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Prevalence and correlates of non-suicidal self-injury, suicidal ideation, and suicide attempt among children and adolescents: Findings from Uganda and Jamaica

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Abstract

Background: Youth non-suicidal self-injury (NSSI) and suicide are major public health concerns, but limited data are available on the prevalence and correlates of these problems in developing countries. The aim of this study is to describe experiences of three suicidal phenomena (NSSI, suicidal ideation [SI], and suicide attempt [SA]) among children and adolescents from two developing countries. We also examine how depression, anxiety, sleep problems, child maltreatment, and other socio-demographic variables associate with the risk of NSSI only, SI only, SA only, and co-occurring NSSI/SI/SA.

Methods: We conducted a population-based cross-sectional study of school-based Ugandan and Jamaican children and adolescents. Participants were 11,518 (52.4% female) Ugandan and 7,182 (60.8% female) Jamaican youths aged 9-17 years.

Results: The estimated lifetime prevalence of NSSI, SI, and SA was 25.5%, 25.6%, and 12.8% respectively among Ugandan boys and 23.2%, 32.5%, and 15.3% respectively among Ugandan girls. As for the Jamaican sample, the estimated lifetime prevalence of NSSI, SI, and SA was 21%, 27.7%, and 11.9% among boys and 32.6%, 48.6%, and 24.7% respectively among girls. The odds of experiencing SI only, SA only, and co-occurring NSSI/SI/SA were significantly elevated among participants with mild, moderate, and severe depression in both countries.

Limitations: The current study relied on self-report.

Conclusions: This study found that suicidal phenomena are common among youths from Uganda and Jamaica, with rates substantially higher than among youths from high-income countries. The risk of suicidal phenomena was especially high among youths with severe depression.

Key words: Non-suicidal self-injury (NSSI); Suicidal ideation (SI); Suicide attempt (SA); Youths; Developing countries

Introduction

Globally, suicide is the second leading cause of death in adolescents aged 15-19 years (WHO, 2019). Approximately 10% of adolescents had attempted suicide at some point in their lives (Evans, Hawton, Rodhma, & Deeks, 2005b). An important suicide phenomenon often discussed in the literature is suicidal ideation (SI), defined as thoughts of harming or killing oneself (Institute of Medicine, 2002). SI constitutes a significant predictor of both suicide attempt (SA) and completed suicide among youth (Harris & Barraclough, 1997). Lifetime prevalence of SI is estimated at 30% (Evans et al., 2005b; Nock et al., 2013). Non-suicidal self-injury (NSSI) is another related factor frequently addressed in suicide research. Defined as causing intentional self-injury with no intent to die (e.g., cutting, burning) (Nock et al., 2010; Stewart et al., 2017), the behaviour is observed to peak in mid-adolescence (Hawton et al., 2012). NSSI among the general population of adolescents was reported to range between 10% (Grandclerc et al., 2016) and 17% (Swannell et al., 2014). In most western societies, suicidal phenomena are more common among females, but males are more likely to die as a result of a suicidal act (Beautrais, 2002; Canetto & Sakinofsky, 1998; D'Eramo et al., 2004). However, data from southern India, Malaysia, China, and Singapore revealed a substantially higher suicide rate among girls than boys (Aaron et al., 2004; Armitage et al., 2015; Gould et al., 2003; Phillips et al., 2002), which may be reflective of greater gender inequality in societies with more traditional gender-role beliefs.

Although NSSI, SI, and SA are distinct phenomena, they frequently co-occur. The nature of the relationship between them is unclear (Andover, Morris, Wren, & Bruzzese, 2012; Cloutier, Martin, Kennedy, Nixon, & Muehlenkamp, 2010), but past literature introduced the hypothesis of a continuum in suicidality. The hypothesis assumes a progression from mild to more severe forms of suicidality, which usually involves the following stages: suicidal ideation, suicide plan, suicide attempt, and completed suicide

(Sveticic & De Leo, 2012). As for the NSSI, its relationship with the remaining suicidal phenomena can be explained with the theory of acquired capability for suicide, a component of Joiner's (2005) Interpersonal-Psychological Theory of Suicide. More specifically, engagement in NSSI may reduce fear and inhibitions around self-inflicted violence and hence increase the risk for suicide attempts among those with a history of NSSI. Indeed, longitudinal research demonstrated that history of NSSI predicts both SI and SA (Guan, Fox, & Prinstein, 2012).

In addition, evidence demonstrates that adolescents who were physically or sexually abused are more likely to experience suicidal thoughts and behaviours and NSSI than their non-abused counterparts (Evans et al., 2005a; Kukoyi et al., 2010; Madge et al., 2011). A recent meta-analytic study found that although all forms of child maltreatment were associated positively with suicidal behaviour, emotional abuse had the strongest effect (Liu et al., 2017). Mental health-related problems that predispose to suicide and NSSI include sleep difficulties, depression, and anxiety (Brown et al., 2017; Goldstein et al., 2008; Madge et al., 2011). Social and environmental risk factors include impaired parent-child relationship, living outside of the family, a higher position in the birth order, and social isolation. Social support constitutes a protective factor for suicide (Bjørngaard et al., 2013; Farrell et al., 2015).

Most research into suicidal phenomena during adolescence, and especially studies examining childhood maltreatment as a potential risk factor, was conducted among at-risk samples (such as offending populations, runaway adolescents), self-selecting samples, or in medical settings. This limits the generalisability of findings to general adolescent populations (Evans et al., 2005a). Using medical samples is problematic because youths with NSSI and SA who receive medical attention differ in demographic and psychosocial characteristics from those who do not receive medical attention (Kann et al., 2000). Another prior research

limitation pertains to the use of WEIRD (Western, Educated, Industrialised, Rich, and Democratic) samples, drawn predominantly from the United States. Indeed, although 79% of all suicides in 2016 occurred in low- and middle-income countries (WHO, 2019), most research into suicidal phenomena were conducted in high-income countries (Armitage et al., 2015; Evans, Hawton, & Rodham, 2005a; Tan et al., 2018).

There is a paucity of research into suicidal phenomena and mental health problems among youths from developing countries, including Uganda and Jamaica (Evans et al., 2005b; Kieling et al., 2011; Kukoyi et al., 2010; Rudatsikira et al., 2007; Tan et al., 2018). The aim of the current study is to address this evidence gap by describing experiences of NSSI, SI, SA, mental health problems, as well as child abuse and neglect (CAN) among children and adolescents from the general population of two developing countries, Jamaica and Uganda. We also examine how CAN, depression, anxiety, sleep problems, and other socio-demographic variables associate with NSSI only, SI only, SA only, and co-occurring SI/NSSI/SA. In addition, we test the dose-response or graded relationship hypothesis that the more severe depression and anxiety category, the higher the risk of NSSI only, SI only, SA only, and co-occurring NSSI/SI/SA. Such a relationship was previously suggested between NSSI and depression and anxiety in adolescent samples from Europe (Madge et al., 2011).

Method

Data collection and sample

This paper draws on population-based cross-sectional data from the None-in-Three (Ni3) study from Uganda and Jamaica conducted in 2019. Ni3 is an internationally collaborative investigation into CAN, gender-based violence (GBV), and the prevention of GBV. The study methodology was similar in both participating countries. School-based surveys were conducted with children and adolescents aged 9-17 years who provided anonymous self-report information on their social and environmental circumstances,

experiences, and mental health. All participating students had parental consent to take part in the study and also provided informed consent themselves. Additionally, the tertiary and fourth level of consent was signed off at government level and individual schools which provided consent for the children under their care to take part, subject to the parental and youths' own consent. Students were asked to complete paper and pencil questionnaires which were compiled into a booklet along with an information and instruction sheet attached to the front of the booklet. Each participant was provided with a description of the study, how to complete the questionnaire, and the general expected completion time. All data collection took place in classroom settings, with a researcher present during the process to facilitate completion of the survey. Participants were assured about the confidentiality of their participation and informed that they could withdraw from the study at any time. Participation was voluntary without any form of reward. Schools were systematically selected to be locally and nationally representative. Local researchers received a list of schools, which was used to randomly select participating institutions. Groups of students were opportunistically selected within each institution. Response rates were 92% and 94% for Uganda and Jamaica respectively. The Ugandan sample consisted of 11,518 (52.4% females) children and adolescents aged 9-17 years (M = 14, SD = 1.95) surveyed in 37 primary and 34 secondary schools. The Jamaican sample consisted of 7,182 (60.8% female) children and adolescents aged 9-17 years (M = 13.74, SD = 1.97) surveyed in 7 primary and 13 secondary schools. More details on both samples are provided in Table 1.

Measures

Socio-demographic questionnaire. Youths were asked to state their gender, age, what position they were born into the family, location (rural/urban), whether they were bullied by their siblings (yes/no), whether they lived with both parents (yes/no), whether they felt safe in

their family (always, usually, sometimes, never), and whether anyone in their home took alcohol or drugs and then behaved in a way that frightened them (yes/no).

Suicidal phenomena were assessed with three questions developed for the purpose of the current study. SI was assessed by asking: “Have you ever felt so unhappy that you have thought about killing yourself?”. SA was measured by asking: “Have you ever tried to commit suicide or tried to do something that meant you could die?”. NSSI was assessed by asking: “Have you ever harmed yourself on purpose in a way that was not to take your life?”. Response options for all questions were “yes” and “no”.

Anxiety was assessed using the 13-item Patient-Reported Outcomes Measurement Information System (PROMIS) Anxiety Short Form measure (PROMIS Health Organization and PROMIS Cooperative Group, 2012a). Respondents were asked to indicate how often they had thought certain thoughts or felt certain feelings in the past seven days. Exemplar items include: “I felt like something awful might happen”, “I felt nervous”, and “I worried about what could happen to me”. The items were scored on a 5-point scale, ranging from 1 (never = symptom not present) to 5 (almost always = symptoms strongly present). Scores range from 13 to 65 (Cronbach's alpha = .90). Scores less than 28 = none to slight anxiety, 29-33 = mild anxiety, 34-47 = moderate anxiety, and 48 and over = severe anxiety.

Depression was assessed using the 14-item Patient-Reported Outcomes Measurement Information System (PROMIS) Depression Short Form measure (PROMIS Health Organization and PROMIS Cooperative Group, 2012b). Respondents were asked to indicate how often they had thought certain thoughts or felt certain feelings in the past seven days. Exemplar items include: “I could not stop feeling sad”, “It felt lonely”, and “Being sad made it hard for me to do things with my friends”. The items were scored on a 5-point Likert scale, ranging from 1 (never = symptom not present) to 5 (almost always = symptoms strongly present). Notably, the measure does not include items that capture suicidal thinking or

behaviour. Scores range from 14 to 70 (Cronbach's alpha = .94). Scores less than 31 = none to slight depression, 32-38 = mild depression, 39-53 = moderate depression, and 54 and over = severe depression.

Sleep problems were assessed using a shortened version of the Patient-Reported Outcomes Measurement Information System (PROMIS) Sleep Disturbance Short form measure (PROMIS Health Organization and PROMIS Cooperative Group, 2012c). Of the eight scale items, three items were administered in the current study. Two items ("My sleep was restless" and "I had difficulty falling asleep") were rated on a 5-point Likert scale ranging from 1 = not at all to 5 = very much. One item ("My sleep was…") was rated using a 5-point Likert scale ranging from 1 = very good to 5 = very poor. Scores range from 3 to 15, with higher scores indicating increased sleep problems (Cronbach's alpha = .62).

Social support was measured with the 12-item Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al., 1988). The scale assesses participants' perceived support from family, friends, and significant other. Exemplar items include: "There is a special person who is around when I am in need" and "I can count on my friends when things go wrong". The items were scored on a 5-point Likert scale, ranging from 1 (not at all) to 5 (absolutely yes). Total scale scores range from 12 to 60, with higher scores indicating greater level of perceived social support (Cronbach's alpha = .93).

Child maltreatment by a parent, guardian, or other adult in the house was measured using the 29-item Child Victimization Experiences Questionnaire (Choo et al., 2011). The questions inquired into participants' lifetime experiences of corporal punishment (1 item; *slap your face, head, ears*), physical abuse (6 items; e.g., *choke you*), non-contact sexual abuse (6 items; e.g., *made you see others having sex*), contact sexual abuse (2 items; *made you have sex*), emotional abuse (6 items e.g., *embarrassed you in front of other people*), physical neglect (2 items; e.g., *did not get you enough food, even when there was enough to*

share), medical neglect (1 item; *did not take you to a doctor when you were sick*), emotional neglect (5 items; *did not get enough love*). Reponses to all questions were recorded as either present or absent. A specific type of child maltreatment was recorded as present when students endorsed at least one item measuring this abuse.

Ethics and Safety

Ethical approval for the study was granted by the ethics committee at the UK university leading the research as well as the partner institutions' ethics boards in both participating countries. The main ethical issue concerned the safety of participating youths. Thus, there was a school guidance councillor on hand, fully briefed that the study was taking place and on standby to deal with an increased need for support within each school/country. Participants were also informed of appropriate school services and a licensed referral psychological/counselling clinic where they could be provided with assistance should they self-identify as abuse survivors or experience any emotional discomfort because of their participation in the study.

Statistical analysis

Data analysis was performed using SPSS version 26. Descriptive statistics were performed by obtaining frequencies for the distribution of categorical variables as well as means (*M*) and standard deviations (*SD*) for all continuous variables included in the study. To determine risk and protective factors for NSSI, SI, and SA among youths from Uganda and Jamaica, we performed multinomial logistic regression analyses. The outcome variable consisted of five categories: 1 = reference group (participants who did not report any suicidality), 2 = participants who reported NSSI only, 3 = participants who reported SI only, 4 = participants who reported SA only, 5 = participants who reported all three suicidal phenomena (co-occurring SI/NSSI/SA). Odds ratios (with 95% Confidence Interval) were generated as measures of association. Child maltreatment predictors included in the analyses

were corporal punishment, physical abuse, non-contact sexual abuse, contact sexual abuse, emotional abuse, physical neglect, medical neglect, and emotional neglect. Other social and environmental risk factors were alcohol/drugs in the family and bullying by siblings. Mental health-related predictors were anxiety, depression, and sleep problems. Social support was an environmental protective factor included in the model. Location (urban/rural), living with both parents, feeling safe in the family, birth order, and age were included as potential confounders. Missing values for any of the categories included in the outcome measure (NSSI: Uganda = 3%, Jamaica = 14.7%; SI: Uganda = 1.7%, Jamaica = 14.4%; SA: Uganda = 4.3%, Jamaica = 15.3%) were excluded from the analyses. Total sample included in the multinomial logistic regression for Uganda was 7258 and for Jamaica 3444.

Results

Prevalence and descriptive statistics of NSSI, SI, SA, and correlates are presented in Table 1. Additionally, for the purpose of multinominal logistic regression analyses, the number of participants in each category of the outcome variable were calculated for Uganda (reference group: *n* = 6218, 55%; NSSI only group: *n* = 1255, 11.1%; SI only group: *n* = 2253, 19.9%; SA only group: *n* = 1009, 8.9%; co-occurring NSSI/SI/SA group: *n* = 571, 5.1%) and Jamaica (reference group: *n* = 3093, 50.1%; NSSI only: *n* = 433, 7%; SI only: *n* = 1425, 23.1%; SA only: *n* = 472, 7.6%; co-occurring NSSI/SI/SA group: *n* = 752, 12.2%).

Table 1

Descriptive Statistics for All Study Variables by Study Sample and Gender

	Uganda		Jamaica	
	Boys *N* (%) or *M*(*SD*)	Girls *N* (%) or *M*(*SD*)	Boys *N* (%) or *M*(*SD*)	Girls *N* (%) or *M*(*SD*)
Location				
Urban	3300 (64.6%)	3941 (66.3%)	810 (32.8%)	1167 (30.3%)
Rural	1805 (35.4%)	1999 (33.7%)	1660 (67.2%)	2684 (69.7%)
Living with both parents	2756 (51.8%)	2988 (48.2%)	921 (32.7%)	1336 (30.6%)
Safe in the family	*M* = 1.72 (*SD* = .99)	*M* = 1.11 (*SD* = 1.00)	*M* = 1.40 (SD = .77)	*M* = 1.49 (*SD* = .82)
Alcohol/drugs in the family	903 (17.1%)	969 (15.7%)	262 (9.4%)	510 (11.8%)
Bulling by siblings	990 (18.7%)	1377 (22.3%)	473 (19.8%)	943 (23.5%)
Born in the family				
First	1546 (29.5%)	1652 (26.8%)	1059 (40.6%)	1483 (35.1%)
Second	1083 (20.6%)	1274 (20.7%)	656 (25.2%)	1076 (25.5%)
Third	965 (18.4%)	1083 (17.6%)	408 (15.6%)	725 (17.2%)
Fourth (and more)	1655 (31.5%)	2125 (31.5%)	485 (18.6%)	937 (22.2%)
Age				
9-12 years	1185 (22.3%)	1564 (25.3%)	849 (30.5%)	1263 (29.4%)
13-17 years	4121 (77.7%)	4623 (74.7%)	1939 (69.5%)	3027 (70.6%)
Anxiety				
None to slight	3507 (72.5%)	3524 (65.6%)	1730 (71.3%)	2153 (55.2%)
Mild	615 (12.7%)	727 (13.5%)	351 (14.5%)	607 (15.6%)
Moderate	587 (12.1%)	942 (17.5%)	301 (12.4%)	906 (23.2%)

Severe	127 (2.6%)	177 (3.3%)	46 (1.9%)	235 (6.0%)
Depression				
None to slight	3650 (74.9%)	3708 (66.0%)	1861 (76.1%)	2241 (56.4%)
Mild	591 (12.1)	756 (13.5%)	253 (10.4%)	529 (13.3%)
Moderate	492 (10.1%)	876 (15.6)	242 (9.9%)	770 (19.4%)
Severe	141 (2.9%)	275 (4.9%)	88 (3.1%)	431 (10.9%)
Sleep problems	*M* = 6.07 (*SD* = 2.91)	*M* = 6.08 (*SD* = 2.99)	*M* = 5.57 (*SD* = 2.73)	*M* = 6.18 (*SD* = 3.20)
Social support	*M* = 43.17 (*SD* = 13.15)	*M* = 43.94 (*SD* = 2.99)	*M* = 42.88 (*SD* = 13.26)	*M* = 44.64 (*SD* = 11.91)
Corporal punishment	3086 (58.9%)	3792 (61.9%)	1759 (64.5%)	2686 (62.7%)
Physical Abuse	1159 (22.4%)	1308 (21.6%)	625 (23.3%)	870 (20.5%)
Non-contact sexual abuse	929 (17.8%)	1152 (19.9%)	254 (9.3%)	407 (9.5%)
Contact sexual abuse	282 (5.4%)	373 (6.1%)	138 (5.1%)	218 (5.1%)
Emotional abuse	2965 (57.3%)	3780 (63.3%)	1688 (63.7%)	2933 (70.7%)
Physical neglect	818 (15.6%)	895 (14.6%)	282 (10.4%)	412 (9.6%)
Medical neglect	748 (14.2%)	1091 (17.6%)	502 (18.4%)	880 (20.5%)
Emotional neglect	2245 (43.3%)	2894 (47.7%)	1184 (44.8%)	2189 (52.8%)
Non-suicidal self-injury (NSSI)	1311 (25.5%)	1401 (23.2%)	473 (21.0%)	1267 (32.6%)
Suicidal ideation (SI)	1334 (25.6%)	1988 (32.5%)	624 (27.7%)	1901 (48.6%)
Suicide attempt (SA)	648 (12.8%)	915 (15.3%)	266 (11.9%)	956 (24.7%)

The results of the multinomial logistic regression analysis for Uganda are presented in Table 2. The model was statistically significant, $\chi^2 = 1554.45$, $df = 104$, $p < .001$ (Pearson $\chi^2 = 28553.99$, $df = 28188$, $p = .24$, Deviance $\chi^2 = 16163.24$, $df = 28188$, $p = 1.00$; Cox and Snell$^2 = .19$; Nagelkerke $R^2 = .21$). Results show that, compared with the reference group, female gender is a significant predictor of the SI only group, whereas male gender is a significant predictor of the NSSI only group. Living in rural areas increased participants' odds of belonging in the NSSI only, SI only, and SA only groups. The co-occurring NSSI/SI/SA group is more likely to be affected by bulling by siblings and alcohol and drugs in the family home. Age is a significant predictor of NSSI only, SI only, and SA only. Anxiety and depression (particularly severe levels of both disorders), sleep problems, and emotional abuse are statistically significant predictors in all four groups (i.e., NSSI only, SI only, SA only, and co-occurring NSSI/SI/SA) in comparison to reference group. Emotional neglect is a significant predictor for all groups except for the NSSI only group, physical abuse and lack of social support for SA only group, non-contact sexual abuse for the NSSI only group, and medical neglect for the co-occurring NSSI/SI/SA group.

Table 2

Results from Multinomial Logistic Regression (Uganda)

	NSSI only OR (95% CI)	SI only OR (95% CI)	SA only OR (95% CI)	Co-occurring NSSI/SI/SA OR (95% CI)
Gender (1 = male)	1.29*** (1.11/1.52)	.83** (.73/.95)	.86 (.71/1.04)	.97 (.76/1.24)
Location (1 = urban)	.78** (.66/.92)	.80** (.70/.92)	.73** (.59/.89)	.96 (.74/1.23)
Living with both parents	1.07 (.91/1.25)	1.04 (.91/1.18)	.95 (.79/1.15)	1.15 (.89/1.48)
Safe in the family	1.06 (.97/1.15)	.99 (.92/1.07)	1.07 (.97/1.18)	1.08 (.94/1.23)
Alcohol/drugs in the family	.99 (.79/1.25)	1.16 (.97/1.39)	1.18 (.92/1.50)	1.36* (1.02/1.83)
Bulling by siblings	1.34** (1.09/1.64)	.99 (.83/1.18)	1.11 (.88/1.40)	1.39* (1.05/1.84)
Born in the family				
First	.92 (.75/1.13)	1.14 (.97/1.35)	1.15 (.98/1.47)	1.11 (.82/1.50)
Second	.94 (.76/1.17)	.94 (.78/1.12)	1.12 (.86/1.45)	.99 (.71/1.38)
Third	.94 (.75/1.18)	.99 (.83/1.20)	1.01 (.76/1.33)	.79 (.55/1.15)
Fourth (and more)	Ref	Ref	Ref	Ref
Age	1.07*** (1.03/1.12)	1.07*** (1.03/1.10)	1.06* (1.01/1.12)	1.03 (.96/1.10)
Anxiety				
None to slight	Ref	Ref	Ref	Ref
Mild	1.44 (.74/2.81)	1.44 (.89/2.34)	1.40 (.80/1.44)	1.67 (.91/3.08)
Moderate	1.66*** (1.26/2.18)	1.62*** (1.30/2.01)	1.30 (.96/1.77)	1.89*** (1.29/2.74)
Severe	1.57*** (1.24/1.99)	1.56*** (1.28/1.89)	1.47** (1.11/1.95)	1.68** (1.152.46)
Depression				
None to slight	Ref	Ref	Ref	Ref
Mild	1.14 (.60/2.18)	1.56*** (1.28/1.91)	1.54** (1.15/2.07)	2.11*** (1.43/3.10)

Moderate	.93 (.68/1.28)	1.96*** (1.57/2.46)	2.67*** (1.97/3.61)	3.43*** (2.32/5.07)
Severe	1.36* (1.07/1.73)	2.40*** (1.51/3.81)	4.61*** (2.74/7.77)	8.61*** (4.88/15.17)
Sleep problems	1.04** (1.01/1.52)	1.07*** (1.04/1.09)	1.11*** (1.07/1.14)	1.16*** (1.12/1.21)
Social support	1.00 (.99/1.01)	1.00 (.99/1.01)	.99* (.98/1.00)	.99 (.98/1.01)
Corporal punishment	1.14 (.96/1.36)	1.08 (.94/1.24)	1.08 (.87/1.33)	1.01 (.75/1.34)
Physical Abuse	1.15 (.93/1.42)	1.13 (.96/1.35)	1.44** (1.14/1.81)	1.30 (.97/1.73)
Non-contact sexual abuse	1.38** (1.11/1.71)	.95 (.79/1.14)	1.12 (.87/1.43)	1.08 (.79/1.46)
Contact sexual abuse	.92 (.62/1.36)	.78 (.56/1.08)	1.32 (.91/1.92)	.93 (.58/1.47)
Emotional abuse	1.20* (1.00/1.44)	1.49*** (1.28/1.74)	1.50*** (1.19/1.90)	1.52* (1.08/2.13)
Physical neglect	.89 (.69/1.17)	1.00 (.81/1.23)	.80 (.61/1.06)	1.01 (.80/1.52)
Medical neglect	.89 (.69/1.15)	1.03 (.85/1.26)	1.01 (.78/1.31)	1.48* (1.09/2.01)
Emotional neglect	1.17 (.97/1.40)	1.60*** (1.37/1.86)	1.49*** (1.19/1.86)	1.49* (1.08/2.05)

Note. Reference group = No suicidality; NSSI = Non-suicidal self-injury; SA = suicide attempt; SI = suicidal ideation.
* $p < .05$, ** $p < .01$, *** $p < .001$

The results of the multinomial logistic regression analysis for Jamaica are presented in Table 3. The model was statistically significant, $\chi^2 = 1593.65$, $df = 104$, $p < .001$ (Pearson ($\chi^2 = 13408.85$, $df = 13268$, $p = .19$, Deviance $\chi^2 = 7508.54$, $df = 13268$, $p = 1.00$; Cox and Snell^2 = .37, Nagelkerke $R^2 = .40$). Results indicate that, compared with the reference group, males are less likely to belong to the SI only, SA only, and co-occurring NSSI/SI/SA groups. Living a rural area is a significant risk factor for belonging in the NSSI only, SI only, and SA only groups. The co-occurring NSSI/SI/SA group, in comparison with the reference group, is more likely to be affected by bulling by siblings. Safety in the family was reported as a significant factor in predicting membership in the SA only group. Depression, corporal punishment, and emotional neglect are statistically significant predictors in all four groups (i.e., NSSI only, SI only, SA only, and co-occurring NSSI/SI/SA) in comparison to reference group. Noteworthy, ORs for severe depression were extremely high for the SA only and co-occurring NSSI/SI/SA groups. Emotional and physical abuse are significant predictors for SI only and SA only groups, lack of social support for SA only and co-occurring NSSI/SI/SA groups, sleep problems for SI only and co-occurring NSSI/SI/SA groups, and medical neglect for the NSSI only group. Finally, it is also worth mentioning that anxiety is not a significant risk factor in this particular model.

Table 3

Results from Multinomial Logistic Regression (Jamaica)

	NSSI only OR (95% CI)	SI only OR (95% CI)	SA only OR (95% CI)	Co-occurring NSSI/SI/SA OR (95% CI)
Gender (1 = male)	1.23 (.93/1.63)	.59*** (.48/.72)	.66* (.47/.91)	.27*** (.19/.38)
Location (1 = urban)	.81** (.71/.95)	.82** (.69/.95)	.82** (.66/.91)	.91 (.70/1.28)
Living with both parents	.82 (.61/1.08)	.92 (.76/1.13)	.99 (.72/1.36)	.96 (.721.28)
Safe in the family	.97 (.78/1.19)	.99 (.86/1.14)	1.27* (1.05/1.53)	1.03 (.87/1.22)
Alcohol/drugs in the family	.87 (.52/1.48)	1.29 (.93/1.79)	1.33 (.94/2.09)	1.47 (.99/2.18)
Bulling by siblings	1.00 (.70/1.45)	1.26 (.99/1.61)	1.25 (.88/1.79)	1.50** (1.10/2.04)
Born in the family				
First (ref)	Ref	Ref	Ref	Ref
Second	.82 (.57/1.20)	1.18 (.86/1.61)	1.21 (.81/1.80)	1.30 (.91/1.87)
Third	.95 (.64/1.41)	1.30 (.99/1.72)	1.18 (.77/1.79)	1.14 (.78/1.67)
Fourth (and more)	1.12 (.73/1.72)	1.29 (.99/1.70)	.80 (.47/1.34)	1.17 (.76/1.80)
Age	1.31 (.97/1.77)	1.04 (.84/1.29)	1.19 (.85/1.68)	.85 (.61/1.18)
Anxiety				
None to slight	Ref	Ref	Ref	Ref
Mild	1.10 (.74/1.64)	1.16 (.89/1.52)	1.28 (.84/1.94)	1.37 (.92/2.02)
Moderate	1.00 (.65/1.55)	.84 (.63/1.13)	1.00 (.65/1.54)	1.35 (.93/1.97)
Severe	1.39 (.48/3.98)	1.62 (.77/3.41)	1.47 (.58/3.72)	2.09 (.94/4.64)
Depression				
None to slight	Ref	Ref	Ref	Ref
Mild	2.51*** (1.69/3.74)	2.52*** (1.89/3.36)	3.26*** (2.11/5.06)	3.23*** (2.11/4.95)

Moderate	1.67* (1.02/2.74)	3.85*** (2.83/5.24)	4.19*** (2.66/6.62)	6.02*** (4.00/9.07)
Severe	4.01*** (1.57/10.26)	9.55*** (4.93/18.50)	16.68*** (7.69/36.16)	38.95*** (19.38/78.28)
Sleep problems	1.05 (.99/1.11)	1.05* (1.01/1.08)	1.04 (.98/1.09)	1.12*** (1.07/1.17)
Social support	1.00 (.99/1.01)	.99 (.98/1.01)	.98* (.97/.99)	.98*** (.97/.99)
Corporal punishment	1.75*** (1.27/2.42)	1.54*** (1.24/1.91)	1.65** (1.14/2.39)	2.12*** (1.51/2.97)
Physical Abuse	.99 (.67/1.45)	1.34* (1.05/1.73)	1.73** (1.22/2.46)	1.37 (.99/1.89)
Non-contact sexual abuse	1.43 (.84/2.43)	1.05 (.71/1.54)	.82 (.47/1.43)	1.49 (.96/2.31)
Contact sexual abuse	1.44 (.72/2.91)	1.08 (.64/1.84)	.92 (.43/1.98)	1.26 (.68/2.31)
Emotional abuse	1.18 (.84/1.68)	2.11*** (1.63/2.72)	1.72* (1.09/2.72)	1.50 (.97/2.32)
Physical neglect	.92 (.54/1.55)	.95 (.66/1.38)	1.11 (.67/1.82)	1.23 (.80/1.89)
Medical neglect	1.72** (1.21/2.44)	1.19 (.92/1.54)	.70 (.48/1.05)	.99 (.71/1.38)
Emotional neglect	1.38* (1.00/1.91)	1.29* (1.03/1.60)	1.52* (1.06/2.19)	1.42* (1.01/1.99)

Note. Reference group = No suicidality; NSSI = Non-suicidal self-injury; SA = suicide attempt; SI = suicidal ideation.
* $p < .05$, ** $p < .01$, *** $p < .001$

Discussion

We performed a population-based cross-sectional study to examine the lifetime prevalence and psychosocial predictors of NSSI only, SI only, SA only, and co-occurring NSSI/SI/SA among children and adolescents from Jamaica and Uganda. Prior research in the area was based predominantly on samples from high-income countries. The lack of understanding of suicidal phenomena among youths from low- and middle-income countries significantly undermines the development of effective suicide screening protocols as well as prevention and intervention programs and perpetuates health inequalities in teens from different world regions.

We estimate that 12.8% of Ugandan boys, 15.3% of Ugandan girls, 11.9% of Jamaican boys, and 24.7% of Jamaican girls had attempted suicide at some point in their lives. These estimates are higher than the pooled prevalence of SA calculated in a review of 128 population-based studies, i.e., 9.7% (Evans et al., 2005b). The majority of studies included in the review, however, were conducted in North America (60.2%) and Europe (25%). This indicates that youths from developing countries, especially girls, are at an increased risk of attempting suicide. SI was reported by 25.6% of Ugandan boys, 32.5% of Ugandan girls, 27.7% of Jamaican boys, and 48.6% of Jamaican girls. These results are mostly consistent with prior studies reporting lifetime prevalence of SI at the level of 30%. Further, compared with previously reported rates of NSSI ranging from 10% (Grandclerc et al., 2016) to 17% (Swannell et al., 2014), the odds of NSSI among Ugandan and Jamaican youths were substantially increased. The lowest NSSI prevalence was found for Jamaican boys (21%), followed by Ugandan girls (23.2%), Ugandan boys (25.5%), and Jamaican girls (32.6%). Overall, the elevated odds of suicidal phenomena in girls compared with boys are consistent with prior studies conducted in developing countries (Aaron et al., 2004; Armitage

et al., 2015; Gould et al., 2003; Phillips et al., 2002). The particularly high rates of suicide attempt, SI, and NSSI among Jamaican girls are especially noteworthy and may be reflective of wider gender imbalance, violence, and health inequality experienced by women in the region. Indeed, gender-based violence (GBV) affects a significant proportion of women and girls in the Caribbean, with the risk of exposure to such violence being among the highest in the world (Debowska et al., 2018; Jermiah, Gamache, & Hegamin-Younger, 2013; Jeremiah, Quinn, & Alexis, 2017; Reid, Reddock, & Nickening, 2014).

Our study also provides new information about the associations of mental health problems, child maltreatment, and other socio-environmental factors with suicidal phenomena in youths from developing countries. Among both samples of youths, the odds of experiencing SI only, SA only, and co-occurring NSSI/SI/SA were significantly elevated among participants with mild, moderate, and severe depression. As long as the odds of NSSI only were increased for Jamaican youths with mild, moderate, and severe depression, the same was true for Ugandan youths with severe depression but not its milder forms. These findings are consistent with previous reports indicating that depression is a risk factor for various suicidal phenomena (Brown et al., 2017; Goldstein et al., 2008; Madge et al., 2011). The graded relationship hypothesis that the more severe depression categories would be associated with higher incidence of suicidal phenomena was also supported. The increase in risk was especially sharp for SA only and co-occurring NSSI/SI/SA among youths classed as severely depressed, especially in the Jamaican sample. Notably, Jamaican youths in the mild, moderate, and severe depression category were three, six, and nearly forty times more likely respectively to report all three suicidal phenomena, compared with their counterparts with none to slight depression. Another interesting finding was that both moderate and severe anxiety was predictive of NSSI only, SI only, and co-occurring NSSI/SI/SA, whereas severe anxiety was predictive of SA only, but only among Ugandan adolescents. At the same time,

there were no striking differences in the number of youths from the two countries falling into different anxiety categories based on intensity of symptoms. This result points to potential cultural differences in the expression of anxiety disorders, a possibility that has already been described elsewhere (Hoge et al., 2006). Further, the dose-response relationship between anxiety and suicidal phenomena was not observed in either sample.

As for child maltreatment, having experienced emotional abuse and/or emotional neglect was associated with increased odds of SI only, SA only, and co-occurring NSSI/SI/SA in both samples and NSSI only in the Ugandan sample, which is consistent with prior research (Christoffersen & DePanfilis, 2010; Liu et al., 2017). Emotional abuse was reported by approximately 60% of youths and emotional neglect was reported by approximately 45% of youths in our study (with rates exceeding 70% and 50% respectively among Jamaican girls). These results highlight how widespread and serious these least understood forms of child maltreatment are. In addition, corporal punishment increased the risk of NSSI only, SI only, SA only, and co-occurring NSSI/SI/SA in Jamaican youths. Surprisingly, exposure to sexual abuse did not increase the risk of suicidal phenomena (both co-occurring and single forms), with the exception of Ugandan youths for whom a history of non-contact sexual abuse was associated with an elevated risk of NSSI only. This finding is in contrast to results of an earlier Jamaica-based study, which reported significant associations between sexual abuse and SI as well as SA (Kukoyi et al., 2010). It may be that sexual abuse leads to other forms of psychopathology, but this possibility needs to be explored in future research. Finally, echoing previous research findings (Farrell et al., 2015), social support was associated with lowered risk of co-occurring NSSI/SI/SA in Jamaican youths as well as lowered risk of SA only among youths from both countries.

It is noteworthy that the rates of mental health problems and child maltreatment reported here are higher than the rates found in community studies of adolescents conducted

mainly in high income countries (Stoltenborgh et al., 2015; Thapar et al., 2012). Notably, in excess of 30% of Jamaican girls had moderate or severe depression, which can partly explain the elevated rates of suicidal phenomena in our study. Indeed, the burden of depression was found to be the highest in low- and middle-income countries (Thapar et al., 2012) and our study expands on those previous findings by identifying a population of youths for whom the burden seems exceptionally high. These findings call for immediate public health efforts to reduce health inequalities experienced by Jamaican girls in particular.

These findings should be interpreted in light of several limitations. First, the results are based on retrospective data that may be subject of recall bias. Second, we did not measure certain mental health phenomena which have been associated with suicidal behaviour (e.g., borderline personality traits). Third, we included only one protective factor in the analysis. Future research should pay greater attention to factors that may build resilience to suicide, to better inform prevention and intervention efforts. These limitations notwithstanding, our study provides valuable new information about suicidal behaviours among children and adolescents from developing countries. The results point to the need for actionable strategies for timely identification and prevention of these behaviours, ideally in school settings to ensure wide reach.

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