Alcohol consumption among tertiary students in the Hohoe municipality, Ghana: analysis of prevalence, effects, and associated factors from a cross-sectional study

Richard Gyan Aboagye¹, Nuworza Kugbey², Bright Opoku Ahinkorah³, Abdul-Aziz Seidu⁴, Abdul Cadri⁵ and Paa Yeboah Akonor¹

Abstract

Background: Alcohol consumption constitutes a major public health problem as it has negative consequences on the health, social, psychological, and economic outcomes of individuals. Tertiary education presents students with unique challenges and some students resort to the use of alcohol in dealing with their problems. This study, therefore, sought to determine alcohol use, its effects, and associated factors among tertiary students in the Hohoe Municipality of Ghana.

Methods: An institutional-based cross-sectional study was conducted among 418 tertiary students in the Hohoe Municipality of Ghana using a two-stage sampling technique. Data were collected using structured questionnaires. A binary logistic regression modelling was used to determine the strength of the association between alcohol consumption and the explanatory variables. The level of significance was set at \( p < 0.05 \). Stata version 16.0 was used to perform the analysis.

Results: The lifetime prevalence of alcohol consumption was 39.5%. Out of them, 49.1% were still using alcohol, translating to an overall prevalence of 19.4% among the tertiary students. Self-reported perceived effects attributed to alcohol consumption were loss of valuable items (60.6%), excessive vomiting (53.9%), stomach pains/upset (46.1%), accident (40.0%), unprotected sex (35.1%), risk of liver infection (16.4%), depressive feelings (27.3%), diarrhoea (24.2%), debt (15.2%), and petty theft (22.4%). In terms of factors associated with alcohol consumption, students aged 26 years and above were more likely to have consumed alcohol \([AOR = 4.4, 95\% CI = 1.74, 11.14]\) than those in 16–20 years group. Muslim students had lower odds of alcohol consumption compared to Christians \([AOR = 0.1, 95\% CI = 0.02, 0.31]\). It was also found that students who had peer influence \([AOR = 3.7, 95\% CI = 2.31, 5.82]\) and those who had academic adjustment problems \([AOR = 3.6, 95\% CI = 2.01, 6.46]\) were more likely to consume alcohol.

© The Author(s). 2021 Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article’s Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article’s Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by/4.0/.
Conclusion: Lifetime prevalence of alcohol consumption is high among tertiary students in the Hohoe Municipality of Ghana, with several physical, psychosocial and economic consequences. Alcohol-related education should be intensified in tertiary institutions and counseling units should be equipped with relevant assessment tools to assess and help students who are at risk and those who are already consuming alcohol.

Keywords: Alcohol consumption, Risk factors, Perceived effects, Tertiary students, Ghana

Background
Alcohol consumption is an integral part of many cultural, religious, and social practices worldwide [1, 2]. However, in recent years, the volume and risky pattern of consumption pose a significant public health threat to the consumer, family, friends, and the larger society [3–5]. Harmful alcohol consumption results in health, social, and economic burden on both the individual and others in both immediate and distal environments [4].

Alcohol is a commonly used substance among the youth in tertiary institutions [5, 6]. In many instances, alcohol serves as a gateway to the usage of other psychoactive substances [6]. Tertiary education is a transitional period characterized by autonomy or independence from family control, and self-decision making, academic pressures, forming social groups, and sharing living quarters with new students with diverse cultural values [5, 7–9], and peer influence [9–13]. Other factors shown by researchers to predispose students to alcohol consumption include; ease of availability and accessibility of alcohol [14], academic pressures [12, 15], family member use of alcohol [8], and psychological distress [3, 16]. These features of tertiary institutions’ environment elsewhere are synonymous with those in the Ghanaian setting [17].

Globally, alcohol consumption is the leading causal factor for the overall morbidity and mortality burden [18, 19]. Harmful alcohol consumption serves as a risk factor in over 200 diseases and injuries [4]. These diseases and injuries contribute to about 3 million deaths annually, representing 5.3% of all mortality globally and 132.6 million (5.1%) disability-adjusted life years (DALYs) [2, 4]. About 13.5% of all mortality cases in young people aged 20–39 years were attributed to excessive alcohol consumption [2]. However, the association between alcohol consumption and its negative health implications remains complex and inconclusive given the protective effects of moderate alcohol consumption on the human body [19].

Alcohol consumption during the early years is associated with negative consequences such as alterations in attention, verbal learning, and memory, along with altered development of major parts of the brain [20]. These negative consequences subsequently lead to behavioural, emotional, social, and academic problems in later life [21]. Researchers have shown that harmful alcohol consumption leads to the development of cardiovascular diseases [18], cancer [22], liver diseases [23], hepatitis [24], risky sexual behaviours and sexually transmitted diseases [25, 26], mental and behavioural disorders, injuries, violence [2], and poor academic performance [27–29].

Most countries in sub-Saharan Africa are experiencing rapid economic, social, and cultural transitions which have created an avenue for increased and socially disruptive use of alcohol [30]. Ferreira-Borges et al. [31] asserted that alcohol consumption and disease burden in Africa are expected to increase, but that policymakers have paid little or no attention to the issue of increasing alcohol consumption. Studies conducted in various parts of Africa reported a significant prevalence of alcohol consumption among tertiary students. For instance, reported lifetime prevalence of alcohol consumption ranged from 16.9 to 34.5% in Ethiopia [8, 9, 32], 31.1 to 78.4% in Nigeria [33, 34], 31.9% in Botswana [5], 50.7–63.2% in Kenya [35, 36], and 2.7% in Sudan [37].

Limited studies (example [17, 38]) have been conducted on alcohol consumption among tertiary students in Ghana. This makes it difficult to implement effective interventions due to the dearth of literature on the magnitude of alcohol consumption and its contributory factors. In Ghana, recent evidence showed that there has been an increase in the promotion, competition, and popularity of alcoholic beverages in both the media and non-media sources [38]. These alcoholic beverages are considerably cheaper than soft drinks. As a result, young people (majority of which are students) tend to consume alcoholic beverages due to its accessibility and low cost [38]. Anecdotally, there has been an increased proliferation of drinking spots, night clubs, and alcohol vending sites in the Hohoe Municipality. This has also resulted in easy accessibility to alcoholic beverages by students in the Hohoe Municipality. Hence, the present study sought to determine the prevalence of alcohol consumption and its associated factors among tertiary students in the Hohoe Municipality of Ghana. The findings are likely to inform the development of school-based programmes and interventions aimed at reducing alcohol consumption and promoting healthy lifestyles among students.

Methods
Study setting
We conducted the study in the Hohoe Municipality, which is one of the seventeen (17) administrative
The district has a total land area of 1172 km². In tire district population whilst males represent 47.9% growth rate of 2.5%. Females make up 52.1% of the en-

The sample size for the study was determined using the Cochran formula; \( n = \frac{z^2 \times p \times (1-p)}{d^2} \) [40]. Where \( n \) = required sample size, \( z \) = reliability coefficient (z-score) of 1.96 at 95% confidence level, \( p \) = estimated proportion who use alcohol, and \( d \) = margin of error of 5% (0.05). With a 44.9% prevalence of alcohol consumption among students in Cape Coast Metropolis [41] and a 10% non-response rate, the estimated sample size for the study was 418 tertiary students.

A two-stage sampling technique was used to recruit the 418 tertiary students. A simple random technique was first used to select three tertiary institutions using ballotery without replacement method. The three schools that were randomly selected were UHAS, MTS, and FRANCO.

In the second phase, we employed a proportionate stratified sampling method to apportion the sample size per each institution based on the students’ population size. We calculated the sample size for each school as the product of the total students’ population in a selected school and the total sample size for the study divided by the total students’ population in the three schools. With a total students population of 2001 from the three selected schools as at the time of the study, the calculated sample size per each selected school was UHAS (125), MTS (65), and FRANCO (228).

At the school level, a simple random sampling technique using the lottery method was used to recruit the students to include in the study. Pieces of paper with inscription “YES” or “NO” written on them were used and the students were asked to pick one each. Any student who picked “YES” was given a consent form and both parental/guardian consent and assent forms to those below 18 years for their voluntary approval to take part in the study. We repeated the procedure in all selected schools until we obtained the required sample size.

Data collection procedure
A self-administered structured questionnaire was used to collect data from the students. We developed the questionnaire from a review of pertinent literature on the subject [34–36]. Detailed questionnaire has been attached as a supplementary file. We pretested the developed questionnaire among 42 tertiary students who were not part of the actual study in the Hohoe Municipality. We then administered the pretested questionnaire to the students with the aid of five (5) trained data collectors. We structured the questionnaire into four (4) sections. These sections comprised the sociodemographic characteristics, the pattern of alcohol consumption, psychosocial factors of alcohol consumption, and perceived effects of alcohol consumption. We included students aged 18 years and above who signed the written informed consent. For those below 18 years, we sought written informed consent from their parents or guardians and child assent form from the student. Both written parental or guardian informed consent and child assent forms were required before the students aged below 18 years were included in the study and given a questionnaire to complete.

Statistical analyses
Data collected from the respondents were entered into EpiData 3.1 and exported into Stata version 16.0 for the analysis. The exported data were cleaned, validated, and coded for analysis. We presented categorical variables using frequencies and percentages in tables and charts. A Chi-square test was first performed to determine the relationship between lifetime alcohol consumption and the explanatory variables. We performed a binary logistic regression analysis to determine the strength of association between lifetime alcohol consumption and the explanatory variables. All the variables that showed statistical significance were placed in the regression model. We presented the results of the regression analysis using crude odds ratio (COR) and adjusted odds ratio (AOR) with their
corresponding confidence interval (CIs) and \( p \)-value. A \( p < 0.05 \) was considered statistically significant, showing the level of precision.

**Ethical issues**

We obtained ethical approval for the study from the Ghana Health Service Ethics Review Committee (GHS-ERC) with a reference number (GHS-ERC:92/10/16). We strictly adhered to the ethical guidelines and protocols put forth by the GHS-REC throughout the study. We also sought institutional approval from the Ghana Education Service and Municipal Health Directorate, Hohoe, and Heads of the various institutions. Before the commencement of data collection, written informed consent was sought from students aged 18 years and above before inclusion in the study. For students aged below 18 years, written informed consent was obtained from each student’s parents or guardian before participating in the study. Additionally, written parental or guardian consent and child assent were sought from each student before inclusion in the study. All ethical issues concerning research among humans were strictly followed. Respondents’ rights to withdraw from the study, confidentiality, participants’ privacy, risk, and benefits involved in the study were duly explained to the students after which interested respondents voluntarily signed the written consent or assent forms.

**Results**

**Sociodemographic characteristics of the tertiary students**

Of the 418 tertiary students, 51.4% were males. The majority (65.3%) of the students were aged 21–25 years with the mean age of 22.4 ± 3.1 years. Almost all the students (95.0%) were single. Most of the students were Christians (87.1%) and residents on school campuses (64.6%). In the year of study, 39.0% were in the first year as shown in Table 1.

| Table 1 Sociodemographic characteristics of the tertiary students |
|---------------------------------------------------------------|
| **Variable** | **Frequency (n = 418)** | **Percentage (%)** |
| Mean age of students (years ± SD) | 22.4 ± 3.1 years | |
| **Age group** | | |
| 16–20 | 111 | 26.6 |
| 21–25 | 273 | 65.3 |
| 26 and above | 34 | 8.1 |
| **Sex** | | |
| Male | 215 | 51.4 |
| Female | 203 | 48.6 |
| **Marital status** | | |
| Single | 397 | 95.0 |
| Married | 21 | 5.0 |
| **Institution** | | |
| UHAS | 125 | 29.9 |
| FRANCO | 228 | 54.5 |
| MTC | 65 | 15.6 |
| **Religion** | | |
| Christian | 364 | 87.1 |
| Traditional | 8 | 1.9 |
| Muslim | 46 | 11.0 |
| **Year(s) of study** | | |
| One | 163 | 39.0 |
| Two | 115 | 27.5 |
| Three | 101 | 24.2 |
| Four | 39 | 9.3 |
| **Residential status** | | |
| Resident | 270 | 64.6 |
| Non resident | 148 | 35.4 |
Pattern of alcohol consumption among the tertiary students
The lifetime prevalence of alcohol consumption was 39.5%. Out of them, 49.1% were still using alcohol, translating to an overall current prevalence of 19.4% among the tertiary students. The majority (83.0%) of alcohol consumers started between the ages of 16–20 years. The mean age of alcohol initiation was 18.9 ± 2.7 years. Seventy-two (43.6%) of the students consume alcohol yearly. Beer (37.6%) was the most consumed alcoholic beverage followed by wine (35.2%). On a typical day, 41.2% of the students consume alcohol 1–2 times. Also, 28.5% of the students drank alcohol at least once in the past week prior to the study as presented in Table 2.

Psychosocial factors of alcohol consumption
Two hundred and twelve respondents (50.7%) attributed alcohol consumption among students to peer influence. Regarding curiosity/imitation, 35.2% of the respondents reported curiosity/imitation to influence students’ alcohol consumption. Also, psychological issues (29.9%), family influence (21.8%), and academic adjustment problems (18.9%) were some of the key reasons influencing alcohol consumption among tertiary students as presented in Fig. 1.

Factors influencing alcohol consumption among tertiary students
Results from the bivariate analysis (chi-square analysis) showed that age group ($\chi^2 = 13.16, p < 0.001$), sex ($\chi^2 = 10.43, p < 0.001$), religion ($\chi^2 = 27.90, p < 0.001$), peer influence ($\chi^2 = 47.17, p < 0.001$), and academic adjustment problems ($\chi^2 = 28.31, p < 0.001$) were significantly associated with alcohol consumption among tertiary students (Table 3).

Predictors of alcohol consumption among tertiary students
Results of the regression analysis of predictors of alcohol consumption among tertiary students has been shown in Table 4. In the adjusted model, students aged 26 years and above were 4.4 times more likely to consume alcohol compared to those aged 16–20 years, and the association was statistically significant [AOR = 4.4, 95% CI = 1.74, 11.14]. Muslim students were 90.0% less likely to consume alcohol compared to their Christian counterparts [AOR = 0.1, 95% CI = 0.02, 0.31]. Students with peer influence had higher odds of alcohol consumption as against those without peer influence [AOR = 3.7, 95% CI = 2.31, 5.82]. Also, students with academic adjustment problems were more likely to consume alcohol compared to their counterparts without academic problems [AOR = 3.6, 95% CI = 2.01, 6.46].

Table 2 Pattern of alcohol consumption among the students

| Variables                                      | Frequency (n) | Percentage (%) |
|------------------------------------------------|---------------|----------------|
| Ever consumed alcohol (n = 418)                |               |                |
| Yes                                            | 165           | 39.5           |
| No                                             | 253           | 60.5           |
| Current users of alcohol (n = 165)             |               |                |
| Yes                                            | 81            | 49.1           |
| No                                             | 84            | 50.9           |
| Mean age of initiation (years ± SD)            |               |                |
| 10–15                                          | 9             | 5.5            |
| 16–20                                          | 137           | 83.0           |
| 21–25                                          | 15            | 9.1            |
| 26 and above                                   | 4             | 2.4            |
| Frequency of alcohol consumption                |               |                |
| Daily                                          | 9             | 5.5            |
| Weekly                                         | 36            | 21.8           |
| Monthly                                        | 48            | 29.1           |
| Yearly                                         | 72            | 43.6           |
| Type of alcoholic beverage consumed            |               |                |
| Beer                                           | 62            | 37.6           |
| Wine                                           | 58            | 35.2           |
| Spirits                                        | 9             | 5.5            |
| Gin                                            | 10            | 6.1            |
| All                                            | 26            | 15.8           |
| Number of drinks per typical day                |               |                |
| None                                           | 91            | 55.2           |
| 1–2 times                                      | 69            | 41.2           |
| 3 and above                                    | 5             | 3.6            |
| Number of drinks in the past week              |               |                |
| None                                           | 98            | 59.4           |
| Once                                           | 47            | 28.5           |
| Twice                                          | 14            | 8.5            |
| Three or more                                  | 6             | 3.6            |

Perceived effects of alcohol consumption
Commonly reported effects attributed to alcohol consumption among the students were loss of valuable items (60.6%), and excessive vomiting (53.9%) as shown in Table 5.

Discussion
This study sought to determine the prevalence of alcohol consumption among tertiary students in the Hoohoe Municipality of Ghana. We also assessed the factors associated with alcohol consumption and the perceived effects of alcohol among the consumers. We found that the
overall lifetime and current prevalence of alcohol consumption among the students were 39.5% and 19.4% respectively. These findings are similar to that of Gebremariam et al. [32] who reported the lifetime and current alcohol consumption prevalence of 36.3% and 16.9% respectively among university students in Ethiopia. However, our prevalence rates were lower than some studies from Kenya [35], Nigeria [6, 33], and Ghana [17, 38]. For instance, the study conducted in Ghana reported an ever alcohol consumption prevalence of 56.3%, whiles current consumers were 25.8% [17]. Also, Hassan [36] found in Kenya that lifetime alcohol consumption was prevalent among 63.2% of tertiary students. The observed differences in prevalence could be because of the inclusion of two health tertiary institutions in the current study. These students from health institutions might be knowledgeable about the health implications of alcohol consumption hence the less consumption rate.

Our findings showed that the odds of alcohol consumption among the students increased with increasing age. Students aged 26 years and above were more likely to consume alcohol. This finding is consistent with results from a cross-sectional study conducted in China [42] and Nigeria [33]. The finding also confirms the association between older age and alcohol consumption found in a study that used data from 24 different countries [43]. The plausible explanation of the finding could be that older students were more likely to access alcohol because they have passed the legal age of alcohol consumption [33]. Also, older age is associated with societal pressure, stress, and increased quest to achieve success and this could have increased their likelihood of resorting to consuming alcohol as a way of coping [33].

Consistent with previous literature from Ethiopia [7, 9] and Ghana [38], this study found that being a Muslim was associated with lower odds of alcohol consumption. This finding is not surprising as alcohol consumption is prohibited in the Islamic religion. It is against the religious doctrines as a Muslim to consume alcohol.

Also, the study found that peer influence was associated with higher odds of alcohol consumption. This finding corroborates studies from South Africa [13], Ethiopia [8, 9, 12, 15, 44] where peer influence was a significant predictor of alcohol consumption among tertiary students. Studies conducted in Ghana also reported similar findings [10, 11]. The social learning principle which emphasizes that individuals can learn bad behaviours from watching their peers [14] could explain the findings in the study. Also, as peers are important sources of social support and therefore, their pressure can be an enforcer for good and bad behaviour [14].

We found academic adjustment problems to be a significant predictor of alcohol consumption among the students. This finding is in line with previous studies which reported significant associations between students’ academic adjustment problems and alcohol consumption [12, 15, 45]. That is, the rate of alcohol consumption was higher among students with academic problems or those dissatisfied with their academic performance. Plausible factors that could explain the observed association include; difficulties in balancing academics with social life, low level of commitment towards the field of study, and course and assignment overload which could have predispose the students to consume alcohol.

Limitations of the study
The cross-sectional nature of the study did not allow for inferences of causality between alcohol consumption and the risk factors to be made. Second, the self-reported pattern of alcohol consumption and the perceived effects of alcohol use are often prone to recall and social
desirability biases. Also, the study cannot be generalized to the general population because of the involvement of only tertiary students. Additionally, we did not perform rigorous statistical analysis for the perceived effects of alcohol consumption among the students. Furthermore, sample weights were not used in the present study and this limits it’s generalizability to other tertiary students. The use of simple random sampling technique in selecting study schools is another limitation of the study given the varying students population in the selected schools.

Conclusion

Our study found a relatively high prevalence of alcohol consumption among tertiary students in the Hohoe Municipality. Almost half of lifetime alcohol consumers were current drinkers. Among the lifetime alcohol consumers, self-reported effects included stomach pains or upset, accident, unprotected sex, loss of valuable items, excessive vomiting, diarrhea, risk of liver infection, debt, and petty theft. Factors perpetuating alcohol consumption among the students were peer pressure, increasing age (26 years and above), and academic adjustment problems. Being a Muslim was protective against alcohol consumption. Regular alcohol assessment should be carried out in tertiary schools to help identify students with potential alcohol problems in order for appropriated and tailored psychosocial interventions. Students with poor academic performance and psychological distress should be counseled to help them cope with their

Table 3 Bivariate analysis of factors associated with alcohol consumption among tertiary students

| Variable           | Alcohol consumption | Chi-square (χ²) | P-value |
|--------------------|---------------------|----------------|---------|
| Age group          |                     |                |         |
| 16–20              | 78 (70.3)            | 33 (29.7)      |         |
| 21–25              | 168 (61.5)           | 105 (38.5)     |         |
| 26 and above       | 11 (32.4)            | 23 (67.6)      |         |
| Sex                |                     |                |         |
| Male               | 114 (53.0)           | 101 (47.0)     |         |
| Female             | 139 (68.5)           | 64 (31.5)      |         |
| Marital status     |                     |                |         |
| Single             | 243 (61.2)           | 154 (38.8)     |         |
| Married            | 12 (52.2)            | 11 (47.8)      |         |
| Religion           |                     |                |         |
| Christian          | 203 (55.8)           | 161 (44.2)     |         |
| Traditional        | 6 (75.0)             | 2 (25.0)       |         |
| Muslim             | 44 (95.7)            | 2 (4.3)        |         |
| Year of study (s)  |                     |                |         |
| One                | 107 (65.6)           | 56 (34.4)      |         |
| Two                | 65 (56.5)            | 50 (43.5)      |         |
| Three              | 64 (63.4)            | 37 (36.6)      |         |
| Four               | 17 (43.6)            | 22 (56.4)      |         |
| Residential status |                     |                |         |
| Resident           | 166 (61.5)           | 104 (38.5)     |         |
| Non-resident       | 87 (58.8)            | 61 (41.2)      |         |
| Peer influence     |                     |                |         |
| No                 | 159 (77.2)           | 47 (22.8)      |         |
| Yes                | 94 (44.3)            | 118 (55.7)     |         |
| Curiosity/imitation|                     |                |         |
| No                 | 167 (61.6)           | 104 (38.4)     |         |
| Yes                | 86 (58.5)            | 61 (41.5)      |         |
| Psychological issues|                    |                |         |
| No                 | 185 (63.1)           | 108 (36.9)     |         |
| Yes                | 68 (54.4)            | 57 (45.6)      |         |
| Family influence   |                     |                |         |
| No                 | 193 (59.0)           | 134 (41.0)     |         |
| Yes                | 60 (65.9)            | 31 (34.1)      |         |
| Academic adjustment|                     |                |         |
| No                 | 226 (66.7)           | 113 (33.3)     |         |
| Yes                | 27 (34.2)            | 52 (65.8)      |         |

Table 4 Logistic regression analysis of predictors of alcohol consumption among tertiary students

| Variables                      | COR (95% CI) | AOR (95% CI) |
|--------------------------------|--------------|--------------|
| Age group                      |              |              |
| 16–20                          | 1.0          | 1.0          |
| 21–25                          | 1.3 [0.79, 1.99] | 1.7 [0.99, 2.82] |
| 26 and above                   | 4.2* [1.84, 9.49] | 4.4* [1.74, 11.14] |
| Sex                            |              |              |
| Male                           | 1.0          | 1.0          |
| Female                         | 0.5* [0.35, 0.77] | 0.9 [0.54, 1.34] |
| Religion                       |              |              |
| Christian                      | 1.0          | 1.0          |
| Traditional                    | 0.4 [0.08, 2.11] | 0.3 [0.04, 2.03] |
| Muslim                         | 0.1** [0.01, 0.24] | 0.1** [0.02, 0.31] |
| Peer influence                 |              |              |
| No                             | 1.0          | 1.0          |
| Yes                            | 4.2** [2.78, 6.49] | 3.7** [2.31, 5.82] |
| Academic adjustment problems   |              |              |
| No                             | 1.0          | 1.0          |
| Yes                            | 3.8** [2.30, 6.47] | 3.6** [2.01, 6.46] |

COR = Crude Odds Ratio; AOR = Adjusted Odds Ratio, 1 = Reference
* = p < 0.01 ** = p < 0.001
challenges without resorting to alcohol consumption. Health education on alcohol consumption, the risk factors and its effects should be intensified especially in both health and non-health training institutions highlighting the short- and long-term consequences of alcohol and the role of peers in shaping their behaviour.

Abbreviations
AOR: Adjusted Odds Ratio; CI: Confidence Interval; COR: Crude Odds Ratio; DALYs: DisabilityAdjusted Life Years; FRANCO: Saint Francis Training College; GHS-ERC: Ghana Health Service Ethics Review Committee; MTS: Midwifery Training School; THERESCO: Saint Theresa’s Training College; UHAS: University of Health and Allied Sciences

Supplementary Information
The online version contains supplementary material available at https://doi.org/10.1186/s12888-021-03447-0.

Additional file 1. Questionnaire.

Acknowledgements
We are grateful to the staff of the Hohoe Municipal Health Directorate, Hohoe Municipal Education Service, and Heads and Tutors of various institutions used for the study. We are also thankful to the students who participated in the study.

Authors’ contributions
RGA, NK, and AC conceived the study. RGA, AC, BOA, AS, and PYA wrote the methods section and performed the data analysis. RGA, NK, BOA, AS, AC, and PYA were responsible for the initial draft of the manuscript. All the authors reviewed and approved the final version of the manuscript.

Funding
The study did not receive any funding.

Availability of data and materials
The datasets used or analysed during the current study are available from the corresponding author on reasonable request.

Declarations
Ethics approval and consent to participate
Ethical approval for the study was obtained from the Ghana Health Service Ethics Review Committee (GHS-ERC) with a reference number (GHS-ERC:92/10/16). We strictly adhered to the ethical guidelines and protocols of the GHS-ERC throughout the study. We sought institutional approval from the Ghana Education Service, Hohoe, and Heads of the various institutions. Before the commencement of data collection, written informed consent was sought from students aged 18 years and above before inclusion in the study. For students aged below 18 years, written informed consent was obtained from each student’s parents or guardian before participating in the study. Additionally, written parental or guardian consent and child assent were sought from each student before inclusion in the study. Respondents’ rights to withdraw from the study, confidentiality, participants’ privacy, risk, and benefits involved in the study were duly explained to the respondents after which interested respondents voluntarily signed the written consent or assent forms.

Consent for publication
Not applicable.

Competing interests
The authors declare that they have no competing interests.

Author details
1Department of Family and Community Health, School of Public Health, University of Health and Allied Sciences, Ho, Ghana. 2Department of General Studies, University of Environment and Sustainable Development, Somanya, Ghana. 3School of Public Health, Faculty of Health, University of Technology Sydney, Sydney, Australia. 4College of Public Health, Medical and Veterinary Services, James Cook University, Douglas, Australia. 5Department of Social and Behavioural Science, School of Public Health, University of Ghana, Legon-Accra, Ghana.

Table 5 Perceived effects of alcohol consumption among the tertiary students

| Variable | Frequency (n = 165) | Percentage (%) |
|----------|--------------------|----------------|
| Excessive alcohol consumption can cause diarrhoea | | |
| Agree | 40 | 24.2 |
| Disagree | 125 | 75.8 |
| Excessive alcohol consumption can cause stomach upset/pain | | |
| Agree | 76 | 46.1 |
| Disagree | 89 | 53.9 |
| Can increase one’s chances of getting an accident | | |
| Agree | 66 | 40.0 |
| Disagree | 99 | 60.0 |
| Can cause a bloated stomach | | |
| Agree | 134 | 20.6 |
| Disagree | 131 | 79.4 |
| Can cause depressive feeling for weeks | | |
| Agree | 45 | 27.3 |
| Disagree | 120 | 72.7 |
| Can cause one to vomit excessively | | |
| Agree | 89 | 53.9 |
| Disagree | 76 | 46.1 |
| Serves as a risk factor for liver infection | | |
| Agree | 27 | 16.4 |
| Disagree | 138 | 83.6 |
| Influence one to engage in unprotected sex | | |
| Agree | 58 | 35.1 |
| Disagree | 107 | 64.9 |
| Can cause one to lose money and valuable items | | |
| Agree | 100 | 60.6 |
| Disagree | 65 | 39.4 |
| Can cause one to incur debts | | |
| Agree | 25 | 15.2 |
| Disagree | 140 | 84.8 |
| Can cause one to engage in petty theft | | |
| Agree | 37 | 22.4 |
| Disagree | 128 | 77.6 |
References

1. Sebun Err, Kitiyi C, Nabonuka J, Naluji J, Bana H, Kigozi F. Social acceptance of alcohol use in Uganda. BMC psychiatry. 2020;20(1):1–7. https://doi.org/10.1186/s12888-020-2471-2.
2. WHO. Alcohol. Retrieved from https://www.who.int/news-room/fact-sheets/detail/alcohol. Accessed on 12 June 2020.
3. Htet H, Saw YM, Saw TN, Htun NM, Lay Mon K, Cho SM, et al. Prevalence of psychoactive substance use among first-year students in a Botswana University: pattern and demographic correlates. BMC psychiatry. 2018;18(1):270. https://doi.org/10.1186/s12888-018-1844-2.
4. Eze CU, Uzoech U, Alcohol use among full-time students of the University of Abuja. Int J Emerg Mental Health Human Resilience. 2015;17(1):283–7.
5. Ade A, Yinner NB, Kumsa H, Liben ML. Determinants of psychoactive substances use among Woldia University students in northeastern Ethiopia. BMC research notes. 2017;10(1):441 https://doi.org/10.1186/s13104-017-1763-x.
6. Gebreslassie M, Feleke A, Melesse T. Psychoactive substances use and associated factors among Axum University students, Axum town, North Ethiopia. BMC Public Health. 2013 Dec 13;13(1693). https://doi.org/10.1186/1471-2458-13-693.
7. Deressa W, Azaah A. Substance use and its predictors among undergraduate medical students of Addis Ababa University in Ethiopia. BMC Public Health. 2011 Dec 1;11(1):660. https://doi.org/10.1186/1471-2458-11-660.
8. Asvima PI. Factors contributing to alcohol use among the youth aged (16–30) – a case study in Bolgatanga Municipality of the Upper East Region, Ghana (Masters dissertation, University of Development Studies, Tamale, Ghana). 2018.
9. Mensah EA. Substance use among students of a second cycle institution in Accra (masters dissertation, University of Ghana, Legon, Ghana); 2016.
10. Aklog T, Tiruneh G, Tesgay G. Assessment of substance abuse and associated factors among students of debre markos poly technique college in debre markos town, East Gojjam zone, Amhara regional state, Ethiopia, 2013. Global journal of medical research. 2013;13(4):1.
11. Ghumman S, Meyer-Weitz A, Knight S. Prevalence patterns and predictors of alcohol use and abuse among secondary school students in southern KwaZulu-Natal, South Africa: demographic factors and the influence of parents and peers. S Afr Fam Pract. 2012 Mar 15;4(2):132–8. https://doi.org/10.1080/2070864201210784192.
12. Mahmood NA, Othman SM, Al-Tawil NG, Al-Hashmi TS. Substance use among high school students in Erbil City, Kurdistan region: prevalence and potential contributing factors. East Mediterr Health J. 2019;25(11):806–12. https://doi.org/10.26719/emhj.19.022.
13. Hagos EG, Asfaha GG, Berhane BA. Prevalence of substance abuse among regular degree health science students in Sheba University College in debre markos town, East Gojjam zone, Amhara regional state, Ethiopia; 2016.
14. Balogun O, Koyanagi A, Stickley A, Gilmore S, Shibuya K, Alcohol consumption and psychological distress in adolescents: a multi-country descriptive cross-sectional study. BMC Public Health. 2011;11(1):118. https://doi.org/10.1186/1471-2458-11-118.
15. Atwoli L, Mungala P, Nduungu MN, Kinoti KC, Ogut EM. Prevalence of substance use among college students in Eldoret, western Kenya. BMC psychiatry 2011 Dec 11(1):9–5. DOI: https://doi.org/10.1186/1471-244X-11-34.
16. Hassan MN. Factors associated with alcohol abuse among University of Nairobi students (doctoral dissertation, University of Nairobi, Kenya); 2013.
17. Osman T, Viktor C, Abdulmoneim A, Mohammed H, Abdalla A, Ahmed A, et al. Epidemiology of substance use among university students in Sudan. J Addict. 2016 Oct;2016:1–8. https://doi.org/10.1186/s12889-016-0704-7.
18. Osiri-Bonsu E, Appiah PK, Norman ID, Asalu GA, Kweku M, Ahabor SY, et al. Prevalence of alcohol consumption and factors influencing alcohol use among the youth in Tokormi-Hohoe, Volta region of Ghana. Science Journal of Public Health. 2017;5(3):205–14. https://doi.org/10.11648/j.sjph.20170503.18.
19. Ghana Statistical Service. Population & Housing Census: district analytical report: Hoho municipality. Accra. 2010, 2014.
20. Snedecor GW, Cochran WG. Statistical methods, 8thEdn. Ames: Iowa State Univ Press Iowa. 1989:54–712.
21. Nyiri A. Substance abuse among senior high school students in Ghana. International Journal of Social Science and Education. 2014:364–53.
22. Ji CY, Hu PJ, Song Y. The epidemiology of alcohol consumption and misuse among Chinese college students. Alcohol. Alcohol. 2012 Jul 147;464–72. https://doi.org/10.1093/alcalc/agt037.
23. Brindley B, Waterhouse Frequency and geometric mean concentration of alcohol in urine of university students from 24 low, middle income and emerging economy
countries. Community Ment Health J. 2016 Feb 1;52(2):239–44. https://doi.org/10.1007/s10597-015-9925-x.

44. Kumburi GT, Gelgile AK, Hatehu BT, Gemechu DT. Psycho-active substances use and determining factors among regular undergraduate students of dire-Dawa University, eastern Ethiopia. Science Journal of Public Health. 2017;5(2):68–76. https://doi.org/10.11648/j.sjph.20170502.13.

45. Tulu SK, Keski W. Assessment of causes, prevalence and consequences of alcohol and drug abuse among Mekelle University, CSSL 2nd year students. Am J Appl Psycho(3). 2015;3:47–56.

Publisher’s Note
Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.