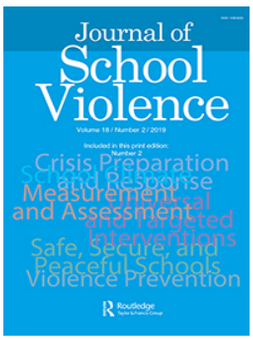


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# Bullying victimization as a predictor of suicidal ideation and suicide attempt among senior high school students in Ghana: Results from the 2012 Ghana Global School-Based Health Survey

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**ABSTRACT**

This paper examined the effect of bullying victimization on suicidal ideation and suicide attempt among adolescents in Ghana. Data on 1,633 students ages 14–18 years (50.6% males) were analyzed using logistic regression. We found that 17% of the 1,633 adolescents examined reported experiencing suicidal thoughts and about 21% of the 1,633 adolescents attempted suicide at some point during the past year. Prevalence of bullying was reported among 40% of the adolescents. Importantly, we found that the experience of bullying victimization was a significant predictor of both suicidal ideation and suicide attempt. While factors such as loneliness, anxiety, and use of illicit substances were positively associated with suicidal behaviors, participating in physical activity, having friends, and parental support reduced the likelihood of experiencing suicidal ideation. We make several policy recommendations, including educational programs on suicidal behaviors, antibullying interventions, and social support programs within schools and other social settings.

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Bullying victimization; suicidal ideation; suicide attempt; adolescents; Ghana

## Introduction

The period of adolescence is a critical transitional stage that is mostly characterized by behavioral problems and mental health disorders. Anxiety disorders, mood disorders, conduct disorders, and substance-use disorders are common forms of mental health disorders among adolescents with onset and development typically occurring during the period of adolescence (Kessler et al., 2007). Kessler et al. (2005) in their study found that half of all mental health disorders start by age 14. Also, suicide has been identified as a major global health issue among adolescents (Cash & Bridge, 2009). Indeed, the World Health Organization (WHO) has observed that suicide is the second leading cause of death globally after traffic accidents and accounts for 8.5% of all deaths among adolescents and young adults (WHO, 2014). Yet, available statistics on the prevalence and predictors of suicidal behaviors (suicidal ideation and suicide attempt) particularly in low- and middle-income countries (LMICs) is lacking (Nock et al., 2008). To date, most of the existing studies on suicide-related behaviors are from high-income countries while studies on suicidal behaviors in LMICs are scarce in global discussions (Vijayakumar, John, Pirkis, & Whiteford, 2005). More evidence is therefore needed in this area, with studies that focus on suicidal ideation and suicide attempt. In view of the fact that about 75% of suicides occur in LMICs (Bantjes et al., 2016), investigating suicidal ideation and suicide attempt in LMICs is crucial.

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The term *suicidal behaviors* refers to suicidal ideation and suicide attempt (Pandey, 2013). Suicidal ideation refers to the presence of thoughts and ideas of engaging in a behavior with the purpose of ending one's life. Suicidal ideation is different from the persistent preoccupation of one's mind with thoughts of death or dying. Suicide attempt refers to engaging in a potentially self-injurious behavior with the intent to die by suicide (Nock & Favazza, 2009). Studies from several countries have found that lifetime prevalence of suicidal ideation among adolescents typically ranges from 11% (Endo et al., 2017) to 50% (Pan et al., 2017) and that of lifetime suicide attempt ranges between 3% and 20% (Zubrick et al., 2017). Some emerging studies have found that suicide attempt among Ghanaians, particularly adolescents of school-going age is on the rise (Akotia, Knizek, Kinyanda, & Hjelmeland, 2014; Nii-Boye Quarshie, Osafo, Akotia, & Peprah, 2015). A recent study by Asante, Kugbey, Osafo, Quarshie, and Sarfo (2017) among adolescent high school students in Ghana found that 18% of students reported ever experiencing suicidal ideation with 22% reporting ever attempting suicide.

Bullying victimization has been implicated as an important risk factor for suicidal behaviors among adolescents in high-income countries (Reed, Nugent, & Cooper, 2015). Holt et al. (2015) reviewed the existing literature in an attempt to understand whether bullying involvement (as a victim, perpetrator, or bully-victim status) was a predictor of suicidal ideation and suicide attempt among adolescents. The authors found that bullying involvement in any capacity was associated with suicidal ideation and suicidal behaviors. However, research investigating the impact of bullying victimization on suicidal behaviors among adolescents in LMICs is limited. We therefore sought to contribute to the extant literature by examining the effect of bullying victimization on suicidal ideation and suicide attempt among adolescents in Ghana.

Although different theories and models have been developed to explain the occurrence of bullying and suicidal behaviors among adolescents, this study was guided by the hopelessness theory of depression proposed by Abramson, Metalsky, and Alloy (1989) and Joiner's (2007) interpersonal theory of suicide. The study was situated in these theories as they provide a comprehensive explanation of bullying and suicidal behaviors. As applied to bullying, hopelessness theory of depression postulates that individuals who have been bullied, go on to self-deprecate and develop negative thoughts about themselves, their personality, and the future (Radliff, Wang, & Swearer, 2016). As a result, these negative thoughts make victims question their own self-worth (e.g., I'm stupid, I'm bad, I'm nothing, I'm of no use to anyone), resort to making negative statements about their personality (e.g., no one likes me, I hate my life), and feel less optimistic about the future (e.g., there's no hope for the future, nothing is going to change for the better) (Baiden, Stewart, & Fallon, 2017).

Joiner's (2007) interpersonal theory of suicide also suggests that suicidal behaviors occur as a result of thwarted belongingness (lack of belonging) and perceived burdensomeness (feelings of hopelessness and isolation). The theory maintains that individuals who have been victimized (adolescents who have been bullied in this context) go on to experience unmet need to belong and develop less satisfying social interactions with others (Van Orden et al., 2010). In view of the fact that belonging or acceptance are essential for building social support networks, the lack of these could result in suicidal ideation and suicide attempts among adolescents, especially those who have been bullied.

Some existing studies have utilized the hopelessness theory of depression and Joiner's interpersonal theory of suicide to understand the link between bullying victimization and suicidal behaviors among adolescents (Baiden et al., 2017; Opperman, Czyz, Gipson, & King, 2015; Stewart, Eaddy, Horton, Hughes, & Kennard, 2017). Drawing on these two theoretical perspectives, we examine the effect of bullying victimization on suicidal ideation and suicide attempt among adolescents in Ghana. This is crucial given that students who are bulled are likely to have suicidal thoughts and may attempt suicide.

Mental health factors such as anxiety, depression, and alcohol and illicit substance use have been found to be associated with suicidal behaviors among adolescents (Capron, Allan, Ialongo, Leen-Feldner, & Schmidt, 2015; Gart & Kelly, 2015; Horwitz, Berona, Czyz, Yeguez, & King, 2017). Also,

adverse childhood experiences such as emotional, physical, and sexual abuse, and neglect have been identified as major predictors of suicidal ideation (Doorley, Williams, Mallard, Esposito-Smythers, & McGeary, 2017; Mossige, Huang, Straiton, & Roen, 2016) and suicide attempt (Daray et al., 2016). Feelings of loneliness (Lamis, Ballard, & Patel, 2014) and isolation (Endo et al., 2017; Miranda, Jaegere, Restifo, & Shaffer, 2014) have similarly been found to be significant predictors of suicidal ideation and suicide attempt among adolescents.

Another behavior problem that has been found to be a predictor of suicidal ideation and suicidal attempt among adolescents is bullying. Bullying as a term has been defined differently by different scholars (Volk, Veenstra, & Espelage, 2017). However, the most commonly quoted definition of bullying was proposed by Olweus (1994): "a student is being bullied or victimized when he or she is exposed, repeatedly and over time, to negative actions on the part of one or more other students" (p. 1173). Three important elements are essential in operationalizing bullying: (a) imbalance of power/strength, (b) repeated negative action, and (c) intent to cause harm (Olweus, 1994). After several decades of debate, being bullied in childhood has now been recognized by scholars as an adverse childhood experience and a major global public health issue (Arseneault, 2017; Finkelhor, Ormrod, Turner, & Hamby, 2005; Swearer & Hymel, 2015). Studies that have investigated the effect of bullying on suicidal behaviors found that compared to adolescents who were not bullied, those who were bullied were more likely to experience suicidal ideation (Lardier, Barrios, Garcia-Reid, & Reid, 2016; Reed et al., 2015) or to have attempted suicide (LeVasseur, Kelvin, & Grosskopf, 2013; Luukkonen, Rasanen, Hakko, & Riala, 2009).

Meta-analyses and systematic reviews have also observed similar association between bullying victimization and suicidal ideation and suicide attempt (Holt et al., 2015; Kim & Leventhal, 2008). Holt et al. (2015) conducted a meta-analysis with multilevel random effects on 47 independent studies focused on children and adolescents and found a strong relationship between bullying victimization and both suicidal ideation and suicide attempt. They also found that the effect of bullying on suicidal ideation was moderated by country of origin with studies from the United Stateshaving significantly larger effects relative to studies conducted outside the United States. In addition to the impact of bullying on suicidal behaviors, many studies have shown the deleterious impact of bullying on various behavioral and mental health, including anxiety and depression (Hamilton et al., 2016), loneliness and social isolation (Campbell, 2013; Storch & Masia-Warner, 2004), low self-esteem (Tsaousis, 2016), and poor psychosocial adjustment (Nansel et al., 2001).

Moreover, other meta-analytic studies have found association between bullying and the onset and maintenance of depression and internalizing behavioral problems (Reijntjes, Kamphuis, Prinzie, & Telch, 2010; Ttofi, Farrington, Lösel, & Loeber, 2011). Besides, some longitudinal studies have established an association between long-term negative effect of bullying victimization and academic performance (Schwartz, Lansford, Dodge, Pettit, & Bates, 2013; Vaillancourt, Brittain, McDougall, & Duku, 2013). On the other hand, factors such as physical activity and social support from peers and parents have been identified to serve as protective factors against suicidal behaviors (Kim, Han, Trksak, & Lee, 2014).

Scholars in LMICs have begun investigating the negative effect of bullying victimization on health and mental health outcomes. Particularly in Ghana, some of these studies so far have focused on investigating the prevalence, patterns, and correlates of bullying victimization and suicidal behaviors without linking the two (Nii-Boye Quarshie et al., 2015; Ohene, Johnson, Atunah-Jay, Owusu, & Borowsky, 2015; Osafo, Akotia, Andoh-Arthur, & Quarshie, 2015). We contribute to filling this research gap by drawing on a large nationally representative data to investigate the effect of bullying victimization on suicidal ideation and suicide attempt among adolescents in senior high schools in Ghana. We hypothesized that, controlling for other risk and protective factors, students who were bullied will have higher odds of experiencing suicidal ideation and attempting suicide.

## Data and methods

### Participants

Data for this study were obtained from the 2012 Ghana Global School-Based Health Survey (GSHS). The Ghana GSHS was a school-based survey conducted among senior high school (SHS) students to understand health behaviors and protective factors related to mortality and morbidity among adolescents in Ghana (Owusu, 2012). The survey was conducted in collaboration with the Joint United Nations Programme on HIV and AIDS (UNAIDS), United Nations Educational, Scientific, and Cultural Organization (UNESCO), United Nations International Children's Emergency Fund (UNICEF), Middle Tennessee State University, and Ghana Education Service (GES) with technical assistance from the Centers for Disease Control and Prevention (CDC). The objectives of the 2012 GSHS among others were to provide reliable data on health behaviors in order to: (a) help Ghana prioritize and allocate resources for school health and adolescent health programs and policies; (b) establish trends in the prevalence of health behaviors and protective factors for use in evaluation of school health and adolescent health promotion; and (c) allow for cross cultural comparisons of student health outcomes between Ghana and other international agencies (Owusu, 2012).

The 2012 Ghana GSHS covered suicidal behaviors, mental health, violence and unintentional injury, physical activity, alcohol and substance use, sexual behaviors that contributed to HIV infection, other STIs, and unintended pregnancy, as well as protective factors. The Ghana GSHS employed a two-stage cluster sampling design to obtain a representative sample of students in SHS. First, the country was divided into three geographic zones (South, Central and North) with 25 schools per zone sampled with probability proportional to school enrolment size. The second stage of the sampling consisted of randomly selecting intact classrooms from each participating school. All classrooms in each selected school were included in the sampling frame (Owusu, 2012). All students in the sampled classrooms were eligible to participate in the GSHS. Written permission for data collection was sought and obtained from GES and the participating schools. Informed consent was obtained from the students and participation in the survey was voluntary and anonymous. Further details about the 2012 Ghana GSHS, could be obtained from the Ghana GSHS Country Report (Owusu, 2012).

The 2012 GSHS had a school response rate of 97% and a student response rate of 84%. There were 1,984 students (weighted = 832,564) in the 2012 Ghana GSHS dataset. Complete data on all the variables included in the multivariate analysis were available for 1,633 students and constituted the sample used in this analysis. The sample was evenly distributed with regard to gender (50.6% males vs. 49.4% females). The majority of the students (54.1%) were ages 18 years or older, 22.2% were ages 17 years, 12.9% were ages 16 years, 8.6% were ages 15 years, and 2.2% were 14 years or younger. The students were fairly equally distributed among the four SHS grade levels. Due to the complex sampling design, a numeral weight was assigned to each student so as to enable generalization of study results to the student population of Ghana. To produce a sample that is equal to the original sample size and representative of the student population of Ghana, the numerical weight was adjusted by dividing each weight by the sum of weights and then multiplied by the sample size. This was done to maintain the original sample size while, at the same time, keeping the weighting structure recommended by the GSHS. All analyses were based on the weighted data.

### Measures

#### Outcome variables

The outcome variables investigated were suicidal ideation and suicide attempt. Suicidal ideation was measured based on response to the question: "During the past 12 months, did you ever seriously consider attempting suicide?" Students who answered in the affirmative were coded 1 and students who answered in the negative were coded 0. Suicide attempt was measured based on response to the

question: "During the past 12 months, how many times did you actually attempt suicide?" with the following options offered to the students "1 = *0 times*," "2 = *1 time*," "3 = *2 or 3 times*," "4 = *4 or 5 times*," and "5 = *6 or more times*." These response options were recoded into a binary variable: "0 = *no attempt*" versus "1 = *at least one attempt*."

### *Explanatory variables*

The main explanatory variable in this study was bullying victimization. Students were asked: "During the past 30 days, how many days were you bullied?" with the following response options "0 = *0 days*" to "6 = *all 30 days*." In defining bullying, students were prompted with the following:

> Bullying occurs when a student or group of students tease, threaten, spread rumors about, hit, shove, or hurt another student over and over again. It is not bullying when two students of about the same strength or power argue or fight or tease each other in a friendly and fun way.

Students who were not bullied were coded as 0, whereas students who were bullied at least on one occasion were coded as 1.

Other explanatory variables examined, included demographic, psychosocial health, substance use, health behavior, as well as protective factors. Demographic factors examined, included age measured in years, gender (male versus female), and grade level (SHS1, SHS2, SHS3, and SHS4). Psychosocial health factors consisted of feelings of loneliness and being worried. Loneliness was measured based on the question: "During the past 12 months, how often have you felt lonely?" with the following response options "1 = *never*," "2 = *rarely*," "3 = *sometimes*," "4 = *most of the time*" and "5 = *always*." Being worried was measured based on the question: "During the past 12 months, how often have you been so worried about something that you could not sleep at night?" with the following response options "1 = *never*," "2 = *rarely*," "3 = *sometimes*," "4 = *most of the time*," and "5 = *always*." For each question, students who answered "never" were coded as 0 and compared to students who answered "rarely" to "always" who were coded as 1.

Substance use factors investigated, included cigarette use, alcohol abuse, and illicit substance use. Alcohol abuse was measured based on the question: "During your life, how many times did you drink so much alcohol that you were really drunk?" with "*0 times*," "*1 or 2 times*," "*3 to 9 times*," and "*10 or more times*" offered as response options. Cigarette use was measured based on the question: "During the past 30 days, on how many days did you smoke cigarettes?" with the following options "1 = *0 days*," "2 = *1 or 2 days*," "3 = *3 to 5 days*," "4 = *6 to 9 days*," "5 = *10 to 19 days*," "6 = *20 to 29 days*" and "7 = *all 30 days*." Illicit substance was measured based on response to the question: "During the past 30 days, how many days did you use any tobacco products other than cigarettes, such as *tawa* snuff powder, chewing tobacco, paper-rolled tobacco, dip, cigars, or pipe?" with the following options "1 = *0 days*," "2 = *1 or 2 days*," "3 = *3 to 5 days*," "4 = *6 to 9 days*," "5 = *10 to 19 days*," "6 = *20 to 29 days*" and "7 = *all 30 days*." Responses to each substance use question were dichotomized into no versus yes. Health behavior factors examined, included physical activity and body weight. Physical activity was measured based on the question: "During the past 7 days, how many days were you physically active for a total of at least 60 minutes per day?" Physical activity was defined as "any activity that increases your heart rate and makes you get out of breath some of the time." Physical activity can be done in sports, playing with friends, or walking to school. Some examples of physical activity are running, fast walking, biking, dancing, football, Ampe, skipping, and hop scotch. Students who engaged in no physical activity within the past 7 days were considered as being inactive and coded 0 whereas students who engaged in physical activity at least once during the past 7 days were considered as being active and coded 1. Body weight was measured as a binary variable "0 = *normal*" versus "1 = *overweight*" based on the derived body mass index (BMI) score that was calculated using respondents' height and weight. Using the WHO child growth standard, overweight was defined as BMI greater than 1 standard deviation above the reference mean.

Protective factors examined were number of close friends and parental support. Number of close friends was measured as a binary variable based on the question "How many close friends do you

have?" with the following response options: "0 = *0*," "1 = *1*," 2 = *2*" and "3 = *3 or more*." Students who indicated having one or more close friends were recoded as 1 compared to students who indicated having no close friends who were coded as 0. Parental support assessed the level of support the student received from his or her parents and was measured as a continuous summative index based on three questions: (a) "During the past 30 days, how often did your parents or guardians check to see if your homework was done?"; (b) "During the past 30 days, how often did your parents or guardians understand your problems and worries?"; and (c) "During the past 30 days, how often did your parents or guardians really know what you were doing with your free time?" Each item was coded on a 5-point Likert scale ranging from 1 (*never*) to 5 (*always*). Scores on the parental support scale ranged from 1 to 15 with higher scores indicating greater parental support. Internal consistency of the parental support scale examined in this study yielded a Cronbach's alpha value of .72, suggesting that the three items are strongly correlated with each other.

### *Data analyses*

Data were analyzed using descriptive statistics, bivariate, and multivariate analytic techniques. First, the distribution of all the variables by gender was examined. Next, Pearson chi-square was used to test the association between suicidal ideation and suicide attempt and the explanatory variables. The multivariate analysis involved the use of binary logistic regression to examine the association between suicidal ideation and suicide attempt and bullying victimization while simultaneously adjusting for the net effect of other predictors. We opted for logistic regression given that the two outcome variables (suicidal ideation and suicide attempt) were measured as binary variables. Variables were entered in the model using the 'enter' procedure. Model fitness was assessed using the Nagelkerke pseudo $R^2$ value, Hosmer-Lemeshow goodness-of-fit (GOF) test statistic, overall percentage of students correctly classified, as well as sensitivity and specificity ratios. The classification cut-off was adjusted to reflect the proportion of respondents who experienced suicidal ideation or attempted suicide. Adjusted odds ratios (AOR) were reported together with their corresponding 95% Confidence Intervals (CI). Variables were considered significant if the *p*-value was less than .05. All analyses were performed using SPSS version 24 for Windows (SPSS Inc., Chicago, IL, USA).

## Results

### *Sample characteristics*

The general distribution of the variables examined are presented in Table 1. Of the 1,633 students examined, 280 (17.1%) experienced suicidal ideation within the past 12 months and 349 (21.1%) attempted suicide. Half (51%) of the 349 students who attempted suicide did so once, about a third (32%) attempted suicide on two or three occasions and one in six (16.9%) attempted suicide on four or more occasions. A little over 43% of the students were bulled within the past 30 days. About 18% of the students felt lonely and 15.6% felt anxious within the past 12 months. Substance use rates among students were about 11% for alcohol abuse, while illicit substance use and cigarette smoking were 5.6% and 2.7%, respectively. About one in four students were physically inactive, 7.8% were overweight, and 86.1% had at least one close friend. The average parental support score was 9.60 ($SD$ = 3.58; range = 1–15). There were significant gender differences on the following factors: number of suicide attempt, cigarette use, physical activity, body weight, number of close friends, and parental support. The proportion of males that attempted suicide multiple times, smoked cigarettes, or had at least one close friend was greater than the proportion of females that attempted suicide multiple times, smoked cigarettes, or had at least one close friend. The proportion of females that were inactive or overweight was greater than the proportion of males that were inactive or overweight. Also, average parental support was high among females than males.

**Table 1.** Sample distribution by gender.

| Variables | Total *n* (%) | Males *n* (%) | Females *n* (%) | $\chi^2$ value | *p value* |
|---|---|---|---|---|---|
| Outcome variables | | | | | |
| Suicidal ideation | | | | 12.07 | .001 |
| No | 1,353 (82.9) | 710 (86.1) | 643 (79.6) | | |
| Yes | 280 (17.1) | 115 (13.9) | 165 (20.4) | | |
| Suicide attempt | | | | 3.08 | .079 |
| No | 1,284 (78.7) | 664 (80.4) | 620 (76.8) | | |
| Yes | 349 (21.1) | 162 (19.6) | 187 (23.2) | | |
| Number of suicide attempt | | | | 7.24 | .001 |
| One | 178 (51.0) | 78 (48.4) | 100 (53.5) | | |
| Two or three | 112 (32.0) | 62 (38.5) | 49 (26.2) | | |
| Four or more | 59 (16.9) | 21 (13.0) | 38 (20.3) | | |
| Main predictor variable | | | | | |
| Bullying victimization | | | | 3.10 | .001 |
| No | 924 (56.6) | 485 (58.7) | 439 (54.4) | | |
| Yes | 709 (43.4) | 341 (41.3) | 368 (45.6) | | |
| Control variables | | | | | |
| Age | | | | 7.50 | .112 |
| 14 years or less | 35 (2.2) | 17 (2.1) | 19 (2.4) | | |
| 15 years | 140 (8.6) | 60 (7.3) | 80 (9.9) | | |
| 16 years | 211 (12.9) | 99 (12.0) | 112 (13.9) | | |
| 17 years | 362 (22.2) | 199 (24.1) | 163 (20.2) | | |
| 18 years or older | 884 (54.1) | 451 (54.6) | 433 (53.7) | | |
| Grade level | | | | 0.17 | .982 |
| SHS1 | 414 (25.3) | 207 (25.1) | 207 (25.6) | | |
| SHS2 | 426 (26.1) | 214 (25.9) | 213 (26.4) | | |
| SHS3 | 435 (26.7) | 222 (26.9) | 213 (26.4) | | |
| SHS4 | 385 (21.9) | 183 (22.2) | 175 (21.7) | | |
| Loneliness | | | | 2.10 | .148 |
| No | 1,342 (82.2) | 690 (83.5) | 652 (80.8) | | |
| Yes | 291 (17.8) | 136 (16.5) | 155 (19.2) | | |
| Anxiety | | | | 1.02 | .312 |
| No | 1,378 (84.4) | 704 (85.3) | 674 (83.5) | | |
| Yes | 255 (15.6) | 121 (14.7) | 133 (16.5) | | |
| Cigarette use | | | | 6.52 | .011 |
| No | 1,590 (97.3) | 795 (96.4) | 794 (98.4) | | |
| Yes | 43 (2.7) | 30 (3.6) | 13 (1.6) | | |
| Alcohol use | | | | 3.15 | .076 |
| No | 1,461 (89.5) | 728 (88.1) | 733 (90.8) | | |
| Yes | 172 (10.5) | 98 (11.9) | 74 (9.2) | | |
| Illicit substance use | | | | 3.75 | .053 |
| No | 1,542 (94.4) | 771 (93.3) | 771 (95.5) | | |
| Yes | 91 (5.6) | 55 (6.7) | 36 (4.5) | | |
| Physical activity | | | | 13.40 | <.001 |
| Inactive | 401 (24.5) | 171 (20.7) | 230 (28.5) | | |
| Active | 1,232 (75.5) | 655 (79.3) | 577 (71.5) | | |
| Body weight | | | | 52.59 | <.001 |
| Normal | 1,506 (92.2) | 801 (97.0) | 705 (87.4) | | |
| Overweight | 127 (7.8) | 25 (3.0) | 102 (12.6) | | |
| Number of close friends | | | | 12.47 | <.001 |
| None | 227 (13.9) | 90 (10.9) | 137 (17.0) | | |
| One or more | 1,406 (86.1) | 735 (89.1) | 671 (83.0) | | |
| Parental support score | 9.60 (3.58) | 9.29 (3.54) | 9.91 (3.61) | $F$ = 12.02 (1,1630) | .001 |

### *Bivariate association between bullying victimization and demographic characteristics*

We found significant association between bullying victimization and age, grade level, and body weight. As shown in Table 2, the distribution of bullying victimization by age is as follows: 14 years or less (48.6%), 15 years (54.6%), 16 years (54%), 17 years (43.4%), and 18 years or older (38.9%, $\chi^2$ (4) = 24.54, $p < .001$. There was an inverse association between bullying victimization and grade level as more than half of students in SHS1 (54%) and SHS2 (57%) were bullied compared to a third of

**Table 2.** Bivariate association between bullying victimization and demographic characteristics.

| Variables | Bullying victimization *n* (%) | | $\chi^2$ value | *p value* |
|---|---|---|---|---|
| | No | Yes | | |
| Age | | | 24.54 | <.001 |
| 14 years or less | 18 (51.4) | 17 (48.6) | | |
| 15 years | 64 (45.4) | 77 (54.6) | | |
| 16 years | 97 (46.0) | 114 (54.0) | | |
| 17 years | 205 (56.6) | 157 (43.4) | | |
| 18 years or older | 540 (61.1) | 344 (38.9) | | |
| Gender | | | 3.10 | .078 |
| Male | 485 (58.7) | 341 (41.3) | | |
| Female | 439 (54.4) | 368 (45.6) | | |
| Grade level | | | 107.33 | .001 |
| SHS1 | 190 (46.0) | 223 (54.0) | | |
| SHS2 | 183 (43.0) | 243 (57.0) | | |
| SHS3 | 290 (66.5) | 146 (33.5) | | |
| SHS4 | 261 (72.9) | 97 (27.1) | | |
| Body weight | | | 6.68 | .010 |
| Normal | 866 (57.5) | 640 (42.5) | | |
| Overweight | 58 (45.7) | 69 (54.3) | | |

students in SHS3 (33.5%) and 27% of students in SHS4 ($\chi^2(3) = 107.33$, $p < 0.001$). Also, the proportion of students who described their body weight as overweight and were bullied (54.3%) was significantly greater than the proportion of students who described their body weight as normal and were bullied (42.5%), $\chi^2(1) = 6.68$, $p = .010$. Although the proportion of females who were bullied was greater than that of males, this difference failed to reach the threshold for statistical significance, $\chi^2(1) = 3.10$, $p = .078$.

### *Bivariate association between suicidal ideation and explanatory variables*

Significant bivariate association was observed between suicidal ideation and a number of explanatory variables. In Table 3, about 23% of students who were bullied compared to 13% of students who were not bullied experienced suicidal ideation, $\chi^2(1) = 25.92$, $p < .001$. One in four females (20.4%) compared to one in seven males (13.9%) experienced suicidal ideation, $\chi^2(1) = 12.07$, $p < .001$. Students were also more likely to report experiencing suicidal ideation if they felt lonely (27% vs. 15%), $\chi^2(1) = 24.93$, $p < .001$; felt anxious (28.7% vs. 15%), $\chi^2(1) = 28.46$, $p < .001$; used illicit substances (27.2% vs. 16.5%), $\chi^2(1) = 6.90$, $p < .01$; were overweight (27% vs. 16.3%; $\chi^2(1) = 9.30$, $p < .01$; or had no close friends (25.1% vs. 15.9%), $\chi^2(1) = 11.77$, $p < .001$. The ANOVA results indicated that average parental support among students with no suicidal ideation was significantly greater than average parental support among students who experienced suicidal ideation ($M_{\text{no suicidal ideation}} = 9.71$ vs. $M_{\text{suicidal ideation}} = 9.06$, $F(1, 1630) = 7.62$, $p < .01$).

### *Bivariate association between suicide attempt and explanatory variables*

Table 4 shows the bivariate association between suicide attempt and categorical explanatory variables. About one in three students who were bullied (30.9%) compared to one in seven students who were not bullied (14.0%) attempted suicide, $\chi^2(1) = 25.92$, $p < .001$). No significant association was observed between gender and suicide attempt. The proportion of students in SHS1 and SHS2 who attempted suicide was greater than the proportion of students in SHS3 and SHS4, $\chi^2(3) = 21.19$, $p < .001$. About 27% of students who felt lonely compared to 20.1% of students who did not feel lonely attempted suicide, $\chi^2(1) = 6.37$, $p < .05$. A little over 30% of students who felt anxious compared to 19.7% who did not feel anxious attempted suicide, $\chi^2(1) = 14.00$, $p < .001$. Students were also more likely to attempt suicide if they smoked cigarettes (52.3% vs. 20.5%), $\chi^2(1) = 25.73$, $p < .001$; used

**Table 3.** Bivariate association between suicidal ideation and sample characteristics.

| | Suicidal ideation *n* (%) | | | |
|---|---|---|---|---|
| Variables | No | Yes | $\chi^2$ value | *p* value |
| Bullying victimization | | | 25.92 | .001 |
| No | 804 (87.0) | 120 (13.0) | | |
| Yes | 549 (77.4) | 160 (22.6) | | |
| Age | | | 0.34 | .987 |
| 14 years or less | 29 (82.9) | 6 (17.1) | | |
| 15 years | 117 (83.6) | 23 (16.4) | | |
| 16 years | 174 (82.1) | 38 (17.9) | | |
| 17 years | 303 (83.7) | 59 (16.3) | | |
| 18 years or older | 731 (82.7) | 153 (17.3) | | |
| Gender | | | 12.07 | .001 |
| Male | 710 (86.1) | 115 (13.9) | | |
| Female | 643 (79.6) | 165 (20.4) | | |
| Grade level | | | 4.16 | .245 |
| SHS1 | 342 (82.6) | 72 (17.4) | | |
| SHS2 | 342 (80.3) | 84 (19.7) | | |
| SHS3 | 362 (83.2) | 73 (16.8) | | |
| SHS4 | 307 (85.8) | 51 (14.2) | | |
| Loneliness | | | 24.93 | .001 |
| No | 1,141 (85.0) | 201 (15.0) | | |
| Yes | 212 (72.9) | 79 (27.1) | | |
| Anxiety | | | 28.46 | .001 |
| No | 1,172 (85.0) | 207 (15.0) | | |
| Yes | 184 (71.3) | 73 (28.7) | | |
| Cigarette use | | | 3.26 | .071 |
| No | 1,321 (83.1) | 268 (16.9) | | |
| Yes | 32 (72.7) | 12 (27.3) | | |
| Alcohol use | | | 3.31 | .069 |
| No | 1,219 (83.4) | 242 (16.6) | | |
| Yes | 134 (77.9) | 38 (22.1) | | |
| Illicit substance use | | | 6.90 | .009 |
| No | 1,286 (83.5) | 255 (16.5) | | |
| Yes | 67 (72.8) | 25 (27.2) | | |
| Physical activity | | | 1.58 | .209 |
| Inactive | 324 (80.8) | 77 (19.2) | | |
| Active | 1,029 (83.5) | 203 (16.5) | | |
| Body weight | | | 9.30 | .002 |
| Normal | 1,261 (83.7) | 246 (16.3) | | |
| Overweight | 92 (73.0) | 34 (27.0) | | |
| Number of close friends | | | 11.77 | .001 |
| None | 170 (74.9) | 57 (25.1) | | |
| One or more | 1,183 (84.1) | 223 (15.9) | | |
| Parental support score | 9.71 (3.57) | 9.06 (3.61) | F = 7.62 (1,1630) | .006 |

illicit substances (53.8% vs. 19.4%), $\chi^2(1) = 60.76$, $p < .001$; were physically inactive (25.4% vs. 20.0%), $\chi^2(1) = 5.40$, $p < .05$; were overweight (28.3% vs. 20.8%), $\chi^2(1) = 3.99$, $p < .05$; or had no close friends (27.8% vs. 20.3%), $\chi^2(1) = 6.53$, $p < .05$. Similar to the results of suicidal ideation, average parental support among students with no history of suicide attempt within the past 12 months was significantly greater than average parental support among students who attempted suicide within the past 12 months ($M_{\text{no suicide attempt}} = 9.69$ vs. $M_{\text{suicide attempt}} = 9.25$), $F(1, 1630) = 4.10$, $p < .05$.

### *Multivariate logistic regression predicting the odds of suicidal ideation and suicide attempt*

Although a number of explanatory variables were significantly associated with suicidal ideation and suicide attempt at the bivariate level, we were unable to assess the relative contribution of each explanatory variable on suicidal ideation and suicide attempt given that there were no controls at this level. Thus, in the multivariate logistic regression, we controlled for the effect of other predictors in order to assess the true

**Table 4.** Bivariate association between suicide attempt and sample characteristics.

| Variables | Suicide attempt *n* (%) | | $\chi^2$ value | *p value* |
|---|---|---|---|---|
| | No | Yes | | |
| Bullying victimization | | | 68.55 | <.001 |
| No | 795 (86.0) | 129 (14.0) | | |
| Yes | 490 (69.1) | 219 (30.9) | | |
| Age | | | 12.73 | .013 |
| 14 years or less | 29 (82.9) | 6 (17.1) | | |
| 15 years | 116 (82.9) | 24 (17.1) | | |
| 16 years | 155 (73.5) | 56 (26.5) | | |
| 17 years | 268 (74.0) | 94 (26.0) | | |
| 18 years or older | 716 (81.0) | 168 (19.0) | | |
| Gender | | | 3.08 | .079 |
| Male | 664 (80.4) | 162 (19.6) | | |
| Female | 620 (76.8) | 187 (23.2) | | |
| Grade level | | | 21.19 | <.001 |
| SHS1 | 319 (77.1) | 95 (22.9) | | |
| SHS2 | 308 (72.3) | 118 (27.7) | | |
| SHS3 | 354 (81.4) | 81 (18.6) | | |
| SHS4 | 304 (84.9) | 54 (15.1) | | |
| Loneliness | | | 6.37 | .012 |
| No | 1,072 (79.9) | 270 (20.1) | | |
| Yes | 213 (73.2) | 78 (26.8) | | |
| Anxiety | | | 14.00 | <.001 |
| No | 1106 (80.3) | 272 (19.7) | | |
| Yes | 178 (69.8) | 77 (30.2) | | |
| Cigarette use | | | 25.73 | <.001 |
| No | 1,264 (79.5) | 326 (20.5) | | |
| Yes | 21 (47.7) | 23 (52.3) | | |
| Alcohol use | | | 2.63 | .105 |
| No | 1,157 (79.2) | 304 (20.8) | | |
| Yes | 127 (73.8) | 45 (26.2) | | |
| Illicit substance use | | | 60.76 | <.001 |
| No | 1242 (80.6) | 299 (19.4) | | |
| Yes | 42 (46.2) | 49 (53.8) | | |
| Physical activity | | | 5.40 | .020 |
| Inactive | 299 (74.6) | 102 (25.4) | | |
| Active | 986 (80.0) | 246 (20.0) | | |
| Body weight | | | 3.99 | .046 |
| Normal | 1,193 (79.2) | 313 (20.8) | | |
| Overweight | 91 (71.7) | 36 (28.3) | | |
| Number of close friends | | | 6.53 | .011 |
| None | 164 (72.2) | 63 (27.8) | | |
| One or more | 1,121 (79.7) | 285 (20.3) | | |
| Parental support score | 9.69 (3.60) | 9.25 (3.52) | 4.10 (1,1630) | .043 |

effect of each explanatory variable on suicidal ideation or suicide attempt. In Table 5, suicidal ideation was predicted by bullying victimization, gender, loneliness, anxiety, illicit substance use, number of close friends, and parental support. Controlling for other factors, students who were bullied had 71% higher odds of experiencing suicidal ideation when compared to their counterparts who were not bullied (AOR = 1.71; $p < .001$; 95% CI = 1.29–2.27). Compared to males, females had 47% higher odds of experiencing suicidal ideation (AOR = 1.47; $p < .01$; 95% CI = 1.11–1.94). Students who felt lonely had 56% higher odds of experiencing suicidal ideation (AOR = 1.56; $p < .01$; 95% CI = 1.14–2.16). Relative to students without anxiety, those with anxiety had 93% higher odds of experiencing suicidal ideation (AOR = 1.93; $p < .001$; 95% CI = 1.40–2.68). Number of close friends and parental support were both associated with lower odds of suicidal ideation. Students who had at least one close friend had 41% lower odds of experiencing suicidal ideation when compared to their counterparts who had no close friends (AOR = 0.59; $p < .01$; 95% CI = 0.42–0.84). Controlling for other factors, each additional increase in parental support decreased the odds of suicidal ideation by 4% (AOR = 0.96; $p < .05$; 95% CI = 0.92–0.99).

**Table 5.** Multivariate logistic regression predicting suicidal ideation and suicide attempt

| | Suicidal ideation | | Suicide attempt | |
|---|---|---|---|---|
| Variables | AOR | 95% CI | AOR | 95% CI |
| Bullying victimization (no) | | | | |
| Yes | 1.71 | [1.29, 2.27]*** | 2.34 | (1.79, 3.04]*** |
| Age in years | 1.04 | [0.89, 1.21] | 1.00 | [0.87, 1.15] |
| Gender (Male) | | | | |
| Female | 1.47 | [1.11, 1.94]** | 1.19 | [0.92, 1.54] |
| Grade level (SHS1) | | | | |
| SHS2 | 1.04 | [0.70, 1.54] | 1.24 | [0.86, 1.77] |
| SHS3 | 0.96 | [0.62, 1.50] | 0.90 | [0.60, 1.36] |
| SHS4 | 0.87 | [0.53, 1.42] | 0.76 | [0.48, 1.21] |
| Loneliness (No) | | | | |
| Yes | 1.56 | [1.14, 2.16]** | 1.03 | [0.75, 1.42] |
| Anxiety (No) | | | | |
| Yes | 1.93 | [1.40, 2.68]*** | 1.60 | [1.16, 2.20]** |
| Cigarette use (No) | | | | |
| Yes | 1.13 | [0.51, 2.52] | 1.96 | [0.95, 4.07] |
| Alcohol use (No) | | | | |
| Yes | 1.17 | [0.77, 1.79] | 0.91 | [0.60, 1.39] |
| Illicit substance use (No) | | | | |
| Yes | 1.51 | [0.87, 2.63] | 3.38 | [2.06, 5.55]*** |
| Physical activity (Inactive) | | | | |
| Active | 0.86 | [0.63, 1.16] | 0.70 | [0.53, 0.92]* |
| Body weight (Normal) | | | | |
| Overweight | 1.54 | [0.99, 2.39] | 1.22 | [0.79, 1.89] |
| Number of close friends (None) | | | | |
| One or more | 0.59 | [0.42, 0.84]** | 0.62 | [0.44, 0.86]** |
| Parental support score | 0.96 | [0.92, 0.99]* | 0.97 | [0.94, 1.01] |
| Nagelkerke pseudo $R^2$ | .093 | | .131 | |
| Hosmer-Lemeshow GOF test (sig.) | 11.61 (.170) | | 7.32 (.503) | |
| Overall percentage correctly classified | 69.6 | | 63.4 | |
| Sensitivity | 73.8 | | 62.3 | |
| Specificity | 49.7 | | 67.4 | |

*Note.* AOR = adjusted odds ratios; GOF = goodness of fit.
*$p < .05$; **$p < .01$; ***$p < .001$.

The results predicting suicide attempt were slightly different from that of suicidal ideation. Bullying victimization, anxiety, illicit substance use, physical activity, and number of close friends were found to predict suicide attempt. We found that odds were more than doubled for students who were bullied to attempt suicide when compared to students who were not bullied (AOR = 2.34; $p < .001$; 95% CI = 1.79–3.04). Compared to students who did not feel anxious, students who felt anxious had 60% higher odds of attempting suicide (AOR = 1.60; $p < .01$; 95% CI = 1.16–2.20). Odds were more than threefold higher for students who used illicit substance to attempt suicide when compared to their counterparts who did not use illicit substance (AOR = 3.38; $p < .001$; 95% CI = 2.06–5.55). Students who were physically active had 30% lower odds of attempting suicide when compared to their inactive counterparts (AOR = 0.70; $p < .05$; 95% CI = 0.53–0.92). Lastly, compared to students who had no close friends, students who had at least one close friend had 38% lower odds of attempting suicide (AOR = 0.62; $p < .01$; 95% CI = 0.44–0.86).

All the model fitness statistics indicated that the multivariate model was fit and the predictors included made significant contributions to the model. Based on the Nagelkerke pseudo $R^2$ value, all the variables cumulatively explained 9.3% of the variance in suicidal ideation and 13.1% of the variance in suicide attempt. The Hosmer-Lemeshow test statistic in both models was not significant ($\chi^2 = 11.61$, $p = .170$ for suicidal ideation and $\chi^2 = 7.32$, $p = .503$ for suicide attempt), demonstrating that the model fits the data reasonably well. The model correctly classified 69.6% of the respondents as having experienced suicidal ideation versus no suicidal ideation and 63.4% of the respondents were classified as having attempted suicide versus no suicide attempt. About 75% of respondents were observed and correctly predicted to have suicidal ideation (sensitivity), whereas 49.7% were

observed as not having suicidal ideation and were correctly predicted to not have suicidal ideation (specificity). Similarly, 62.3% of respondents were observed and correctly predicted to have attempted suicide (sensitivity), whereas 67.4% were observed as not having attempted suicide and were correctly predicted to not have attempted suicide (specificity).

## Discussion

Drawing on a large nationally representative dataset from Ghana, this is among the first studies to investigate the link between bullying victimization and suicidal ideation and suicide attempt among adolescents. We found that 17% of adolescents reported having had thoughts about suicide and a little over one in five attempted suicide at some point during the past year. We also found that more than 40% of the adolescents were bullied during the past 30 days. A number of factors emerged as significant predictors of suicidal ideation and suicide attempt in the multivariate analyses. Being bullied and feeling anxious were both associated with greater likelihood of experiencing suicidal ideation or attempting suicide. Having at least one close friend was associated with lower likelihood of experiencing suicidal ideation or attempting suicide. Furthermore, engagement in physical activities lowered the likelihood of suicide attempt but had no effect on suicidal ideation. In addition, suicidal ideation was predicted by gender and feeling lonely, whereas suicide attempt was predicted by use of an illicit substance.

The prevalence rate of suicidal ideation among adolescents in this study is fairly consistent with a recent study that was conducted in Ghana by Asante et al. (2017). Although the prevalence of suicide attempt is often lower than suicidal ideation among adolescents (e.g., (Thullen, Taliaferro, & Muehlenkamp, 2016), it is interesting to note that in this study, the proportion of adolescents who attempted suicide in the past year was greater than the proportion of adolescents who experienced suicidal ideation. Some scholars have suggested that high levels of impulsivity may explain why some adolescents may attempt suicide without first experiencing suicidal ideation (Auerbach, Stewart, & Johnson, 2017; Daray et al., 2016). The concept of impulsivity as it relates to sensation seeking, frequent engagement in acting out behaviors, lack of perseverance, and engagement in violent and risk taking behaviors, such as dangerous driving (Pedersen & McCarthy, 2008), substance use (Charles et al., 2016), risky sexual behaviors (Dir, Coskunpinar, & Cyders, 2014), and suicidal behaviors (Glenn & Klonsky, 2010; You & Leung, 2012) has been studied extensively.

Furthermore, we found support for the association between bullying victimization and both suicidal ideation and suicide attempt, which is consistent with past studies (Luukkonen et al., 2009; Reed et al., 2015; Yen, Liu, Yang, & Hu, 2015). The importance of the link between bullying victimization and both suicidal behaviors cannot be overstated. According to the theory of hopelessness, bullying victimization tends to create feelings of unwantedness and increase the likelihood of engaging in suicidal behaviors (Opperman et al., 2015). Given that the period of adolescence is a transitional stage of development, the feeling of not belonging due to experiences of bullying may be unbearable and could result in suicidal behaviors. Recent evidence demonstrates the growing incidence of bullying among adolescents in Ghana (Dunne, Sabates, Bosumtwi-Sam, & Owusu, 2013; Ohene et al., 2015). In the context of increasing incidence of bullying, as well as the findings of this study, several concerns are raised about the role of bullying in other mental health problems. For instance, evidence from other jurisdictions suggests that peer victimization contributes to decreased self-worth (Mishna et al., 2016), low self-esteem (Jones, Bilge-Johnson, Rabinovitch, & Fishel, 2014; Tsaousis, 2016), as well as feelings of hopelessness and loneliness (Campbell, 2013; Storch & Masia-Warner, 2004), all of which, in turn, significantly increases the risk of suicidal ideation and suicide attempt (Horwitz et al., 2017).

In addition, studies using longitudinal and meta-analytic techniques have found similar relationship between bullying victimization and suicidal behaviors among adolescents. For instance, Turner, Finkelhor, Shattuck, and Hamby (2012) investigated the independent and cumulative effects of exposure to different forms of childhood victimization on suicidal ideation using longitudinal data

from the National Survey of Children's Exposure to Violence and found that peer victimization at Wave 1 had an independent significant effect on suicidal ideation at Wave 2. Besides, Kim and Leventhal (2008) in their review of 37 studies on the association between bullying victimization and suicide found that adolescents who were bullied had higher odds of experiencing suicidal ideation and attempting suicide. They also noted that low self-esteem, loneliness, isolation, and somatic symptoms played significant role in these associations.

Some past studies have shown that although females are more likely to ideate about suicide, males are usually more likely to attempt suicide (Beautrais, 2002). In this study however, gender was an important factor explaining suicidal ideation and not suicide attempt. Nonetheless, the finding that adolescent females ideate about suicide more than males is consistent with existing literature (e.g., Sampasa-Kanyinga, Dupuis, & Ray, 2017). Although there was no significant difference between males and females in terms of experiencing bullying victimization, it is possible that the resulting effect of bullying victimization on suicidal behaviors may differ for males and females. Additional studies that examine the effect of bullying victimization on the onset of anxiety and depressive symptoms by gender are needed so as to fully tease apart how gender might interact with bullying victimization in predicting suicidal behaviors.

Our findings demonstrate that healthy and unhealthy emotional situations and behaviors were associated with suicidal behaviors among adolescents. For instance, while healthy behaviors, such as participating in physical activity reduced the likelihood of suicide attempt, unhealthy emotional situations and behaviors, such as loneliness, anxiety and use of illicit substances increased the likelihood of engaging in suicidal behaviors. These findings are consistent with previous studies, which found similar negative association between participation in physical activities and suicidal behaviors (Kim et al., 2014), as well as a positive association between unhealthy emotional situations and behaviors such as loneliness, anxiety, and substance use and suicide behaviors (Sampasa-Kanyinga et al., 2017). Physical activity and active participation in sports are known to buffer the effect of childhood adversity on depression (Perron-Gélinas, Brendgen, & Vitaro, 2017), which is a major risk factor found to be associated with suicidal behaviors (Horwitz et al., 2017; Stewart et al., 2017). On the other hand, emotional distress and loneliness maybe a manifestation of feelings of unwantedness, which is known to be associated with suicidal behaviors (Stewart et al., 2017; Van Orden et al., 2010).

Consistent with the extant literature, we found that social support, in the form of having one or more close friends and parental support, acted as protective factors against suicidal ideation. This finding is perhaps due to the moderating effects of peer and family support on bullying, which has been well established in the literature (Elgar et al., 2014; Holt & Espelage, 2007). Importantly, several studies including scoping review of existing studies indicate that the absence of social support and interpersonal relationships exacerbates the risk of suicidal behaviors among adolescents (Endo et al., 2017; Miller, Esposito-Smythers, & Leichtweis, 2015). In Ghana, the absence of counseling services in many educational institutions may further increase the risk of suicide behaviors among adolescents who may be experiencing bullying and also lack social support.

Bullying has a negative impact on the perpetrator, the victim, and other bystanders in the school environment (Barhight, Hubbard, Grassetti, & Morrow, 2017; Janson, Carney, Hazler, & Oh, 2009). It also adversely affects school safety and it is costly in terms of resources devoted to providing security staff in schools, as well as absenteeism and dropout rates (Pack, White, Raczynski, & Wang, 2011). Studies have shown that students are more likely to feel unsafe in environments where bullying is likely to take place (Lorenzo-Blanco, Unger, Oshri, Baezconde-Garbanati, & Soto, 2016; Varjas, Henrich, & Meyers, 2009). For instance, Brown, Birch, and Kancherla (2005) found that 15% of students in their study reported being afraid to go to school once in a while or every day for fear of being bullied. Glew, Fan, Katon, and Rivara (2008) also found that controlling age, gender, race/ethnicity, grade level, and academic performance, victims of bullying were 2 times more likely to report feeling unsafe at school.

Victims were also more likely to report feeling sad and more likely to report feeling that they did not belong at school. School administrators interested in preventing bullying and its negative effects

on academic performance and mental health should first collect detailed information on bullying and identify factors that predict bullying perpetration. The School Safe Ambassadors (SSA) program where ambassadors are trained to identify, prevent, and act as proactive and helpful bystanders is known to be effective in preventing peers from engaging in hurtful and aggressive acts (Pack et al., 2011; Ward & Odegard, 2011; Yerger & Gehret, 2011).

## Limitations, implications and future research

This study is not without limitations. First, we relied on data from a cross-sectional survey. As such, our findings are limited to associations between the study variables. Also, due to the cross-sectional nature of the study, we were unable to control for time-varying characteristics, which may influence suicidal behaviors among the study population. Longitudinal studies, which allow for measurement of theoretically relevant factors over time, will offer a more nuanced understanding of the relationship between bullying victimization and suicidal behaviors. Second, the use of secondary data limits the analysis to those factors for which information is available. For instance, we were unable to examine the effect of other theoretically relevant predictors, such as perceived bullying, being alienated from school, bullying perpetrator, bystander effects, and cyberbullying on suicidal ideation and suicide attempt. Future studies should go beyond the traditional measurement of bullying (i.e., face-to-face bullying), to examine other factors, such as perceived bullying, cyberbullying, and bystander effects as predictors of suicidal ideation and suicide attempt.

Third, the reliance on a single item in measuring bullying may underestimate both prevalence and the extent of the impact of bullying on suicidal behaviors. This is important given adolescents' use of social media and other online platforms where they may be exposed to cyberbullying or social media trolls (Bannink, Broeren, van de Looij-Jansen, de Waart, & Raat 2014; Wong, Merchant, & Moreno, 2014). Fourth, given that the sample represents senior high school students, we were unable to obtain data on those who dropped out of school. Additional studies that compare students who are in school versus students who dropped out of school are needed to fully understand the effect of bullying victimization on suicidal ideation and suicide attempt. Lastly, changing the underlying levels of measurement of a variable has the potential to affect the effect size of some of the results reported in this article. However, the decision to recode most of the variables in the current study as binary variables was informed by the fact that the distribution on most of the ordinal variables was not proportional across the various categories. In these situations, it is recommended that ordinal variables be treated as binary variables (Tabachnick & Fidell, 2007).

## Conclusion

Notwithstanding the limitations identified in this study, the findings make important contributions to the literature on the connection between bullying victimization and suicidal behaviors among adolescents in Ghana. Although suicidal behaviors constitute an important health concern among adolescents globally, studies on the phenomenon from developing countries remain limited. Even fewer studies from developing countries draw connections between bullying victimization and suicidal behaviors. As such, this study offers important insights on the connections between the two factors and provides directions for policy action. For instance, based on the findings of this study, we suggest that the GES incorporate educational programs on suicidal behaviors for adolescents in senior high schools. Campus safety mechanisms such as the SSA would go a long way in preventing bullying and consequently prevent suicidal behaviors. Moreover, in conjunction with GES, senior high schools should design and implement antibullying interventions. These would make schools safe learning environments, boost student performance, and enhance the overall educational experience of students. Schools could also develop peer-support systems through sporting activities and other social learning programs to serve as conduits for building social support for students. Finally, in addition to showing more support

for their children, parents should encourage the participation of adolescents in activities in other social settings, such as religious organizations and social clubs where they could make friends and build social support.

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## Disclosure statement

No potential conflict of interest was reported by the authors.

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