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Article

The prevalence and correlates of suicidal behaviours (ideation, plan and attempt) among adolescents in senior high schools in Ghana

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ABSTRACT

Suicide is recognised as the third leading cause of death among adolescents globally. There is however limited data on the prevalence and factors associated with suicide particularly in Ghana. To explore the prevalence and risk and protective factors associated with suicide in Ghana, a nationwide Global School-based Student Health Survey data collected among senior high school adolescents in Ghana was used. The prevalence of suicidal behaviours was 18.2%, 22.5% and 22.2% for suicidal ideation, suicidal plan and suicidal attempt respectively. In the final analysis, anxiety increases the odds of suicidal behaviour, even after controlling for other variables. Loneliness increases the odds of suicidal behaviour but after adjusting for other factors the odds remained for only suicidal plan. Being bullied, physically attacked, involved in a physical fight and food insecurity remained risk factors for suicidal behaviour (i.e. ideation, plan and attempt) after adjusting for other factors. Truancy was found as a risk factor for both suicidal ideation and plans but such effect diminished for suicidal plan after adjusting for other variables. Increasing number of close friends remained a risk factor for both suicidal plan and attempt but such effect diminished for suicidal ideation after adjusting for other variables. Parental understanding of adolescents' problems and worries remained a significant protective factor for all the indices of suicidal behaviour after adjusting for other variables. Parental respect for privacy was protective of suicidal attempt but was not significant after adjusting for other variables. Early identification and intervention for at-risk adolescents in senior high schools, for example those experiencing different forms of physical abuse, drug and substance use and hunger can potentially reduce the prevalence of suicide among this population in Ghana.

Introduction

In Sub-Saharan Africa, about 23% of the population is aged between 10 and 19 years old (WHO, 2014a). Projections by the Ghana Statistical Service (GSS) show that Ghana's population has grown from 24,658,823 (in 2010) to 28,308,301, as of December 2016 (GSS, 2012, 2017). Persons aged between 10 and 24 years constitute about 38.3% of the population. There are significant developmental changes that take place during the transition from childhood to adolescence, which are accompanied by physical and psychological challenges (Sinha, Cnaan, & Gelles, 2007). Among these challenges is engagement in risky behaviours (e.g., having unprotected sex and substance use, self-harm etc.) which increases their vulnerability to poor physical and mental health outcomes (Glozah & Pevalin, 2016; Patel, Flisher, Hetrick & McGorry, 2007; WHO, 2014a). Since it has been estimated that sub-Saharan Africa will have more adolescents than any other region by the year 2050, adolescent health research and interventions, thus become key priority (WHO, 2014a).

Globally, 10–19 year olds are highly susceptible to mental health disorders. It has been suggested that about half of adult mental health disorders begin in adolescence, but go undetected and untreated (WHO, 2014a). Suicide is recognised as the third leading cause of death among adolescents globally, and in Ghana, anecdotal evidence has suggested an increase in suicide among adolescents (Citifmonline, 2012). Suicidal ideation is a strong predictor of suicide in both the general population as well as among adolescents (WHO, 2011). Furthermore, psychological autopsy studies show that most suicides occur on the first attempt (Cavanagh, Carson, Sharpe, & Lawrie, 2003), highlighting the impor-

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tance of identifying precursors to suicidal behaviour (such as suicidal ideation) to inform suicide prevention efforts. Multiple studies have demonstrated that several factors (e.g., personal/intrapersonal, interpersonal and environmental) are associated with adolescent suicidal ideation and attempts (Brent & Mann, 2006; Johnson, Krug & Potter, 2000; Portzky, Audenaert, & van Heeringen, 2005; Roberts, Roberts & Chen, 1998). These studies have contributed to the development of interventions aimed at suicide prevention among young adults globally.

There is continuous disagreement among clinicians and researchers on suicide-related nomenclature, terminology and definitions, particularly for nonfatal suicidal behaviours and outcomes (O'Carroll et al., 1996; Silverman, Berman, Sanddal, O'Carroll, & Joiner, 2007a, 2007b; Wagner, 2009). Thus, in this study the commonly used definitions with consensus in the literature are applied. We define *suicidal ideation* as "any self-reported thoughts of engaging in suicide related behaviour" (O'Carroll et al., 1996, p.247); *suicidal plan* refers to the formulation of a specific method by which one intends to kill oneself (Silverman et al., 2007b); *suicidal attempt* is used to mean "intentional self-inflicted poisoning, injury or self-harm which may or may not have a fatal intent or outcome" (WHO, 2014b, p.12); and *suicide* is defined as "the act of deliberately killing oneself" (WHO, 2014b, p.12). A person experiencing suicidal crisis typically engages in suicidal behaviours from thinking about suicide (suicidal ideation), formulating plans for suicide (suicidal plans), trying out suicidal acts (attempting suicide), to actually killing oneself (Millner, Lee, & Nock, 2016; WHO, 2014b). Recent clinical and school-based studies involving young people show that sometimes impulsivity facilitates the transition from suicidal thoughts to suicide in the face of negative emotions (Anestis, Soberay, Gutierrez, Hernández, & Joiner, 2014; Klonsky, & May, 2010; Klonsky, May, & Glenn, 2013; May, & Klonsky, 2016; Millner et al., 2016).

Compared to high income countries, studies on the prevalence and determinants of adolescent suicide in low-and middle-income countries (LAMICs), including many countries in sub-Saharan Africa such as Ghana, are limited. Nevertheless, evidence from a number of studies shows a significant increase in suicidal attempts and suicide related deaths among adolescents and young adults in Africa, including Ghana (McKinnon, Gariépy, Sentenac, & Elgar, 2016; Quarshie, Osafo, Akotia & Peprah, 2015; Swahn, Palmier, Kasirye & Yao, 2012; WHO, 2014b). In a study examining adolescent suicidal behaviour among 32 countries in low-and middle-income countries using the Global School-based Health Survey (GSHS), selected countries within sub-Saharan Africa had relatively higher prevalence of suicidal behaviours among school-going adolescents, compared to the selected low-and middle-income countries from other WHO regions (i.e., Americas, Eastern Mediterranean, and South-East Asia and Western Pacific) involved in the study (McKinnon et al., 2016). A study pooling data from Botswana, Kenya, the Seychelles, Uganda, United Republic of Tanzania, and Zambia showed that parental involvement served as both risk and protective factor for various mental health problems including suicidal ideation, attempt and plan (Arat & Wong, 2016). On a broader societal level, a systematic review of studies on the prevalence of child mental health problems in sub-Saharan Africa showed that low subjective socio-economic status, poverty, or insufficient food are the most significant risk factors for poor mental health (Cortina, Sodha, Fazel & Ramchandani, 2012).

In Ghana, the 2010 population and housing census report by the Ghana Statistical Service (GSS, 2012) provides some omnibus statistics of death by suicide, violence, accident, and homicide. The report shows 18,938 deaths recorded and categorized under *deaths by accident, violence, homicide, or suicide* within the 12 months preceding the census. Additionally, the 2008 GSHS data from Ghana also showed that 14.6% of the students seriously considered attempting suicide during the 12 months before the survey and 15.4% of the students made plans to attempt suicide during the 12 months preceding the survey (Owusu, 2008). A recent study revealed an increase in suicide reported cases among adolescents in Ghana over a 15-year period, with more boys than girls likely to attempt and die by suicide (Quarshie et al., 2015). The same report also indicated that psychological factors, conflictual relationships, loss of significant other, poor school work, and socio-economic factors influence adolescent suicidal behaviours (Quarshie et al., 2015). Thus, generally, in Ghana, few studies have assessed the factors that are associated with suicidal behaviours. In the context of this gap in knowledge, the purpose of this study was therefore to examine the factors that are associated with suicidal ideation, plans and attempts using a national school-based survey of Ghanaian senior high school adolescents.

Conceptual framework of adolescent suicide

The risk and protective factors model (Hawkins, Catalano, & Miller, 1992) served as the theoretical framework that guided this study. This framework posits that within a particular population, there are factors that may ameliorate the effects of psychological problems (protective factors) or exacerbate the probability of developing a psychological problem (risk factors). Among school-going adolescents, several factors may be associated with susceptibility to mental health problems including suicide. These include personal and situational and/or social context characteristics associated with mental health. Among adolescents, pertinent socio-demographic factors related to suicidal ideation and attempt may include their younger age, perceived socio-economic status, and alcohol and substance use. Knowledge of risk and protective factors associated with suicidal ideation among school-going adolescents living in Ghana is needed to help develop appropriate harm-reduction programmes for this population.

The above mentioned studies suggest that suicidal ideation and attempts among adolescents are associated with several personal, familial, societal and systemic factors which need to be addressed holistically in any attempt to reduce the incidence and prevalence of suicide among adolescents. In the present study, we used the nation-wide Global School-based Health Survey, conducted among senior high school students in Ghana, to explore risk and protective factors associated with suicidal ideation, plans and attempts. We assessed multiple risks and protective factors at the individual, family, peer and school levels to provide a broader perspective of factors related suicidal behaviours in adolescents in senior high schools in Ghana. We hypothesized that risk and protective factors will be uniquely associated with suicidal ideation, plans and attempts. Specifically, we expected psychosocial variables (anxiety and loneliness), substance use and violence related behaviours to heighten the risk of suicidal behaviours whilst parental support behaviours, and peer behaviours (having close friends) may be protective of suicidal behaviours.

Methods

Study design and sample

Data for this study was obtained from the Ghana Global School-based Student Health Survey (GSHS) conducted in 2012 (WHO, 2014c). This survey was conducted through the partnership among the World Health Organization (WHO), Disease Control and Prevention (CDC), Middle Tennessee State University and the Ghana Education Service (GES). The data was collected using a cross-sectional survey design among WHO countries which were interested in examining the behavioral risk factors and protective factors in several domains of functioning among the youth in schools. Data collection was done by the use of close-ended structured questionnaires administered to the students. Details of the systematic steps involved in the data collection among the students can be found on the WHO website (WHO, 2014d) for further information. Participants for this study were sampled from selected senior high schools (SHS) in all the 10 administrative regions

of Ghana. A two-stage cluster sampling design was used to select 25 senior high schools to represent all the 10 regions of Ghana. Selection of schools at the first stage of the sampling was based on a probability proportional to the size of enrollment. At the second stage a random sampling technique was used to select the classes in each school. This allowed every student to have an equal chance of being selected for study. A numerical weighting was applied to each student record to enable generalization of results to the eligible population. A total of 1984 students participated in the study. This sample included 1065 (53.7%) males, 908 (45.7%) females and 11 (0.6%) were missing data. The majority of the students, 1062 (53.5%) were aged 18 years or older. Students aged 14 years and below, 15 years, 16 years and 17 years constitute 50 (2.5%), 180 (9.1%), 245 (12.4%) and 440 (22.3%) of the sample respectively. The students were relatively equally split across the four Senior High School grade levels. Two-thirds of those surveyed were boarding students.

Measures

Dependent variables

Three main outcome measures were extracted from the data, namely, suicidal ideation, suicidal plan and suicidal attempts. In this study, each of these three outcome variables was measured with a single self-report item or question. For example, the item, "*during the past 12 months, did you ever seriously consider attempting suicide*?" was used to measure suicidal ideation while suicidal plan was measured with the question, "*during the past 12 months, did you make a plan about how you would attempt suicide*?". The responses were categorized as "yes" (1) or "no" (0). Suicidal attempt was measured with the question "*during the past 12 months, how many times did you actually attempt suicide?*" The responses for this questions were "0", "1", "2 or 3", "4 or 5", and "6 or more times". The responses were recoded as *no attempt* (0) and *one or more attempts* (1) for analysis.

Independent variables

A set of predictor variables including demographic characteristics of the participants, psychological socio-environmental factors and parental involvement was used to determine their predictive effects on the three outcome variables (suicidal ideation, suicidal plan and suicidal attempts). The details of the questions used, the variable names and the coding used for the statistical analysis are presented in Table 1.

Ethical statements

The Ghana Global School-based Student Health Survey (GSHS) questionnaire used in the data collection in 2012 was piloted to ensure adequate comprehension of the survey items. The Ghana Education Service's (GES) policies on ethics regarding the use of students in survey studies were adhered to in the data collection. Official written permissions were obtained from Ghana Education Service (GES), the selected schools, and classroom teachers. Written informed consent was obtained from the students and parental consent was also obtained for minors.

Statistical analysis

Sample weights were used in all analyses so results are generalizable to the population, and further to reduce bias on differing pattern of non-response. All variables were re-coded on dichotomous scale in this study as in other existing GSHS studies (e.g., Arat & Wong, 2016; Ohene et al., 2015; Randall, Doku, Wilson & Peltzer, 2014). The primary analyses were performed in two steps to determine factors most strongly associated with suicidal behaviours (ideation, attempt and plan) in adolescents. First, bivariate analyses using the Chi-square (χ^2) test was used to examine possible relations between the independent variables and suicidal behaviours. Variables that demonstrated significant differences between those who reported any of the indices of suicidal behaviour and those who did not were entered into logistic regression models at the second step. In the second step, binominal logistic regression analyses were conducted to examine the impact of the various risk and protective factors on suicidal behaviours (ideation, plan and attempt). Demographic variables (age and sex) were included in all logistic regression models. The results from the regression analyses are presented as odds ratio (OR) and 95% confidence interval (CI). Statistical significance was defined as two-tailed p-value < 0.05 in all analyses. The Statistical Package for the Social Sciences (SPSS) version 23.0 for Window (IBM SPSS, Inc., Chicago, IL, USA) was used to conduct data analyses. A multiple imputation method was utilized for variables where the amount of missing data exceeded 5% to overcome the weakness in analysing, or preventing any bias, or misinterpretation, and to secure representativeness (Sterne et al., 2009). To prevent estimation bias resulting from the exclusion of these subjects, missing values were replaced with imputed values, using the multiple imputation by *Expectation-Maximization* (EM) (Graham, 2012). The results of the multiple imputation analysis suggested that the analysis for risks and protective factors associated with suicidal behaviour (ideation, plan and attempt) among adolescents did not demonstrate serious bias.

Results

Univariate analysis

The prevalence of suicidal behaviours were 18.2%, 22.5% and 22.2% for suicidal ideation, suicidal plan and suicidal attempt respectively. A total of 317 (16.0%) of the participants reported feeling of anxiety during the past 12 months and 367 (18.4%) reported feelings of loneliness within the same time frame. About 43.8%, 37.5% and 28.2% of the participants reported to have been bullied, physically attacked and involved in a physical fight on once or more occasions respectively. Over a third of the participants (32.1%) were truant over the past 30 days.

Bivariate analysis

Bivariate findings are presented in Table 2. Age was not significantly associated with any of the suicidal behaviours. With exception of suicidal attempt, gender was associated with both suicidal ideation ($p < 0.001$) and suicidal plan ($p < 0.001$). More than one in four of the participants who reported feelings of loneliness and anxiety also reported suicidal ideation, suicidal plan and suicidal attempt. Socio-environmental factors such as truancy, been bullied, physically attacked, involved in a physical fight, going hungry (food insecurity) and having close friends were independently associated with all the indices of suicidal behaviour (i.e. ideation, plan and attempt). Parental understanding of adolescents' problems and worries was found to be significantly associated with all the indices of suicidal behaviour (i.e. ideation, plan and attempt) but parental intrusion was related to only suicidal attempt.

Multivariate analysis

The logistic regression analyses are presented in Table 3. After controlling for other factors, male were less likely to be involved in suicidal ideation and suicidal plan. Anxiety increases the odds of suicidal behaviour, even after controlling for other variables. Loneliness increases the odds of suicidal behaviour but after adjusting for other factors the odds remained for only suicidal plan.

Being bullied, physically attacked, involved in a physical fight and food insecurity remained risk factors for suicidal behaviour (i.e. ideation, plan and attempt) after adjusting for other factors. Truancy was found as a risk factor for both suicidal ideation and suicide plan but such effect diminished for suicidal plan after adjusting for other

Table 1
Independent variables derivation from survey data.

Variable	Survey question	Coding
Age	How old are you?	11–18 years (coded categorically)
Sex	What is your sex	(1) Male (0) Female
Anxiety	During the past 12 months, how often have you been so worried about something that you could not sleep at night?	(1) Most of the times/always (0) Never/rarely/sometimes
Loneliness	During the past 12 months, how often have you felt lonely?	(1) Most of the times/always (0) Never/rarely/sometimes
Truancy	During the past 30 days, how many days did you miss classes or school without permission?	(0) 0–2 times (1) 3 or more times
Bullied	During the past 30 days, how many days were you bullied?	(0) 0 times (1) 1 or more times
Attacked	During the past 12 months, how many times were you physically attack?	(0) 0 times (1) 1 or more times
In a fight	During the past 12 months, how many times were you in a physical fight?	(0) 0 times (1) 1 or more times
Food Insecurity	During the past 30 days, how often did you go hungry because there was not enough food in your home?	(1) Most of the times/always (0) Never/rarely/sometimes
Close friends	How many close friends do you have?	(0) 0 friends (1) 1 or more close friend
Smoking	During the past 30 days, how many days did you smoke cigarette?	(0) 0 times (1) 1 or more times
Substance Use	How old were you when you first used drugs?	(0) I have never used drugs (1) Any other response
Alcohol misuse	During your life, how many times did you drink so much alcohol that you were really drunk?	(0) 0 times (1) 1 or more times
Parental homework checking	During the past 30 days, how often did your parents or guardians check to see if your homework was done?	(1) Most of the times/always (0) Never/rarely/sometimes
Parental understanding	During the past 30 days, how often did your parents or guardians understand your problems and worries?	(1) Most of the times/always (0) Never/rarely/sometimes
Parental knowledge of activity	During the past 30 days, how often did your parents or guardians really know what you were doing you're your free time?	(1) Most of the times/always (0)Never/rarely/sometimes
Parental intrusion of privacy	During the past 30 days, how often did your parents or guardians go through your things without your approval?	(1) Most of the times/always (0)Never/rarely/sometimes

Table 2
Association of risks factors with suicidal ideation, plan and attempts among Ghanaian adolescents.

Variables	Sample	Suicidal Ideation		Suicidal Plan		Suicidal Attempt	
	100%	**n(%) 360(18.2%)**	ρ	**n(%) 438(22.5%)**	ρ	**n(%) 438(22.2%)**	ρ
Demographic							
Age			.952		.523		.068
≤14years	50(2.5%)	9 (2.5%)		8(1.8%)		10(2.3%)	
15years	180(9.1%)	29(8.1%)		35(8.0%)		30(6.8%)	
16years	245(12.4%)	44(12.2%)		58(13.2%)		61(13.9%)	
17years	440(22.3%)	82(22.8%)		105(24.0%)		114(26.0%)	
≥18years	1062(53.7%)	196(54.4%)		232(53.0%)		223(50.9%)	
Sex (Male)	1062(53.7%)	163(45.7%)	.001	210(48.5%)	.010	225(52.0%)	.287
Psycho-social							
Anxiety	317(16%)	91(25.4%)	< .001	102(23.3%)	< .001	101(23.1%)	< .001
Loneliness	364(18.4%)	93(26.0%)	< .001	111(25.6%)	< .001	97(22.4%)	.012
Socio-environment							
Truancy	629(32.1%)	142(39.7%)	.001	162(37.3%)	.004	169(39.4%)	< .001
Bullied	806(43.8%)	194(60.6%)	< .001	226(57.5%)	< .001	256(65.0%)	< .001
Attacked	737(37.5%)	180(50.8%)	< .001	214(49.2%)	< .001	249(57.5%)	< .001
In a fight	558(28.2%)	142(39.9%)	< .001	164(37.6%)	< .001	184(42.4%)	< .001
Food insecurity	261(13.2%)	77(21.4%)	< .001	93(21.3%)	< .001	86(19.7%)	< .001
Close friends	278(14.1%)	65(18.4%)	.010	83(19.1%)	< .001	76(17.6%)	.010
Smoking	112(5.6%)	27(51.9%)	.316	29(52.7%)	.302	47(54.7%)	.428
Substance Use	184(9.3%)	48(71.6%)	.988	54(72.0%)	.895	70(73.7%)	.610
Alcohol misuse	270(13.6%)	52(47.3%)	.916	64(47.8%)	.739	57(45.2%)	.620
Parental support issues							
Parental homework checking	830(42.3%)	147(41.5%)	.705	187(43.3%)	.630	184(42.7%)	.844
Parental understanding	867(44.6%)	131(37.0%)	.010	157(36.7%)	< .001	159(37.0%)	< .001
Parental knowledge of activity	871(40.2%)	132(37.8%)	.299	169(39.8%)	.825	155(36.3%)	.081
Parental intrusion of privacy	1074(54.8%)	185(52.4%)	.326	232(53.7%)	.489	214(49.4%)	.010

Table 3
Logistic regression for predictors of suicidal ideation, plan and attempts.

Variables	Suicidal Ideation		Suicidal Plan		Suicidal Attempt	
	OR (95%CI)	AOR (95%CI)[a]	OR (95%CI)	AOR (95%CI)[a]	OR (95%CI)	AOR (95%CI)[a]
Demographic						
Age	–	–	–	–	–	–
≤14years	1	1	1	1	1	1
15years	0.88(0.38–1.99)	0.96(0.40–2.10)	1.29(0.55–2.98)	1.34(0.58–3.12)	0.81(0.37–1.80)	0.89(0.40–2.01)
16years	1.00(0.45–2.21)	1.02(0.46–2.27)	1.66(0.74–3.75)	1.70(0.75–3.85)	1.33(0.63–2.83)	1.38(0.64–2.97)
17years	1.05(0.49–2.25)	1.06(0.49–2.27)	1.69(0.77–3.71)	1.69(0.96–3.72)	1.42(0.69–2.92)	1.44(0.68–3.03)
≥18years	1.04(0.50–2.17)	1.02(0.48–2.15)	1.50(0.70–2.17)	1.49(0.69–3.222)	1.07(0.53–2.18)	1.06(0.52–2.20)
Sex (Male)	0.67 (0.53–84) ***	0.65(0.49–0.84)**	0.76 (0.31–94) *	0.73(0.57–0.93) *	0.89(0.72–1.10)	0.42(0.10–1.68)
Psycho-social						
Anxiety	2.17(1.64–2.86)***	1.80(1.30–2.49) ***	1.95(1.50–2.56)***	1.52(1.11–2.08)**	1.87(1.43–2.44) ***	1.39(1.01–1.93)*
Loneliness	1.75(1.34–2.30)***	1.36(0.99–1.87)	1.78 (1.38–2.29)***	1.43(1.06–1.91) *	1.40(1.08–1.82) *	1.11(0.81–1.52)
Socio-environment						
Truancy	1.52(1.20–1.92)***	1.40(1.06–1.84)*	1.39(1.11–1.73) ***	1.31(1.01–1.69)*	1.52(1.22–1.90) ***	1.25(0.96–1.62)
Bullied	2.29(1.79–2.93)***	1.68(1.38–2.20) ***	2.05(1.63–2.57) ***	1.62(1.26–2.08)***	3.04(2.41–3.84) ***	2.14(1.65–2.77)***
Attacked	1.98(1.57–2.49)***	1.38(1.05–1.81) *	1.89(1.52–2.34) ***	1.35(1.05–1.74)*	2.93(2.35–3.65) ***	2.14(1.64–2.76)***
In a fight	1.93(1.52–2.46)***	1.44(1.08–1.92)	1.80(1.44–2.26) ***	1.39(1.06–1.82)*	2.34(1.87–2.93) ***	1.62(1.24–2.13)***
Food insecurity	2.15(1.60–2.89)***	1.56(1.09–2.23)*	2.26(1.70–2.99) ***	1.61(1.15–2.46)**	1.95(1.47–2.60) ***	1.48(1.05–2.09)*
Close friends	1.49(1.10–2.02)*	1.36(0.95–1.95)	1.65 (1.24–2.20) **	1.65(1.19–2.30)**	1.46(1.09–1.95) *	1.53(1.08–2.15)*
Smoking	0.72(0.38–1.37)	0.73(0.19–2.79)	0.71(0.38–1.36)	0.47(0.12–1.85)	0.79(0.44–1.42)	1.67(0.48–5.80)
Substance use	1.02(0.54–1.85)	2.5(0.58–10.90)	1.04(0.57–1.91)	1.88(0.47–7.61)	1.16(0.66–2.06)	1.31(0.37–4.62)
Alcohol misuse	1.02(0.67–1.55)	0.52(0.13–2.04)	1.07(0.72–1.58)	1.22(0.31–4.87)	0.90(0.61–1.35)	0.55(0.16–1.92)
Parental support issues						
Parental homework checking	0.96(0.76–1.21)	1.02(0.22–4.63)	1.05(0.85–1.31)	1.85(0.46–7.50)	1.02(0.82–1.27)	3.65(0.96–13.96)
Parental understanding	0.68(0.54–0.86) ***	0.69(0.52–0.89) ***	0.66(0.53–0.83) ***	0.69(0.54–0.88)**	0.67(0.53–0.83)***	0.67(0.52–0.88)**
Parental knowledge of activity	0.88(0.69–1.11)	0.75(0.17–3.33)	0.98(0.78–1.22)	0.95(0.23–3.90)	0.82(0.66–1.03)	0.55(0.14–2.17)
Parental intrusion of privacy	0.89(0.71–1.12)	0.26(0.10–1.02)	0.93(0.75–1.15)	0.45(0.26–1.95)	0.75(0.61–0.93) **	0.89(0.69–1.15)

*** $\rho < 0.001$.
** $\rho < 0.01$.
* $\rho < 0.05$.
[a] AOR adjusted for all factors which appear in table.

variables. Increasing number of close friends remained a risk factor for both suicidal plan and attempt but such effect diminished for suicidal ideation after adjusting for other variables. Parental understanding of adolescents' problems and worries remained a significant protective factor for all the indices of suicidal behaviour after adjusting for other variables. Parental respect for privacy was protective of suicidal attempt but was not significant after adjusting for other variables.

Discussion

Despite the recent increase in adolescent suicide rates in Ghana (Quarshie et al., 2015), sparse literature exists on the factors associated with suicidal behaviours in adolescents. This study was conducted to examine the risk and protective factors associated with suicidal behaviour among adolescents in senior high schools in Ghana. The prevalence of suicidal behaviours were 18.2%, 22.5% and 22.2% for suicidal ideation, suicidal plan and suicidal attempt respectively. In the multivariate analyses, several factors were found to be significantly associated with suicidal ideation, plan and attempt. Being bullied, physically attacked, involved in a physical fight and food insecurity, having close friends were found as risk factors for suicidal behaviour whilst Parental understanding of adolescents' problems and worries was protective for all suicidal behaviour.

The prevalence of suicidal ideation, suicidal plan and suicidal attempt reported among this population falls within the range of what has been reported in studies from other African countries such as Benin, Uganda and Seychelles (Randall et al., 2014; Swahn et al., 2012; Wilson, Dunlavy, Viswanathan & Bovet, 2012). However, the prevalence rates of 18.5% and 22.5% for suicidal ideation and plan respectively were higher compared to the prevalence rates of 7% and 6.3% for suicidal ideation and plan respectively in Tanzania (Dunlavy, Aquah, & Wilson, 2015). The differences in the prevalence rates of suicidal behaviour as found in this study and those observed in other African countries could, in part, reflect differences in the meaning of suicidal thoughts and normative attitudes towards suicide across diverse cultural, religious and economic settings (Wasserman, & Wasserman, 2009). Suicidal behaviours are highly related to context which is why critical suicidologists have suggested recently that context should be given a critical consideration in the assessment of the risks and protective factors related to suicidality (White, Marsh, Kral, & Morris, 2015). The magnitude of suicidal ideation and suicidal plan in the present study using the 2012 Global School-based Health survey was higher than 14.6% and 15.4% for suicidal ideation and plan as reported in the 2008 version of the same survey in Ghana (Owusu, 2008). This increase could also be attributed to the existing economic situations in Ghana during the data collection period. The year 2012 was significant in the history of Ghana as it was characterized by high rates of inflations coupled with difficult financial consequences for families and individuals, a situation which was found to increase the risk for suicidal behaviour in Ghana (Osafo, Akotia, Andoh-Arthur & Quarshie, 2015). Finally, the lower rate of suicidal ideation (18.2%) compared to suicidal plan (22.5%) and suicidal attempt (22.2%) observed in this study may be attributable to the characteristic of impulsivity associated with suicidal behaviour in young people (Millner et al., 2016). Evidence from recent clinical and school-based studies (e.g., Anestis et al., 2014; Klonsky, & May, 2010; Klonsky et al., 2013; May, & Klonsky, 2016; Millner et al., 2016) indicate that, compared to adults, many young people experiencing suicidal crisis attempt suicide without prior suicidal ideation or both suicidal ideation and plans due to adolescent impulsivity. Thus, impulsivity can be a pathway to suicidal attempt in young people (Klonsky, & May, 2010; Millner et al., 2016).

Consistent with other studies, we found that compared to males, females were more likely to have suicidal ideation and suicidal plan

(McKinnon et al., 2016; Sharma, Nam, Kim & Kim, 2015; Swahn et al., 2012). A study of suicidality in street children and adolescents in Ghana showed a highly significant difference between the proportion of females reporting suicidal plans and attempts compared to their male counterparts (Oppong Asante, 2015). As argued by Blumenthal and Kupfer (1990), the female preponderance of suicidal ideation and planning may be linked to females' higher tendency of engaging in both covert and overt help-seeking behaviour, plus their higher score on affective disorders, compared to males. In low-and middle-income countries, it has been observed that adolescent girls are more prone to suicidal behaviour (and negative mental health outcomes, more generally) notably because of rigid gender norms and discrimination (Petroni, Patel, & Patton, 2015; WHO, 2014e). Although rigid gender norms and discrimination (e.g., unequal chore burdens, caretaking responsibilities, sexual abuse and exploitation exclusion from education, employment, and decision making etc.) have negative effects on both adolescent boys and girls, the effects are much more telling on girls, constraining their opportunities and aspirations (Petroni et al., 2015).

Our study showed an association between suicidal behaviour (ideation, plan and attempts) and anxiety and loneliness. The transition from childhood to adolescence, which is accompanied by physical and psychological challenges such as depression, anxiety and loneliness have been linked to suicidal behaviours in other studies (McKinnon et al., 2016; Swahn et al., 2012, Shilubane et al., 2014). Blum and Nelson-Mmari (2004) in their study to examine the principal causes and influences of morbidity and mortality among young people throughout the world, indicated that there are myriad of psychological and mental health problems that could lead to suicidal behaviours in young people. Even though 16.0% and 18.4% of the participants reported feeling anxiety and loneliness respectively, in the multivariate analysis only anxiety increased the odds of suicidal behaviour, even after controlling for other variables. This suggests that those who follow through more readily with the suicide are those with feelings of anxiety and not necessarily those with feelings of loneliness. Unlike other studies (e.g. Page & West, 2011; Randall et al., 2014; Swahn et al., 2012; Wilson et al., 2012), this study did not find substance use as a risk factors for suicidal ideations, plans and attempts. The lack of the relationship between substance use and suicidal behaviour is surprising but this could be attributed to social desirability effect where the participants provided socially desirable responses to the items on substance use because of the strong abhorrence of adolescent drug and substance use within the Ghanaian society (Owusu, 2008).

The relationship between hunger/food insecurity and suicide has not been explored in literature particularly among adolescents. However, a systematic review of studies on the prevalence of child mental health problems in sub-Saharan Africa showed that low subjective socio-economic status, poverty, or insufficient food are the most significant risk factors for poor mental health (Cortina et al., 2012). Job loss and chronic unemployment have been found to be risk factors for suicidal ideations and attempts among young adults in Ghana (Adinkrah, 2011; Osafo et al., 2015). In the US, studies have clearly shown that food deprivation among adolescents does not only lead to dysthymia but also thoughts of death, a desire to die and attempted suicide (Alaimo, Olson & Frongillo, 2002; McIntyre, Williams, Lavorato, & Patten, 2013). In this study, perhaps adolescent's inadequate access to food may have led to heightened emotional responsiveness and increased irritability and distraction, leading to suicidal behaviours.

For suicidal ideations, plans and attempts, interpersonal level risk factors that were found to be significant were being bullied, physically attacked and being involved in a physical fight. These findings are consistent with other studies (e.g., Randall et al., 2014; Shilubane et al., 2013; 2014; Swahn et al., 2012). The association between bullying victimization and suicidal ideation is evident globally (McKinnon et al., 2016; WHO, 2014a). Exposure to and engagement in these adverse behaviours may contribute to suicidal behaviour through accumulative internalized behaviours such as social isolation, shame and feelings of depressions, that eventually affect their ability to deal with such stressors that are associated with physical abuse and bullying victimization (Page & West, 2011). These findings therefore underscore the need to develop an intervention policy aimed at reducing bullying and violent-related behaviours among school-going adolescents. It has been suggested that physical violent behaviour of school teachers is a key determinant of the overall burden of youth violence (Devries et al., 2015). Thus, evaluating the possible effects of how violent school teachers' behaviours influence suicidal behaviour is also key.

Unlike other studies which have shown that having less friends was a risk factor for suicidal behaviours (Wilson et al., 2012; Swahn et al., 2012), our study showed that the odds of having suicidal ideations, plans and attempts increase with higher number of close friends. Friendship is a key social relationship channel for adolescents, providing motivational context for learning new social skills and receiving feedback (Cobb, 1992). Thus, in that regard, extensive friendship network should translate into positive developmental outcomes for adolescents. This is however not always the case since peer influence and experience of friendship can also be negative and shaped bicultural dynamics (Deegan, 2003; Toro, Urberg, & Heinze, 2004). We suspect some underlying cultural issue in the way adolescents might have experienced suicidality in relation to friendship in this study. Cross-cultural studies have shown that there are remarkable differences in self-construal between interdependent and independent settings (Markus & Kitayama, 2001). The Ghanaian cultural setting can be described as interdependent (Assimeng, 1999; Nukunya, 1992; Wiredu & Gyekye, 1992) where life is intensely shared, social ethic valued, but shame and stigma highly avoided (Assimeng, 1999; Gyekye, 1995; 1996). Plausibly, adolescents within such cultural context may find it difficult to endure the many social relationships that they may have to manage when they experience challenges, leading to social withdrawal on their part and perhaps avoidance on the part of their friends. Consequently, having large pool of friends could become negative and increase the odds for distress including suicidality. It is also plausible that negative peer relationship and support may be associated with heightened health risk behaviours such as suicidal behaviour, and underscore the need to emphasize the importance of supportive relationship between peers and to develop strategies to promote positive peer support. The only parental variable that showed significant association with suicidal ideation, plans and attempts in the final regression analysis was parental understanding of adolescents' problems and worries, which was protective of suicidal behaviours. In a study on the psychosocial correlates of suicidal ideation in rural South African adolescents, Shilubane and colleagues observed that adolescents who felt parental love and care were less likely to think about suicide or to attempt suicide (Shilubane et al., 2014). Thus, in an interdependent cultural setting such as Ghana, the nature of the relationship with a parent may play an important role in adolescent suicidal behaviours.

Strengths and limitations of the study

This is one of the first primary studies to have used a large data to examine adolescent suicidal behaviours and advances our knowledge of risks and protective factors for suicidal behaviours among senior high school adolescents in Ghana, but some limitations should be noted. The GSHS study provides a cross-sectional database, thus, we could not predict causality between the various risk and protective factors and suicide related outcomes. A further potential limitation relates to the mental health questions. Anxiety (worried), loneliness and suicidal ideation were assessed each by a single question confined to the existing GSHS data. Whereas not sufficient for diagnostic purposes (e.g., assessing suicidal intentions), this question format could capture some predictors of clinical depression in adolescents. Finally, due to the

GSHS, parental involvement was limited to four components, namely, parental bonding (parental knowledge on children's free time), parental connectedness (understanding of children's problems), parental supervision (checking children's homework) and parental intrusion. Additionally, we suspect the presence of social desirability response to some of the items which might also explain potentially, the lack of relationship between substance use measures and suicidal behavior in this sample. Nevertheless, to the best of our knowledge, this is the first cross-sectional study to have used a nationally representative data to explore the risk and protective factors associated with suicidal ideation, plans, and attempts, variables that hitherto have infrequently been studied among adolescents in Ghana. This, thus serves as a basis for further future studies on suicidal behaviour among adolescents in Ghana.

Implications for research and intervention

The findings of this study have two significant implications for research and interventions. First, there were clear school related risk factors accounting for suicidal behaviours among the adolescents in this study. Such factors included bullying, physical attack and physical fight. We know that most of the daytime of adolescents is spent in school. It is therefore, important for school staff to receive suicide literacy training on how to identify early warning signs for intervention (Pompili, Innamorati, Girardi, Tatarelli & Lester, 2011). A related issue for a school-based prevention programme is to train school personnel as gatekeepers to improve their confidence and competence in recognising early signs, suicide risk assessment and connecting such distressed students to school-based resources (Silverman & Berman, 2014; Walsh, Hooven, & Kronick, 2013). To the best of our knowledge there is no available policies from the Ghana Education Service (GES) on how to effectively respond to students who may be experiencing suicidal crisis. This study is a wake-up call for GES to consider such important policy considerations for staff gatekeeping training programs.

Second, parental understanding was significantly related to suicidality among students in the present study, and relates to the importance of the role of the family and social connection in suicidality. The implication is that there may be familial factors which influence suicidal behaviours among these adolescents and thus bring the family into the equation of preventing adolescent suicidality. The role of the family in youth suicide prevention is sometimes paradoxical, as risk or protective (Hooven, 2013). In recent times, connectedness has been identified as providing a conceptual framework for prosecuting a public health prevention agenda in adolescent suicidal behaviours, where parents' awareness of adolescents in distress needing help and leading them to seek support becomes critical. (Whitlock, Wyman, & Moore, 2014). Community-based programmes where parents are targeted for education on distress in adolescents and how to relate and provide help is an important prevention target (Omer & Dolberger, 2015). For the past eight years, there have been some gatekeeper training programmes in suicide prevention in Ghana including religious leaders, nurses, media personnel, psychology students and the police. Loudly missing in these programmes is one targeting parents especially when we are increasingly becoming aware that suicidal behaviour among adolescents in Ghana is becoming a public health problem and parent-adolescent dynamics are implicated (Quarshie et al., 2015). Potential programmes such as Parent-Teacher meetings in schools and religious programmes for parents should all be harnessed as avenues for educating and training parents and empowering them as an important youth suicide prevention objective in the country.

Conclusion

This study showed a relatively high prevalence of suicidal ideation, plans and attempts among adolescents in senior high school in Ghana, with females more likely to engage in such behaviours than males. Suicidal behaviour was also found to be associated with several risk and protective factors. Whilst anxiety, loneliness, being bullied, physically attacked, involved in a physical fight, and food insecurity were found to be risk factors for suicidal behaviour, only parental intrusion was found to be protective of adolescent suicidal behaviours. Early identification and intervention for at-risk street school-going adolescents, for example those experiencing different forms of physical abuse, drug and substance use and hunger, can potentially reduce the prevalence of suicidal behaviours among this population in Ghana. These findings underscore the need to develop suicide prevention programmes that particularly focus on the school setting and the family environment.

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