14.6%) were likely to engage in future suicidal attempt. The findings therefore, indicate that while respondents who had attempted suicide were highly likely to attempt suicide in the future, those with suicidal plans were also slightly vulnerable to suicide attempts, but not those with insignificant or no SB.

Discussion

SB is a major public health problem among adolescents, thus, the need to establish its prevalence. In the current study, the prevalence of SB was 21.5% among the 1,040 students who were screened at baseline. This prevalence was slightly higher than the global prevalence of SB among adolescents which was estimated to be 18.0% (Muehlenkamp et al., 2012). However, it was slightly lower than that recorded by Palmier (2011) (27.9%) among school going adolescents in the Kenyan population. The slight prevalence difference could be attributed to the different tools used; unlike the current study which used SBQ-R thus, focusing on different aspects of SB, the study by Palmier (2011) used Global School-Based Student Health Survey (GSHS) which focused on suicidal ideations. The SB prevalence in the current study was closer to that of youths in the informal settlements of Kampala, Uganda which was 23.5% (Culbreth et al., 2018). This could be due to the similar socio-economic set-up. Adolescents from informal settlements are likely to despair in life due to high exposure to traumatic events and financial instability leading to lack of basic needs (Chang, Stuckler, Yip, & Gunnell, 2013; Onyango & Tostensen, 2015). The current prevalence is therefore among the normal ranges of those in a similar set-up although slightly higher than the global prevalence.

The prevalence of SB in developed countries tends to differ from those of developing countries. Studies in high-income countries have shown a lower prevalence of SB at 10.5% in European countries, 8.1% in Canada, and 17.2% in China (Georgiades et al., 2014; Kokkevi et al., 2012; Liu et al., 2018; Voss et al., 2019). In the African countries, compared to Western and Asian countries, much higher prevalence has been recorded ranging from 19.6% in Uganda, 20% in Nigeria, to those that are higher than this current study being recorded in Botswana (28.7%), Zambia (31.9%) and South Africa (32.3%) (Korb & Plattner, 2016; Omogbodun et al., 2008; Swahn et al., 2010; van Niekerk et al., 2012;). The trend corroborates with WHO's (2019) report which showed that although suicide occurs in all regions of the world, most (79%) of global suicides occur in low- and middle-income countries. This is probably due to the poor mental health services in Africa characterized by insufficient mental health professionals, poor development of policy and program implementation, research deficiency, and an extremely low proportion of Africans who receive treatment for mental health problems (Mugisha et al., 2019; Sankoh, Sevalie & Weston, 2018).

The current study also sought to establish the prevalence of DD and/or PTSD comorbid SB among high school students in Nairobi County. The prevalence of PTSD comorbid SB was 17%, SB with DD 16.6% and SB, DD and PTSD comorbidity was 15.0%. This indicates that a good number of respondents with SB presented with DD and PTSD. This trend has been observed in other studies. On SB comorbid with DD, higher numbers (31%) than the current study were indicated in a meta-analysis of 65 studies globally (Dong et al., 2019). A number closer to the current study was also found in a study by Jeon et al. (2014), where the prevalence of 17.1% on suicidal attempts was reported among 825 respondents who had major depressive disorders (MDD). Suicidal attempts were significantly greater in those who had experienced some form of trauma than in those who had not ($\chi2=34.66$, $p<0.0001$). The high level of comorbidity indicates that SB is highly prevalent among adolescents with PTSD. Persons with comorbid DD and PTSD have been found to be in great psychological distress and thus, at a very high risk of committing suicide (Khasakhala et al., 2013; Ndetei et al., 2010).

The study findings indicate that older adolescents aged 17-22 years, and those in higher classes (Forms 3 and 4), had a higher prevalence of disorders in comparison to the younger adolescents aged 14-16, and those in lower classes (Forms 1 and 2). Other studies have established that SB among adolescents increases with age, thus, being more prevalent among older adolescents (Boeninger et al., 2010; Cash & Bridge, 2009; Glenn et al., 2019; Thompson & Light 2011). Likewise, in South Africa and Nigeria, SB was higher among older adolescents and those in the universities in comparison to younger ones (Burrows & Laflamme, 2008; Liu et al., 2005; Ojuade et al., 2018). This may imply that SB worsens as the adolescents get older and move to higher levels in their education. Older adolescents tend to be more developed cognitively and socially, leading to increased self-awareness, evaluation of events, overwhelming thoughts and a need for independence which may challenge their coping ability (Tsang, Hui, & Law, 2012). The older adolescents are therefore more vulnerable to SB. However, in Tanzania the risk of planning suicide was found to be higher among younger adolescents (Rudatsikira, Muula, Siziya, & Twa-Twa, 2007). This could be an indication of an earlier onset of suicidal planning which may lead to suicidal attempts at an older age.

Regarding the gender prevalence, this study found females to have a significantly higher prevalence than the males for SB alone and SB in its comorbidities. The study concurs with

studies in German where higher incidences of SB were found among females than males (Voss et al., 2019). Likewise, in Malaysia there were more females (7.6%) than males (4.7%) who had SB. In China too more females (23.5%) were found to have suicidal plans in comparison to males (17.6%) (Liu et al., 2019). A study by Ongeri et al. (2018) among Kenyan University students concurs with the current findings in that it found a higher prevalence of SB in females at 19% as compared to 15% in males. SB is therefore more prevalent among females than males globally. The high prevalence is consistent with the knowledge that internalized mental disorders such as DD and PTSD which pose a high risk to SB are more prevalent among females than in males (Eaton et al., 2012).

Contrary to most studies, researchers Dunlavy, Aquah, and Wilson (2015) reported equal prevalence of SB between males (50%) and females (50%) in Tanzania. This indicates that while generally more females than males present with SB, there are a few exceptions probably due to the different socio-cultural backgrounds. Although there appeared to be more females with SB, it has been found that more males commit suicide than females. WHO (2018) estimated a ratio of 1.5 male to every 1 female committing suicide in low- and middle-income countries, whereas in the high-income countries the ratio was 3 males to 1 female. China, Bangladesh, Morocco, Myanmar and Lesotho were the only countries where females had a higher suicide rate than males (WHO, 2019).

In regard to suicidal plans and attempts, the study results indicate that the majority (82.6%) of the respondents did not have suicidal tendencies. This is expected in a non-clinical setting since, most of suicidal cases are prevalent among psychiatric patients (Phillips, 2010). Regarding the respondents with pathological SB and its comorbid disorders, there were more cases of suicidal plans (51%) and attempts (22.9%) in comparison to non-pathological ones on suicidal plans (8.7%) and attempts (3%). Prevalence closer to those of the non-pathological group have been found in non-clinical settings. A study in the United States of America among high school students, recorded a prevalence of 13.6% on suicidal plan and 7.4% on attempted suicide (Kann et al., 2014). This implies that only a small percentage in a population would present with suicidal tendencies without comorbid psychiatric disorders.

The high prevalence of suicidal plans and attempts among the respondents with comorbid disorders could mean that respondents with psychiatric problems have a higher prevalence of suicidal behavior. This concurs with studies that have shown that about 90% of suicidal cases are associated with mental disorders (WHO, 2018). On the other hand, prevalence closer to those of the pathological group have been recorded among patients in psychiatric hospitals. A study in Nigeria (Ojuade et al., 2018) among adolescents who were in a hospital facility due to suicidal-related problems established a higher prevalence than the current study on suicide attempts (63%) but a lower prevalence on suicidal plans (29%). Prevalence that are much higher than those of the current study were found in a South African psychiatric hospital at 64% on suicidal plan and 70.3% suicidal attempts (Khasakhala et al., 2011). The high prevalence can therefore be attributed to the fact that these studies targeted patients with a history of mental disorders. Studies (Nock et al., 2010; Osváth et al., 2003) have established that individuals with psychiatric disorders present more suicidal attempts and the likelihood of suicidal attempts increases with higher numbers of comorbid mental disorders.

The current study sheds light on the fact that there are many individuals with comorbid psychiatric disorders in non-clinical settings and they are highly suicidal just like those in clinical settings. This may be a reflection of poor mental-health infrastructure in the low-income countries (Suicide Prevention Resource Center, 2020), implying that there is a substantial number of psychologically disturbed adolescents in schools who need to access psychological assessments and interventions.

The study also sought to determine the respondent's self-disclosure of suicidal intent. The SBQ-R question 3 on whether the respondents had told anyone about their suicidal tendencies was used to determine the number of respondents who disclosed their SB tendencies. Most (89.9%) of the non-pathological respondents did not disclose their SB. This may be an indication that they did not have suicidal tendencies or that suicidality was not a distressing problem in their lives. However, among the pathological participants more than half (n=55, 57%) did not disclose. Thus implying that still a good number of suicidal adolescents did not seek help. The high rate of non-disclosure among suicidal adolescents may be due to the fact that SB in Africa is highly stigmatized and suicide attempters are viewed as criminals (Schlebusch & Burrows, 2009).

Nevertheless, a relatively notable number (31.3%, n=30), of the suicidal adolescents disclosed once and it's only a few (n=11, 11.5%) who disclosed more than once. The research findings therefore, indicated that while most of the respondents hardly disclosed their suicidal tendencies, a good number of those at high risk did disclose non-persistently and only a few of them were persistent in their disclosure. A negative reaction or judgmental attitude from those disclosed to may lead to lack of persistence in seeking help. Adolescents who talk about suicide are usually seeking support or help since a significant number of them could be experiencing anxiety, depression and hopelessness (WHO, 2014).

The study findings imply that a good number of high school adolescents could be experiencing great psychological distress, perceived as unbearable and are at a high risk of attempting suicide. Therefore, there is need for assessment and for according the necessary help promptly. The current study was limited to respondents from the low socio-economic background since they were in day schools located within the informal settlements. This calls for a future comparative study in diverse socio-economic settings.

Conclusion

The study sought to establish the prevalence of SB among adolescents with DD and PTSD in the informal settlements of Nairobi. The study revealed a high prevalence (21.5%) of SB which compares well with prevalence in some other parts of Africa, however it is higher than that of the developed countries. The prevalence of SB with DD (16.6%), SB with PTSD (17%), as well as with SB, DD and PTSD together (15.0%) was established among high school students in the informal settlements of Nairobi. Females were found to be more vulnerable to SB since, SB alone and in its comorbidities with DD and PTSD was significantly more prevalent among females than males. Higher prevalence of suicidal planning (51%) and suicidal attempts (22.9%) were established among the respondents with comorbid DD, PTSD and SB (pathological group). The non-pathological group had much lower prevalence of suicidal plans (8.7%) and attempts (3%). It is therefore clear from the study that SB was more prevalent among suicidal adolescents with comorbid DD and PTSD.

The high numbers of SB were comparable to those of psychiatric patients, an indication that there is a good number of individuals with comorbid psychiatric disorders in non-clinical settings. The study further established that although most of the suicidal adolescents did not disclose their SB, the substantial number (31.3%) of those who disclosed had multiple disorders and at a high risk of SB. Therefore, suicidal disclosure should not be assumed to be mere threats but a cry for help by those who are in distress and at high risk of committing suicide. Considering the high prevalence of SB and its comorbidities among the students' population, the study recommended combined effort by the Ministry of Education, Ministry of Health and the institutions' counselling departments, in working towards reduction and mitigation of SB. These sectors are essential in availing continuous psychological assessment and intervention in non-clinical settings, considering that a high number (57.3%) of suicidal adolescents do not seek help and may not be able to access mental health services.

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