**Abstract**

This cross-sectional study examined the prevalence of risky sexual behaviours and associated risk and protective factors among adolescents using the 2012 Ghana Global School-based Student Health Survey. A total of 1648 students from Junior High Schools in Ghana were sampled and administered close-ended questionnaires on the risk and protective factors of several domains of functioning including risky sexual behaviours. Our findings showed 33.5% prevalence of sexual experience among the adolescents. Among those who were sexually experienced, 32.5% were having multiple sexual partners while 26.2% used condom during their last sexual intercourse. Being male, older age, anxiety, loneliness, suicidal ideation, being bullied, food insecurity, current alcohol and marijuana use were significant risk factors for being sexually experienced, multiple partners, but not condom use. Parental knowledge of activity was a significant protective factor against adolescents’ sexual experience. School-based mental and sexual health programmes should be implemented in Ghanaian schools.

**Keywords:** Adolescents, sexual behaviours, risk factors, protective factors, Ghana

**INTRODUCTION**

Risky sexual behaviours among adolescents are major public health issues (Djamba, 2003; Oppong Asante, Meyer-Weitz & Petersen, 2014) which have attracted numerous research and interventions globally. These behaviours which include; early sexual debut, multiple sexual partnership, unprotected sexual intercourse and non-contraceptive use, have the propensity to predispose adolescents to unintended pregnancy and sexually transmitted infections (Doku, 2012; Ugoji, 2014). Adolescents constitute a substantial proportion (30%) of the population of sub-Saharan Africa (Kabiru, Izugbara, & Beguy, 2013) and evidence suggests that these adolescents are at risk of engaging in risky sexual behaviours due to changing economic and socio-cultural dynamics (Madise, Zulu, & Ciera, 2007).

Evidence within sub-Saharan African countries including Ghana has suggested high prevalence of risky sexual behaviours among adolescents (Adu-Mireku, 2003; Doku, 2012; Oppong Asante, Meyer-Weitz & Petersen, 2014; Fearon, Wiggins, Pettifor, & Hargreaves, 2015). For instance, Doku (2012) found among Ghanaian adolescents that 25% were sexually experienced with their mean sexual debut age being 14.8 years and 31% of those who were sexually experienced had multiple partners. These patterns are consistent with what pertains in other African countries (Fatusi & Blum, 2008; Slap, Lot, Huang, Daniyam, Zink, & Succop, 2003). For example, Slap et al. (2003) found among Nigerian adolescents that 34% of adolescents were sexually experienced. These high rates of sexual activity among adolescents require efforts to identify possible risk and protective factors for their sexual behaviours beyond what is already known in the adolescence literature.

Several factors have been found to be predictive of risky sexual behaviours among adolescents. These include; socio-demographic characteristics of the individual adolescents, parenting factors, socioeconomic factors, and some psychological factors. In terms of the socio-demographic risk factors, being a male, older age, and rural residency have been found to be significant risk factors for risky sexual behaviours among adolescents in Ghana and other sub-Saharan African countries (Adu-Mireku, 2003; Doku, 2012; Li, Huang, Cai, Xu, Huang, & Shen, 2009; Peltzer & Pengpid, 2016). These findings suggest that in investigating the risks and protective factors for risky sexual behaviours among adolescents, it is essential to consider their socio-demographic characteristics.

Socioeconomic and mental health related factors such as poverty (Madise, Zulu, & Ciera, 2007), sexting (Houck, Barker, Rizzo, Hancock, Norton, & Brown, 2014; Van Ouytsel, Walrave, Ponnet, & Heirman, 2015), peer norms (Baumgartner, Valkenburg, & Peter, 2011; Van de Bongardt, Reitz, Sandfort, & Deković, 2015), parental influence (Biddlecom, Awusabo-Asare, & Bankole, 2009; Kumi-Kyereme, Awusabo-Asare, Tanle, & Biddlecom, 2007), and substance use including alcohol and marijuana use (Doku, 2012; Oppong Asante et al., 2014; Peltzer & Pengpid, 2016) have been found to be significant risk factors for risky sexual behaviours such as early sexual debut, multiple sexual partnership, transactional sex, and non-utilisation of contraceptives. For example, Peltzer and Pengpid (2016) found among adolescents that their risky sexual behaviours were significantly predicted by tobacco use, alcohol use, mental distress, having no close friends, and truancy.

Evidence available within the sub-Saharan African countries including Ghana has, however, not addressed the significance of psychosocial and mental health problems in impacting risky sexual behaviours among adolescents. Although some studies have examined the association between substance use and risky sexual behaviours (e.g. Doku, 2012; Oppong Asante et al., 2014), other mental health issues such as depression, anxiety, and suicidal behaviours have not been examined to determine their impact on adolescents’ risky sexual behaviours despite evidence from other low and middle income countries pointing to an association between psychological distress and risky sexual behaviours (Peltzer & Pengpid, 2016). Studies among in-school adolescents in Ghana have reported significant mental health problems among adolescents especially depression, anxiety, substance use and suicidal behaviours (Oppong Asante, Kugbey, Osafo, Quarshie, & Sarfo, 2017). In the light of this lacuna in the adolescent health and wellbeing literature, we examined the prevalence of risky sexual behaviours (sexual experience, multiple partnerships, and condom use) and the effects of socio-demographic characteristics, mental health related factors, and parenting variables on risky sexual behaviours among adolescents. It is expected that the results from this study would provide stakeholders with the needed empirical information to holistically address adolescents’ risky sexual behaviours.

**METHODS**

**Description of Survey and Study Sample**

Secondary data from the Ghana Global School-based Student Health Survey (GSHS) conducted in 2012 (WHO, 2014b) was used for this study. The 2012 Ghana Junior High GSHS was a school-based survey of students in grades Junior High School (JHS) 1-3, which are typically attended by students aged 13-17 years. The Ghana Global School-based Student Health Survey (GSHS) was a collaboration among World Health Organization (WHO), Disease Control and Prevention (CDC), Middle Tennessee State University and the Ghana Education Service (GES) to examine behavioural protective and risk factors of several domains of functioning among adolescents in the Ghanaian basic schools. A cross-sectional survey design was used and close-ended structured questionnaires were 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, 2014c) for further information.

A two-stage cluster sampling design was used to produce data representative of all students in grades JHS 1 -3 in Ghanaian Junior High Schools. At the first stage, schools were selected with probability proportional to enrollment size. At the second stage, classes were randomly selected and all students in selected classes were eligible to participate. A numerical weighting was applied to each student record to enable generalization of results to the eligible population. A total of 1648 students participated in the Ghana Junior High GSHS which represent a response rate of 82%. The sample was made up of 863 (52.5%) males and the majority of the students 1146 (70.2%) were 15yeras or younger. Details of the demographic characteristics of the participants can be found in Table 2.

**Measures**

***Dependent variables***

*Risky sexual behaviours* (Sexual experience, multiple partners and condom use at last sex): These were measured with single items which are closed ended. For instance, sexual experience was measured with the item *“have you ever had sexual intercourse?”* This item was originally coded as Yes [1] and No [2] but was recoded for analysis as Yes [1] and No [0]. Multiple sexual partners was measured with the item *“During your life, with how many people have you had sexual intercourse?”* The original responses to the items were; I have never had sexual intercourse [1], 1 person [2], 2 people [3], 3 people [4], 4 people [5], 5 people [6] and 6 or more people [7]. The responses were however recoded as 2 or more sexual partners [1] and 1 partner or none [0]. Condom use at last sex was measured with the item “The last time you had sexual intercourse, did you or your partner use a condom or rubber?” The original responses to the item were; I have never had sexual intercourse [1], Yes [2] and No [3]. The responses were recoded for analysis as; Yes [1] and No [0].

***Independent variables***

A set of independent variables made up of demographic characteristics, mental health related and parental factors were used as the predictors of risky sexual behaviours among the adolescents.

*Demographic characteristics:* Age and Sex

*Mental health related factors:* Anxiety, Loneliness, Suicidal ideation, Bullied, Food insecurity, No close friends, Current alcohol use and Current marijuana use

*Parental factors*: Parental understanding, parental knowledge of activity and parental intrusion of privacy.

The details of the independent variables are presented in Table 1.

[INSERT TABLE 1 HERE]

**Ethical statement**

The data collectors obtained ethical clearance from their respective institutions. Ethical issues and policies regarding the use of students in research by the Ghana Education Service’s (GES) were strictly adhered to in the data collection. The data collectors obtained official permissions from the Ghana Education Service (GES), the selected schools’ heads, and the classroom teachers. Written informed consent and parental assent were obtained from students and parents respectively for the participation of the students in the study.

**Data Analysis**

The Statistical Package for the Social Sciences (SPSS) version 24.0 was used to analyze the data. Frequencies and percentages were used to summarize the data to present a descriptive summary of the data. All the variables used in this study were recoded into a dichotomous variables at two levels as is usually the case in previous studies from the Ghana Global School-based Student Health Survey (Ohene et al., 2015; Oppong Asante et al., 2017). Specific statistical techniques used for the analysis were Chi-square (χ2) and logistic regression analysis. The 0.05 level was used to determine statistical significance in all the analyses (*p*-value < 0.05). Odd ratios (OR) were used to present the logistic regression results and the 95% confidence interval (CI) was adopted for statistical significance. The results are presented in the subsequent section.

**RESULTS**

**Prevalence of risky sexual behaviours and related factors**

The prevalence of risky sexual behaviours (*sexual experience*) was 33.5%. Out of those who were sexually experienced, 32.5% reported having multiple sexual partners, whist 26.2% used condom using condom the last time they had sexual intercourse. In terms of the mental health related factors, 13%, 13.3% and 20.3% of the adolescents reported the experience of anxiety, loneliness and suicidal ideations respectively. It was observed that 62.2%, 14.9% and 11.3% reported being bullied, food insecurity and lack of close friends respectively. Prevalence rates of 15.7% and 7.8% were reported for current alcohol and marijuana use respectively.

**Risky sexual behaviours and associated factors**

The association between the risky sexual behaviours and related factors were examined and results from Table 2 showed that there is a significant association between sex and sexual experience but not multiple partners and condom use. A significant association was found between age and sexual experience but not multiple partners and condom use. A closer look at the pattern of the age and sexual experience showed that increasing age is associated with more sexual experience but started to decrease from age 16years. All the mental health related variables were significantly associated with sexual experience in exception of loneliness and unavailability of close friends. In exception of unavailability of close friends, al the mental health related variables were significantly associated with multiple sexual partners among the adolescents. In terms of the parental factors, parental knowledge of activity and parental intrusion of privacy were significantly associated with sexual experience but not multiple partners and condom use among the adolescents. The details of the results can be found in Table 2.

[INSERT TABLE 2 HERE]

**Predictors of risky sexual behaviours among adolescents**

Results from Table 3 showed that male adolescents had higher odds (OR = 1.55, 95% CI, 1.12-2.15) for being sexually experienced even after controlling for other study variables. However, sex of adolescents was not significantly associated with having multiple partners and condom use during last sexual intercourse. Age of adolescents was predictive of sexual experience among the adolescents with adolescents who are above 14years reporting higher odds (OR = 1.67, 95% CI, 1.21-2.30) even after controlling for other study variables. Mental health and related variables such as anxiety, suicidal ideation, being bullied, food insecurity, alcohol use and marijuana use significantly predicted sexual experience. However, only suicidal ideation (OR = 1.74, 95% CI, 1.12-2.69), alcohol use (OR = 2.02, 95% CI, 1.27-3.20) and marijuana use (OR = 3.45, 95% CI, 1.36-8.73) remained significant after controlling for other study variables. Anxiety, suicidal ideation, being bullied, food insecurity, alcohol use and marijuana use significantly predicted having multiple sexual partners, however, only food insecurity (OR = 2.06, 95% CI, 1.12-3.78), alcohol use (OR = 3.63, 95% CI, 1.93-6.82) and marijuana use (OR = 3.94, 95% CI, 1.74-8.92) remained significant after controlling for other study variables. However, condom use was not significantly predicted by any of the mental health related variables. For parental factors, only parental knowledge of adolescents’ activity significantly predicted sexual experience but diminished after adjusting for other study variables.

[INSERT TABLE 3 HERE]

**DISCUSSION**

This study examined the prevalence and associated factors of risky sexual behaviours among in-school adolescents in Ghana. Findings from the study showed that there is a considerably high prevalence of risky sexual behaviours among Ghanaian adolescents with 33.5% reporting to have ever had sex. About a third of those who are sexually experienced also reported having multiple sexual partners with 26.2% using condom or partner using condom during their last sexual intercourse. This relatively high prevalence of risky sexual behaviours among adolescents is consistent with other studies among adolescents in Ghana (Adu-Mireku, 2003; Doku, 2012), sub-Saharan Africa (Doyle, Mavedzenge, Plummer, & Ross, 2012; Fatusi & Blum, 2008; Slap et al., 2003) and other low income and developing countries (Peltzer & Pengpid, 2016).

The prevalence of sexual experience reported in this study is higher than what was previously reported among adolescents in Ghana (25%) by Doku (2012). This increment in risky sexual behaviours from previous works done in Ghana could be attributed to the changing social and economic changes that have resulted in several permissive attitudes that predispose adolescents to these risky behaviours. For instance, technological advancement has resulted in increased access to all kinds devices that can access information with minimum restriction. Similarly, economic pressures have resulted in low parental involvement in children activities which evidence suggests influences children and adolescents’ risky behaviours including sexual activities (Boislard, & Poulin, 2011; Han, Miller, & Waldfogel, 2010; Savioja, Helminen, Fröjd, Marttunen, & Kaltiala-Heino, 2017).

Findings from the study showed that sex and age of the adolescents significantly predicted their sexual experiences but not having multiple partners and condom use during last sexual intercourse. That is, being a male and 14years years above were associated increased likelihood of adolescents being sexually experienced after controlling of other variables. These findings of demographic characteristics of adolescents being predictive of their sexual behaviour have been by some earlier studies which found being a male and higher age as significant risk factors for sexual behaviors including being sexually experienced (Doku, 2012; Mulenga, Mazaba-Liwewe, Babaniyi, & Siziya, 2015; Peltzer & Pengpid, 2016). These findings could be attributed to the gendered norms about sexuality where female virginity or abstinence is emphasized compared to males in our Ghanaian context (Ababio & Yendork, 2017). These perceptions and views translate into equating masculinity to sexual prowess.

Regarding the mental health and related factors such as anxiety, suicidal ideation, being bullied, food insecurity, alcohol use and marijuana use significantly predicted increased odds of adolescents’ being sexually experienced and multiple sexual partners. That is, adolescents who experienced psychological distress in the form of anxiety and suicidal ideation were more likely to have had sexual intercourse and multiple partners than those who did not experience any form of psychological distress. These findings suggest that the presence of mental health problems could influence adolescents’ judgment and therefore make them prone to engaging in risky behaviours including sexual activities. These findings are consistent with other previous results showing the detrimental impacts of mental health problems on risky sexual behaviours among adolescents (Page & Hall, 2009; Peltzer & Pengpid, 2016; Peltzer, 2010).

Additionally, being bullied and food insecurity were also predictive of adolescents’ sexual experience and multiple partners. This finding could due to the fact that being bullied could result in low self-esteem and in an attempt to overcome this challenge adolescents may resort risky sexual behaviours to increase their self-worth. Also, poverty (food insecurity) has been documented to be a significant risk factor adolescents’ risky sexual behaviours as some of these adolescents may engage in these activities for survival (Davidoff-Gore, Luke, & Wawire, 2011; Madise, Zulu, & Ciera, 2007; Oppong Asante et al., 2014). Presence of substance use (alcohol and marijuana) were significantly predictive of both sexual experience and multiple partners as substance use among adolescents’ have been document to have significant effect on risky behaviours among adolescents (Doku, 2012; Oppong Asante et al., 2014; Peltzer & Pengpid, 2016; Peltzer & Pengpid, 2011).

In terms of protective factors, only parental knowledge of activity significantly predicted sexual experience but diminished after adjusting for other study variables. Parental influence on adolescents’ sexual and other risky behaviours have been demonstrated in some studies (e.g. Biddlecom et al., 2009; Kumi-Kyereme et al., 2007). However, this study showed that only parental knowledge of activity significantly predicted decrease in the probability of adolescents being sexually experienced. This could be due to the supervisory role of parents in monitoring and taking interest in their children’ activities thereby reducing the probability of their children engaging in sexual activities. This implies that parents’ role in their children’s activities especially knowledge about what their children do is a very important protective factor against sexual activity among adolescents. The lack of significant impact of other parental factors on adolescents’ risky sexual behaviours have been found in some studies which showed that parental or guardian supportive behavior did not have any significant effect on adolescents sexual behaviours (Peltzer & Pengpid, 2016).

Interestingly, none of the predictor variables in the study significantly predicted condom use at last sex. That is, the demographic characteristics, mental health and related factors, and parental factors were not significant in influencing condom use among adolescents which is inconsistent with previous works which found most of these factors to be predictive of condom use at last sexual intercourse by adolescents (Peltzer & Pengpid, 2016; Peltzer & Pengpid, 2011). The findings are consistent with what was found in an earlier study conducted among Ghanaian adolescents which did not find any significant associated between the independent variables and condom use (Doku, 2012) and this could be attributed to the low condom usage among the adolescents in the study as reported earlier.

The findings of this study have implications for adolescents’ reproductive health and wellbeing promotion programmes and parenting practices. Firstly, the findings suggest that there is the need for a holistic approach in addressing risky sexual behaviours adolescents by incorporating substance use prevention and mental health promotion programmes into any such intervention. This would ensure that all the potential and proven risk factors for adolescents’ risky sexual behaviours are minimized. For instance, addressing substance use problems adolescents’ may go a long way to minimize risky sexual behaviours among adolescents in Ghanaian context. Secondly, evidence in this study showed that parental knowledge of activity decreases the probability of adolescents being sexually experienced and this suggests that there is the need for parents to be more involved in the activities of their children most especially during adolescence as this period is characterized by several physical and psychosocial crisis. Since early sexual debut has been showed to predict future risky sexual behaviours and acquisition of sexually transmitted diseases such as HIV/AIDS (Harrison, Cleland, Gouws, & Frohlich, 2005; Pettifor, OBrien, Macphail, Miller, & Rees, 2009; Yode & LeGrand, 2012), the roles of parents in promoting positive outcomes in their children cannot be overemphasized.

This study has some strengths and limitations. The study used a nationally representative sample which is a major strength as the results would not be limited to one particular location. To the best of our knowledge, this is one of the few studies that went beyond what is already known in the adolescents’ reproductive health literature to examine the mental health and its related factors as possible risk factors for risky sexual behaviours among adolescents. Despite these strengths, the study included only adolescents who are in school and the results may not be applicable to all adolescents in Ghana. The study employed a cross-sectional survey design which did not account for transient variables that could influence the outcomes measured in the study. In conclusion, this study demonstrated relatively high prevalence of risky sexual behaviours among Ghanaian adolescents. Male gender, older age, presence of mental health problems and substance use were identified as significant risk factors whilst only parental knowledge of activity was a significant protective factor of risky sexual behaviours among adolescents.

**Disclosure statement**

No potential conflict of interest was reported by the authors.

**Funding**

No funding was received for this work by the authors

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**Table 1: Independent variables**

|  |  |  |
| --- | --- | --- |
| 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 |
| Suicidal Ideation | During the past 12 months, did you ever seriously consider attempting suicide? | (1) Yes  (0) No |
| Bullied | During the past 30 days, how many days were you bullied? | (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 |
| Alcohol | During the past 30 days, how many days did you drink alcohol? | (0) 0 times  (1) 1 or more times |
| Marijuana | During the past 30 days, how many days did you smoke? | (0) 0 times  (1) 1 or more times |
| 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 and protective factors with risky sexual behaviours in Ghanaian adolescents**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Variables** | | **Sample (N=1644)** | **Sexual experience** | | **Multiple partners** | | **Condom use** | |
|  |  |  | N(%)  397(33.5%) | ρ | N(%)  129(32.5%) | ρ | N(%)  104(26.2%) | ρ |
| **Sex** (Male) | | 863(52.5%) | 225(58.1%) | .030 | 77(61.1%) | .058 | 55(55.0%) | .111 |
| **Age** | |  |  |  |  |  |  |  |
|  | 11 years old or younger | 40(2.5%) | 12(3.0%) | <.001 | 1(0.8%) | .059 | 2(1.9%) | .723 |
|  | 12 years old | 165(10.1%) | 42(10.7%) |  | 8(6.2%) |  | 4(3.9%) |  |
|  | 13 years old | 274(16.8%) | 61(15.5%) |  | 25(19.4%) |  | 15(14.6%) |  |
|  | 14 years old | 350(21.4%) | 68(17.3%) |  | 24(18.6%) |  | 21(20.4%) |  |
|  | 15 years old | 317(19.4%) | 73(18.5%) |  | 21(16.3%) |  | 16(15.5%) |  |
|  | 16 years old | 195(11.9%) | 41(10.4%) |  | 16(12.4%) |  | 14(13.6%) |  |
|  | 17 years old | 171(10.5%) | 59(15.0%) |  | 23(17.8%) |  | 17(16.5%) |  |
|  | 18 years old or older | 120(7.4%) | 38(9.6%) |  | 11(8.5%) |  | 14(13.6%) |  |
| **Mental health and related factors** | |  |  |  |  |  |  |  |
|  | Anxiety | 213(13.0%) | 57(41.6%) | .028 | 29(15.8%) | <.001 | 22(61.1%) | .057 |
|  | Loneliness | 218(13.3%) | 53(39.0%) | .147 | 27(13.9%) | .005 | 14(46.7%) | .994 |
|  | Suicidal ideation | 327(20.3%) | 98(48.8%) | <.001 | 39(13.8%) | <.001 | 31(54.4%) | .221 |
|  | Bullied | 902(62.2%) | 234(37.9%) | <.001 | 88(10.9%) | <.001 | 61(44.5%) | .473 |
|  | Food insecurity | 244(14.9%) | 65(44.2%) | .003 | 37(16.8%) | <.001 | 17(38.6%) | .235 |
|  | No close friends | 182(11.3%) | 32(26.2%) | .088 | 10(5.8%) | .162 | 8(42.1%) | .624 |
|  | Current alcohol use | 234(15.7%) | 76(53.9%) | <.001 | 50(25.5%) | <.001 | 29(46.0%) | .897 |
|  | Current marijuana use | 120(7.8%) | 31(67.4%) | <.001 | 32(34.0%) | <.001 | 20(58.8%) | .136 |
| **Parental Factors** | |  |  |  |  |  |  |  |
|  | Parental understanding | 524(32.4%) | 135(35.0%) | .387 | 35(7.3%) | .200 | 29(46.6%) | .609 |
|  | Parental knowledge of activity | 523(33.7%) | 105(26.9%) | .013 | 44(9.0%) | .580 | 28(46.7%) | .761 |
|  | Parental intrusion of privacy | 983(60.7%) | 254(35.4%) | .050 | 75(8.4%) | .825 | 65(47.4%) | .811 |

**Table 3: Logistic regression analysis of predictors of risky sexual behaviours in Ghanaian adolescents**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Variables** | | **Sexual Experience** | | **Multiple Partners** | | **Condom Use** | |
|  |  | OR (95%CI) | AOR(95%CI) | OR (95%CI) | AOR(95%CI) | OR (95%CI) | AOR (95%CI) |
| **Sex** (Male) | | 1.31(1.03-1.68)\* | 1.55(1.12-2.15)\*\* | 1.43(.99-2.08) | 1.73(1.00-3.02) | .64(.37-1.11) | .50(.22-1.10) |
| **Age** | |  |  |  |  |  |  |
|  | 14 years or younger | 1 | 1 | 1 | 1 | 1 | 1 |
|  | Above 14 years | 1.49(1.17-1.90)\* | 1.67(1.21-2.30)\*\* | 1.31(.91-1.89) | 1.09(.65-1.85) | 1.15(.67-1.95) | 1.43(.64-3.19) |
| **Mental health and related factors** | |  |  |  |  |  |  |
|  | Anxiety | 1.50(1.04-2.16)\* | 1.05(.64-1.73) | 2.31(1.48-3.61)\*\*\* | 1.34(.66-2.76) | 2.01(.97-4.17) | 2.09(.75-5.89) |
|  | Loneliness | 1.31(.91-1.90) | 1.21(.73 2.00) | 1.90(1.21-3.00)\*\* | .79(.37-1.71) | 1.00(.46-2.17) | .81(.26-2.55) |
|  | Suicidal ideation | 2.22(1.63-3.02)\*\*\* | 1.74(1.12-2.69)\* | 2.06(1.38-3.09)\*\*\* | 1.03(.53-2.01) | 1.46(.80-2.68) | 1.97(.80-4.88) |
|  | Bullied | 1.74(1.33-2.27)\*\*\* | 1.43(.89-2.30) | 2.65(1.65-4.25)\*\*\* | 1.90(1.01-3.59) | .80(.44-1.46) | .70(.26-1.89) |
|  | Food insecurity | 1.68(1.18-2.39)\*\* | 1.28(.93-1.77) | 2.60(1.73-3.93)\*\*\* | 2.06(1.12-3.78)\* | .67(.34-1.31) | .91(.41-1.99) |
|  | No close friends | .69(.45-1.06) | .66(.37-1.17) | .62(.32-1.22) | .74(.28-1.96) | .79(.30-2.04) | .97(.24-3.88) |
|  | Current alcohol use | 2.80(1.96-4.01)\*\*\* | 2.02(1.27-3.20)\*\* | 6.48(4.28-9.81)\*\*\* | 3.63(1.93-6.82)\*\*\* | .96(.53-1.75) | .85(.34-2.12) |
|  | Current marijuana use | 4.81(2.56-9.03)\*\*\* | 3.45(1.36-8.73)\*\* | 8.19(5.05-13.28)\*\*\* | 3.94(1.74-8.92)\*\* | 1.76(.83-3.73) | 1.18(.32-4.36) |
| **Parental Factors** | |  |  |  |  |  |  |
|  | Parental understanding | 1.12(.87-1.45) | 1.31(.91-1.87) | .77(.51-1.15) | 1.02(.56-1.86) | .86(.48-1.54) | .68(.57-3.59) |
|  | Parental knowledge of activity | .71(.54-.93)\* | .73(.51-1.05) | 1.12(.76-1.65) | 1.33(.74-2.38) | .91(.50-1.66) | 1.18(.28-1.66) |
|  | Parental intrusion of privacy | 1.28(1.00-1.65) | 1.17(.84-1.63) | .96(.66-1.39) | 1.06(.62-1.80) | 1.07(.62-1.85) | .97(.54-2.56) |

\* = p < .05, \*\* = p < .01, \*\*\* = p < .001