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Research Article

Using the Socio-ecological Model to Explain the Findings of Prevalence and Demographic Correlates of Alcoholic Beverage Consumption among Adolescents in Public Schools in Uganda

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Introduction: Consumption of alcohol among the youth could be attributable to socio-demographic characteristics. This paper anchors on the socio-ecological model to expound on the prevalence and socio-demographic correlates of alcohol consumption among adolescents in public secondary schools. Specifically, the model was used to explore gender, religious affiliation, form or class of study, social media use, friendships, and involvement in places of entertainment as possible predictors of alcohol consumption.

Method: Within the framework of the socio-ecological model, we employed a cross-sectional survey with quantitative methods to explore socio-ecological covariates of alcohol consumption among the youth in public secondary schools. The sample comprised 1819 participants, yielding a 91.8% response rate. Males were relatively more numerous (59.3%), and the mean age was 17.3 (SD = 1.9). Bivariate and multivariate logistic regressions were employed to deduce the association of selected demographics with the consumption of beer, wine, and spirits.

Results: The prevalence of alcohol consumption was generally high. Multivariate logistic regression showed a significant gender difference in the consumption of beer and spirits. Females had lower odds of consuming beer and spirits. Students in the Muslim and Pentecostal dominions were less likely to consume beer, wine, and spirits than their Roman Catholic and Anglican counterparts. Students in the Roman Catholic dominion had higher odds of consuming any type of alcohol compared to other religions. Loving to be in places of entertainment and the use of social media significantly predicted the consumption of beer, wine, and spirits.

Conclusion: These results could bear importance in demanding benchmarking of ecologically specific advocacy against alcohol consumption in schools. Further, results imply that youth drinking regulatory frameworks may be inclusive of the alcohol industry, including not only the producers of alcohol but also a large network of distributors, wholesalers, bars, and advertisers. Interventions for in-school youth drinking may need to be developed by benchmarking with and involving institutions at different levels of the ecological model, such as religious institutions, healthcare services, media, and the village councils.

1. Background

There has been a reported, inextricable connection between people's behaviours and their environment. Therefore, macro and micro-ecological phenomena influence behaviours, including alcohol consumption among diverse groups and populations (Gruenewald, Remer, & LaScala, 2014; Sudhinaraset, Wigglesworth, & Takeuchi, 2016). Consequently, environmental and personal behaviours that influence alcohol consumption could be contextualized in terms of the social ecological model. Indeed and in the context of this study, the model accounts for multiple correlates associated with alcohol consumption among the youth. Urie Bronfenbrenner coined the ecological model in 1974 to explain the role of familial and other "social contacts" in child development (McLeod, 2023). Since then, the model has been expanded and used by scholars from different disciplines in examining multitudes of behaviours among populations of interest. The model, for example, could be employed in examining social media use among the youth (McLeod, 2023) and alcohol consumption (Agwu et al., 2018; Bogg & Finn, 2009). For this paper, alcohol consumption means the use of beverages containing alcohol as an ingredient (Surujjal & Keyser, 2014). Alcoholic beverages in this case were taken to mean Beers, Wines, and Spirits.

Previous studies have used the social ecological model in examining decisions and behaviours of diverse groups of people. Hickey, Harrison, and Sumsion (2012), for example, used the model in explaining career choices of nursing students. Other studies applied the model in examining alcohol consumption, although mainly among adult populations and without clear regard for the microsystems such as religion and gender as primary contexts for alcohol consumption. Two studies, for example, applied the model in examining alcohol consumption-related decision-making (Bogg & Finn, 2009) and in assessing the relationships of demographic and personality characteristics (Gruenewald, Remer, & LaScala, 2013). Another

study adopted the model in explaining harmful alcohol consumption in Delta State, Nigeria (Agwu, Okoye, Ebimbo, Agbawodikeizu, & Ijeoma, 2018). The Gruenewald, Remer, and LaScala (2013) study, which considered demographic characteristics, as the present study did, was unable to single out adolescents as a point of focus. Yet, adolescence as a developmental period is one stage most likely to be influenced by the human ecological systems into alcohol consumption and other maladaptive behaviours. Based on the ecological model, we asked: what are the socio-demographic correlates of consumption of alcoholic beverages among adolescents in public secondary schools in Uganda?

As earlier typified, this paper anchors on the social ecological model to explore the prevalence and ecological correlates (such as religion, gender, use of social media technology, and level of learning) of alcohol consumption among adolescents. The social ecological model is reliable in explaining complex behaviours such as alcohol consumption. The paper considers a social ecological discourse as it manifests the various levels with which adolescents interact and potentially influence their drinking behaviours. For instance, the microsystem of the ecological model could explain variables such as gender, involvement in places of entertainment, use of social media, friendship dynamics, and level of studying against alcohol consumption.

While measures such as brief interventions have been in place to address youth drinking, less is known about the application of contemporary theoretical frameworks in remedying alcohol use among the youth in schools in developing countries. Possibly, the social ecological model would serve as an addition to the available options for advocacy against youth drinking and better prioritize demographic antecedents in the prevention of alcohol consumption.

The ecological spaces notwithstanding, alcohol consumption is identified as responsible for the estimated increase in the global disease burden (Natasha et al., 2016; Osman et al., 2016). Consequently, alcohol

consumption, especially among the youth, remains one of the key health concerns (Abbo et al., 2016; Atilola et al., 2014; Beck, Caldeira, Vincent, & Arria, 2012; Manyike et al., 2016; Natasha et al., 2016; Swahn, Palmier, Benegas-Segarra & Sinson, 2013). Moreover, alcohol consumption is hazardous at the most formative stage of adolescence (Cheloti & Gathumbi, 2016; Manyike et al., 2016).

Often, in the context of a developing country like Uganda, alcohol consumption has resulted in hazardous and negative outcomes, including increased road traffic injuries, erosion of socio-cultural norms, involvement in risky sexual behaviours, premature death, poor health, interpersonal violence, and self-harm (Kalema & Vanderplasschen, 2015; Swahn, Palmier, & Kasirye, 2013; Tumwesigye, Atuyambe, & Kobusingye, 2016). In the face of the negative outcomes of alcohol consumption among adolescents, there is no known study using the socio-ecological model to examine alcohol consumption among adolescents in Uganda. Moreover, as Kabwama et al. (2016) contend, all previous studies involving alcohol consumption were conducted on a small scale. According to the report on alcohol consumption in Uganda by Young, Empowered, and Healthy [YEAH] (2007), there is hardly any large-scale empirical data regarding the types of alcohol consumed among the youth in schools in Uganda. The YEAH (2007) report further acknowledges the several surveys, anecdotal evidence, and estimations from key experts that provide a proxy indication of the level of alcohol consumption among Ugandan youth. However, the report above only captures drinking behaviours among the general youth population. Data on youth in schools was earnestly lacking. Therefore, this study allows us to gain an understanding of the “socio-ecological” variables predicting alcohol consumption among the youth in schools and potentially informs future interventions using social ecological theories among remedies to alcohol consumption in educational institutions.

Moreover, Tumwesigye et al. (2013) and Swahn, Haberlen, Palmier, & Kasirye (2014) studied alcohol consumption among the youth but only considered vulnerable groups like those living in slums and fish landing sites. Other studies (e.g., Hahn et al., 2014; John-Langba, Ezech, Guiella, Kumi-Kyereme, & Neema, 2006; Kabwama et al., 2016; Kalema, Vindevoegel, Baguma, Derluyn, & Vanderplasschen, 2015; Naamara & Muhwezi, 2014) were conducted among the general population. Notably, Abbo et al. (2016) considered demographic correlates of alcohol consumption among secondary school students. However, their study considered only two districts – Kampala and Gulu. Therefore, using the social ecological theory to explain the consumption of alcoholic beverages among the youth in public schools was necessary.

The present study is anchored on a socio-ecological model to explore the prevalence and identify protective and risky demographic correlates of alcohol consumption among secondary school adolescents. The socio-ecological model posits that individual and environmental variables account for alcohol consumption (Gruenewald et al., 2014) among students. The model comprises five layers within which interaction occurs – the microsystem, mesosystem, exosystem, macrosystem, and chronosystem. The fifth layer may not be applicable in examining correlates of alcohol consumption with cross-sectional data. Therefore, this study is anchored on the first four layers of the ecological model. The concern here is that alcohol consumption among the youth is manifold to the extent of drawing from social and environmental influences. To that end, correlates of alcohol consumption among students mirror individual, interpersonal, institutional, communal, and societal echelons.

Particularly, for the interaction between individual students, the first and second levels seem relevant in examining alcohol consumption among students. Issues of age, gender, religious affiliation and practices, and the way these antecedents interact with students’ socio-economic and neighborhood spaces contribute greatly to expounding alcohol consumption among students (Connell, Gilreath, Aklin, & Brex, 2014; Hickey et al., 2012). Therefore, in the context of the socio-ecological model, this paper underscores students’ age, gender, and religious affiliation, and friendship, involvement in places of entertainment, use of social media, the extent to which students considered themselves religious, and form of students’ classes as possible correlates of alcohol consumption among students. By and large, characteristics of students serve as a basis for adding differences among alcohol consumers (Bliss, 2007; Manu, Maluleke, & Mbuyiselo, 2016; Surujlal & Keyser, 2014).

Regarding prevalence, and as previously noted, alcohol is the leading substance of abuse among adolescents in Uganda. In fact, in a small-scale study, Abbo et al. (2016) found that the most common substance used among students in Kampala and Gulu districts was alcohol (23.3%). The WHO Global School-based Student Health Survey (GSHS) reports that 12.8% of the students in Uganda had at least one alcoholic drink on one or more days during the past 30 days (YEAH, 2007). However, the survey lacked pinpointing ecological correlates of consumption of the different types of alcohol. Other studies (e.g., Atilola et al., 2014; Egbuonu, Egbuonu, & Effiong, 2015; Odejide, 2006; John-Langba et al., 2006; Onya & Flisher, 2008; Othieno & Ofulla, 2009) point to the prevalence of alcohol consumption as superseding the use of other psychoactive substances in schools among developed and developing countries. For instance, alcohol consumption is highly prevalent among students in the United States (Beck et al., 2012; Conway et al., 2013). In a study conducted by Fuhr, Fleischmann, Riley, Kann, & Poznyak (2013), current alcohol consumption was highest compared to current and lifetime drug use. In their study regarding alcohol consumption and treatment-seeking behaviour among young people in Sydney, Australia, Lea, Reynolds, and De-Wit (2013) found that 83% of their participants consumed alcohol (Wills, Pokhrel, Morehouse, & Fenster, 2011). Crooke et al. (2013) discovered that 43.7% of the adolescents were light drinkers, 16.9% were intermediate drinkers, while 39.4% were heavy drinkers. The same study further reports that 61.0% of the adolescents had at least one night drinking experience, 22.0% had intermediate drinking experience, and 46.3% reported one heavy drinking experience.

In addition to the prevalence reported above, students’ characteristics form a significant component of protective or risk factors for alcohol consumption (Beck et al., 2012; Handren, Donaldson, & Crano, 2016). Kabwama et al. (2016) identified that, regionally, Ugandans from the central and western regions were more likely to be medium to high drinkers compared to their counterparts in the eastern region. However, according to Tumwesigye, Kasirye, and Nansubuga (2009), differences in drinking contexts were mainly attributable to social interactions – especially among different social classes. In a study to review psychosocial risk factors for alcohol consumption, Donovan (2004) reports that only two studies examined age as a predictor of alcohol use initiation. In a comparable context, Rodham, Hawton, Evans, and Weatherall (2005) found clear gender differences in alcohol consumption among adolescents – more males than females reported drinking. The studies recorded above, however, were lacking in consideration of adolescents in secondary schools. Likewise, most studies in Africa and beyond only consider age and gender as the correlates influencing alcohol consumption among adolescents. Key and informative demographic areas like students’ level of study and religious background are not accounted for by previous studies (Oman, Tolma, Vesely, & Aspy, 2013; Pengpid & Pelzer, 2013).

Largely, religious inclination and faith tend to influence youths’ decisions to consume or not consume alcohol (Al-Ansari, Day, Thow, & Conigrave, 2016). Church attendance in childhood is presumably protective against the early onset of alcohol consumption and the later development of alcohol-related problems (Mason & Windle, 2015; Porche, Fortuna, Wachholtz, & Stone, 2015). Moreover, evidence is available that youths who identify themselves as being strongly committed to particular faiths are less likely to consume alcohol (Marsiglia, Ayers, & Hoffman, 2012).

In the study to establish grade differences in alcohol consumption, Lakew et al. (2014) found significant findings, although the results were non-significant in multivariate models. Further evidence shows that weekly alcohol consumers in the US constituted about one-seventh of drinkers in the 9th grade but one-fourth in the 11th grade (Austin & Skager, 2011; Austin, Skager, Bailey & Bates, 2007).

In echo with Ahlström and Österberg (2004), most studies regarding alcohol consumption among adolescents are situated in developed economies. As earlier recounted, most studies in Uganda (e.g., Hahn et al., 2014; Kalema et al., 2015; Namaara & Muhwezi, 2014; Swahn, Palmier & Kasirye, 2014) do not consider much about the ecological spaces of alcohol consumption among students in schools. Moreover, most of the studies regarding drinking contexts in Uganda consider the general adult population, without much regard for the most formative stage of adolescence. There was a necessity for a study comparing socio-ecological correlates of alcohol consumption among the youth, to ignite debate regarding some of the ecological determinants of alcohol consumption

among the youth. The social ecological model, in particular, considers antecedents of alcohol consumption and supports understanding of socio-ecological variables for future theoretical interventions. With the antecedents of alcohol consumption in mind, this paper focuses on drinking and non-drinking statuses, and on the socio-ecological predictors of drinking among students. Outcomes of this study potentially support ecologically framed, youth-tailored, participatory policy initiation and adoption.

2. Methodology

2.1. Settings and description of the study sample

This paper employs the social ecological model in reporting on a technique of a large study that was conducted in 2013 and 2014 involving adolescents in public secondary schools in Uganda. The social ecological model was used to explore the socio-ecological variables described under measures, which predict alcohol consumption among a sample of adolescents in public schools in Uganda. This study was instituted to examine ecological phenomena after a considerable number of Ugandan-based reports (e.g., Abbo et al., 2016; John-Langba, 2006) underscored alcohol consumption as a factor in psychosocial challenges among adolescents in schools.

The present paper considers a sample from four geographical regions, namely: Northern, Western, Central, and Eastern Uganda. Notably, Uganda is an amalgam of multi-tribal and multi-cultural societies. The present study premises on an understanding that each of the regions is a unique locality, with atypical socio-cultural settings. With that in mind, students in their respective regions show diversity in alcohol consumption in relation to demographic attributes. Diversity in students' backgrounds and school dynamics is the primary basis for our anticipation of the association between select socio-demographic correlates and alcohol consumption.

The secondary school system in Uganda consists of three distinct categories. In the first category are schools founded by religious entities and aided by either the founding bodies or the Government on behalf of those entities. In the second category are schools founded and run by individual private investors. The third category, the schools regarded in the study as "public secondary schools," was purposely considered and drawn from Uganda's capital city, Kampala, and ten other major towns. The schools considered by the present study were owned and managed by the government. This category of schools was considered based on a number of their unique characteristics. For instance, the schools were historically established to provide affordable education to urban poor children. As such, they were located on the periphery of major towns across Uganda. Further, students in these schools were mainly non-residents. That implies that students in those schools constantly and freely interact with the rest of society, where alcoholic beverages are mainly found. Most of the students involved in this study were adolescents, with an age range of 13 to 20. All students above the age of 20 were hence regarded as emerging adults. Although the mention of emerging adults for a study in schools sounds odd, clarification needs to be made that the status of most public schools in Uganda considers a universalized education system. The school system allows students beyond school age, mainly from poor families, to access free education. Therefore, finding students well above the age of 20 in Ugandan schools is not surprising.

2.2. Design

This was a cross-sectional study. A cross-sectional design enabled the collection of a large dataset at a single moment in time. Further, with this design, we were able to consider many attributes of students at once. Quantitative techniques were used for data collection and analysis. Quantitative techniques were used to generate objective and more generalizable results. The technique of using quantitative tools and randomized processes removed bias from the dataset of the study and ensured reliable observations. Further, a quantitative approach enabled the statistical generalization of our findings to the entire population of students in public schools.

2.3. Measures

Participants completed a self-administered questionnaire. The instrument was administered in classrooms or other convenient places within the schools. The instrument contained items to capture students'

demographics, including region of origin and age as control variables, gender, religious affiliation and religiousness, love for places of entertainment, frequency of use of social media, number of friends, and class/form of study. Gender was classified into the usual categories of males and females. Students were required to select '1' for Male and '2' for Female. Religious affiliation is grouped around the common categories of Roman Catholics ('1'), Anglicans ('2'), Muslims ('3'), Pentecostals ('4'), Seventh Day Adventists ('5'), and Other ('6'). The class of study was labelled 'Senior 2', 'Senior 3', 'Senior 4', 'Senior 5', and 'Senior 6'. Affiliation to a particular religious denomination is often contested as not being a measure of one's faith or "religiousness", probably because children are often inaugurated into religions at an early age without partaking in the decisions. To that end, this study sought to measure students' "religiousness" as a separate variable. Religiousness was tested in three categories: 1 'Very', 2 'Somewhat', and 3 'Not' religious. Love for being in places of entertainment was categorised as 1 'Yes' and 2 'No'. Use of social media was assessed in three categories: 1 'Often', 2 'Occasionally', and 3 'Not'. The number of friends was considered as 1 'Two or more', 2 'Only one', and 3 'None'. Variables like gender, religiousness, class of study, involvement in places of entertainment, and use of social media were considered to be at the micro-level of the ecological model. Other variables, like the number of friends, were considered as being at other levels of the ecological model.

Alcohol consumption was measured using items carefully constructed following guidelines by the United Nations Office on Drugs and Crime [UNODC] (2003) on conducting school surveys on drug abuse. Specifically, students were asked whether they had consumed any of the alcohol-related substances (beers, spirits, and wines) in the previous 12 months. For instance, students were asked: for the previous 12 months, how frequently have you consumed beer (e.g., Bell, Tusker, Nile, Guinness, etc.)? The different types of alcohol were disaggregated in order to account for participants who preferred specific types of drinks to others, as the alcohol industry in Uganda offers a variety of drinks. The initial items regarding alcohol consumption were based on a Likert scale carrying five responses, namely: 1 = never, 2 = rarely, 3 = sometimes, 4 = often, and 5 = very often. Responses to each of the items were transformed into a binary scale: response category 1 was dummied to denote "No" or "never used," and the other categories of 2, 3, 4, and 5 were dummied to denote "Yes" or "ever used." Transformation to dichotomous variables was done to generate a response pattern suitable for the computation of prevalence rates and to compare alcohol consumers and non-consumers – to capture the drinking status of the students. The items were written in simple language to improve interpretability among students from different classes and schools. Names of local brews of alcohol in different regions of Uganda were included in the questionnaire as synonyms for the respective items, based on data provided by the National Care Centre. For instance, local names for spirits were given as *enguli/waragi/kasese*. Names of locally made alcohols were included to improve the validity of the responses generated. During the analyses, alcohol consumption items were further dummied to consider students who consumed one or more types of alcohol – 'polyalcohol consumption'.

2.4. Sample Selection

Part of the sample and sampling technique described in this paper is reported elsewhere (e.g., Rukundo, Ayebare, Kibanja, & Steffens, 2020). Nevertheless, the sampling strategy was thought out and coined after consideration of the distribution of public schools across the geographical space. To that end, the sample was obtained by first clustering schools within their respective regions. Thirteen schools were purposively and then proportionately sampled, three from each of the northern, western, and central regions. Four schools were sampled from the eastern region. Purposive sampling considered only co-educational, urban schools. Proportionate sampling was used to strike a balance between Kampala city, which had many schools (about six), and other towns that had one school each. The sampled schools emerged from Kampala city and the following towns: Entebbe in the central region; Jinja, Mbale, Soroti, and Tororo in the eastern region; Gulu, Moyo, and Arua in the northern region; Fort Portal, Kabale, and Mbarara in the western region. The number of students in all schools was obtained using proportionate sampling. The minimum sample limit was obtained using Leslie's (2002) method of sample size determination, and it was about 380 students. The actual sample, however,

was increased to 1982 to improve the statistical power of the study. However, 1,819 returned the completed questionnaires, making a response rate of 91.8%. Data collection took place mainly in classrooms. However, in some circumstances, other places, e.g., school compounds and laboratories, were used to avoid the distraction of school activities.

2.5. Inclusion and Exclusion Criteria

All students in senior two and above present at the time of data collection were eligible for the study. Students absent from school at the point of data collection were excluded from the study. The study items asked about the experience of alcohol consumption within the previous 12 months of secondary school life. Therefore, senior one students were excluded from the study.

2.6. Data Analysis

Data were managed and analyzed using STATA version 15.0. Missing values for each variable were excluded using list-wise deletion. As a result of excluding missing values, analyses for different relationships were based on varying frequencies or entries (i.e., different N – values). For instance, as a result of excluding missing values, analyses for prevalence and demographic determinants of beer use were based on 1769 entries, and not on the 1819 original responses. Descriptive data were summarized and categorized in terms of frequencies and weighted percentages to correct for sampling errors. The weighting of data was based on students' region of

origin and age as a clustering variable. The prevalence of consumption of the different types of alcohol consumed by students was explored using descriptive statistics. Percentages were used to report the prevalence of consumption of beers, wines, and spirits. The statistical significance of the proportions of alcohol consumers was examined using chi-squares (Bohnert et al., 2010; Conway et al., 2013). Descriptive statistics of the study sample are presented in Tables 1. We chose .05 as the significance level for all statistical tests. Associations of the students' socio-demographics with the consumption of beers, wines, and spirits were explored using bivariable and multivariable logistic regressions. All covariates were entered into the multivariate model, as they were all plausible correlates of alcohol consumption. The models were adjusted for students' age and region of origin.

3. Results

This paper anchors on the socio-ecological model to expound on the prevalence and socio – demographic correlates of alcohol consumption among adolescents in public secondary schools. The frequency distributions of the socio-demographic characteristics of students were examined and presented in Table 1. Bivariable and multivariable logistic regression models testing associations between socio-demographic variables and consumption of beers, wines, spirits, and polyalcohol consumption among students are reported in Tables 2, 3, 4, and 5, respectively.

Characteristics	N	n	%
Class			
S2	1,730	351	20.29
S3		374	21.62
S4		325	18.79
S5		20.64	20.64
S6		18.67	18.67
Gender			
Male	1,778	1,054	59.28
Female		724	40.72
Religion			
Affiliation			
Catholic	1,774	618	34.84
Protestant		681	38.39
Muslim		181	10.20
Pentecostal		247	13.92
SDA		18	1.01
Other		29	1.63
Religiousness			
Very	1,776	976	54.95
Somehow		747	42.06
Not		53	2.98
Love for places of entertainment			
No	1,621	466	28.75
Yes		1,155	71.25
Use of Social Media			
No	1,768	608	34.39
Occasional		607	34.33
Often		553	31.28
Number of friends			
None	1,777	36	2.03
1		86	4.84
≥2		1,655	93.13

Table 1. Socio-demographic characteristics of students in Ugandan public schools

Amongst the Ugandan secondary school students included in this study, the majority were males (59.28%), had 2 or more friends (93.13%), liked visiting places of entertainment (71.25%), and were very religious (54.95%) (Table 1).

Prevalence and Socio-demographic determinants of alcohol use among students in Ugandan public schools

Bivariate analyses were conducted to assess the association between alcohol use and socio-demographic factors. A p-value less than 0.05 was

considered statistically significant. To control for confounding, we employed multivariate logistic regression analysis. We included all the socio-demographic factors in the bivariate analysis since all were plausible affiliates of alcohol use. The results are reported as adjusted odds ratios with their corresponding 95% confidence intervals. Associations were tested using the Pearson chi-squared test and binary logistic regression, with a P < 0.05 considered significant. Table 2 summarizes the prevalence of beer use and non-use.

Determinants	Consumption of Beers (N = 1,769)		UOR (95%CI)	P-value	AOR (95%CI)	P-value
	Yes	No				
	494 (27.93%)	1,275 (72.07%)				
Class						
S1	87(25.22)	258(74.78)	Reference			
S2	103(27.84)	267(72.16)	1.1(0.82-1.59)	0.428	1.0(0.69-1.56)	0.849
S3	81(25.16)	241(74.84)	1.0(0.70-1.41)	0.985	0.9(0.54-1.35)	0.507
S4	113(31.83)	242(68.17)	1.38-0.99-1.92	0.053*	1.1(0.69-1.79)	0.661
S5	95(29.41)	228(70.59)	1.2(0.88-1.74)	0.224	1.0(0.55-1.69)	0.905
Gender						
Male	340(32.50)	706(67.50)	Reference			
Female	152(21.20)	565(78.80)	0.6(0.45-0.69)	<0.001***	0.7(0.51-0.88)	0.004***
Religion						
Affiliation						
Catholic	215(35.30)	294(64.70)	Reference			
Protestant	194(28.66)	483(71.34)	0.7(0.58-0.93)	0.011 **	0.8(0.57-0.100)	0.043*
Muslim	34(18.89)	146(81.11)	0.4(0.28-0.64)	<0.001***	0.4(0.27-0.69)	0.001***
Pentecostal	33(13.41)	213(86.59)	0.3(0.19-0.42)	<0.001***	0.4(0.22-0.56)	<0.001***
SDA	5(27.78)	13(72.22)	0.7(0.25-2.00)	0.512	0.8(0.27-2.44)	0.708
Other	9(31.03)	20(68.97)	0.8(0.36-1.84)	0.638	0.7(0.23-1.85)	0.423
Religiosity						
Very	216(22.31)	752(77.69)	Reference			
Somehow	252(34.05)	488(65.95)	<0.001***	<0.001***	1.6(1.27-2.12)	<0.001***
Not	23(43.40)	30(56.60)	2.7(1.52-4.69)	0.001***	2.5(1.25-4.99)	0.009**
Liking places of entertainment						
No	76(16.45)	386(83.55)	Reference			
Yes	357(31.21)	787(68.79)	2.3(1.75-3.03)	<0.001***	2.0(1.52-2.83)	<0.001***
Media						
No	140(23.33)	460(76.67)	Reference			
Occasion	166(27.48)	438(27.48)	1.2(0.96-1.61)	0.098	1.1(0.79-1.52)	0.580
Often	182(33.15)	367(66.85)	1.6(1.25-2.11)	<0.001***	1.3(0.96-1.88)	0.084
Number of friends						
None	14(38.89)	22(61.11)	Reference			
1	29(33.72)	57(66.28)	0.8(0.36-1.79)	0.586	0.7(0.26-2.12)	0.578
≥2	447(27.26)	1,193(72.74)	0.6(0.29-1.16)	0.126	0.5(0.20-1.21)	0.123

Table 2. Prevalence and socio-demographic determinants of beer use among students in Ugandan public schools

*P<0.05; **P<0.01; ***P<0.001. Reference = 1.0. AOR = Adjusted Odds Ratios. UOR = Unadjusted Odds Ratios.

According to the information in Table 2, the overall prevalence of beer consumption was 27.93%. The independent socio-demographic determinants of beer consumption were gender, religious affiliation, religiousness, and liking places of entertainment. The likelihood of beer consumption was 0.7 times lower among females compared to males (AOR = 0.7, 95%CI: 0.51-0.88, P <.01). Compared to adolescents of Roman

Catholic affiliation, there was a lower likelihood of consumption among students from the Anglican and other denominations (AOR = 0.8, 95%CI: 0.57-0.99, p <.05); Muslims (AOR = 0.4, 95%CI: 0.27-0.69, P = 0.001); Pentecostals (AOR = 0.4, 95%CI: 0.22-0.56, P <.001). Moreover, a lower extent of religiousness (somewhat [AOR = 1.6, 95%CI: 1.27-2.12, P < 0.001] and not religious [AOR = 2.5, 95%CI: 1.25-4.99, P <.01]) was associated with a higher likelihood of beer consumption. Additionally, students who identified as loving places of entertainment were two-fold more involved in beer consumption (AOR = 2.0, 95%CI: 1.52-2.83, P <.001).

Determinants	Wine use (N =1,765)		UOR (95%CI)	P-value	AOR (95%CI)	P-value
	Yes	No				
	663 (37.56%)	1,102 (62.44%)				
Class						
S1	125(35.92)	223(64.08)	1.0		1.0	
S2	135(36.59)	234(63.41)	1.0(0.76-1.39)	0.853	1.0(0.72-1.51)	0.831
S3	120(37.15)	203(62.85)	1.0(0.77-1.44)	0.740	1.2(0.79-1.83)	0.367
S4	145(41.31)	206(58.69)	1.3(0.93-1.70)	0.144	1.5(0.95-2.33)	0.081
S5	125(38.94)	196(61.06)	1.1(0.83-1.56)	0.420	1.5(0.88-2.51)	0.137
Sex						
Male	404(38.70)	640(61.30)	1.0		1.0	
Female	258(36.08)	457(63.92)	0.9(0.73-1.09)	0.267	1.1(0.63-1.07)	0.519
Religion						
Affiliation						
Catholic	271(44.57)	337(55.43)	1.0		1.0	
Protestant	281(41.63)	394(58.37)	0.9(0.71-1.11)	0.288	0.8(0.64-1.07)	0.150
Muslim	34(18.89)	146(81.11)	0.3(0.19-0.43)	0.001***	0.2(0.14-0.37)	0.001***
Pentecostal	53(81.11)	193(78.46)	0.3(0.24-0.48)	0.001***	0.3(0.23-0.52)	0.001***
SDA	8(44.44)	10(55.56)	0.9(0.39-2.56)	0.991	1.1(0.42-3.07)	0.798
Other	11(39.29)	17(60.71)	0.8(0.37-1.75)	0.583	0.5(0.19-1.46)	0.224
Religiosity						
Very	310(32.19)	653(67.81)	1.0		1.0	
Somehow	322(43.45)	419(56.55)	1.6(1.3-1.9)	0.001***	1.4(1.10-1.77)	0.006**
Not	26(49.06)	27(50.94)	2.0(1.16-3.53)	0.013	2.8(1.46-5.58)	0.002**
Liking places of entertainment						
No	117(25.38)	344(74.62)	1.0		1.0	
Yes	477(41.77)	665(58.23)	2.1(1.66-2.68)	0.001***	1.9(1.41-2.43)	0.001***
Media						
No	184(30.67)	416(69.33)	1.0		1.0	
Occasion	226(37.60)	375(62.40)	1.4(1.07-1.73)	0.011	1.2(0.89-1.62)	0.220
Often	244(44.53)	304(55.47)	1.8(1.42-2.31)	0.001***	1.6(1.16-2.15)	0.004**
Number of friends						
None	13(36.11)	23(63.89)	1.0		1.0	
1	30(35.71)	54(64.29)	0.9(0.44-2.21)	0.967	1.0(0.37-3.12)	0.883
≥2	616(37.61)	1,022(62.39)	1.1(0.54-2.12)	0.855	0.9(0.39-2.45)	0.963

Table 3. Prevalence and socio-demographic determinants of wine use among students in Ugandan public schools

*P<0.05; **P<0.01; ***P<0.001

Regarding the consumption of wines, it was established that the overall prevalence of wine consumption was 37.56%. The independent socio-demographic determinants of wine consumption were religious affiliation, loving places of entertainment, and use of social media. Students of Roman Catholic religious affiliation had a higher likelihood of wine consumption compared to Muslims (AOR = 0.2, 95%CI: 0.14-0.37, P = 0.001) and

Pentecostals (AOR = 0.3, 95%CI: 0.23-0.52, P < 0.001). In addition, a lower extent of religiosity was associated with a higher likelihood of wine consumption (somewhat [AOR = 1.4, 95%CI: 1.10-1.77, P < .01]; not religious [AOR = 2.8, 95%CI: 1.46-5.58, P < .01]). Additionally, students who loved being in places of entertainment were two-fold more involved in wine consumption (AOR = 1.9, 95%CI: 1.52-2.83, P = 0.001). However, students who often used social media were 1.6 times more likely to be involved in wine consumption compared to those who did not (AOR = 1.6, 95%CI: 1.16-2.15, P < .01).

Determinants	spirits use		UOR (95%CI)	P-value	AOR (95%CI)	P-value
	Yes	No				
	318 (18.08%)	1,441 (81.92%)				
Class						
S1	53(15.45)	290(84.55)	1.0		1.0	
S2	55(14.95)	313(85.05)	0.9(0.64-1.45)	0.851	0.9(0.56-1.56)	0.809
S3	56(17.34)	267(82.66)	1.1(0.76-1.73)	0.511	1.2(0.68-2.04)	0.552
S4	72(20.57)	278(79.43)	1.4(0.96-2.09)	0.081	1.3(0.70-2.23)	0.440
S5	69(21.50)	252(78.50)	1.5(1.00-2.23)	0.045*	1.3(0.66-2.49)	0.463
Gender						
Male	221(21.25)	819(78.75)	1.0		1.0	
Female	96(13.46)	617(86.54)	0.6(0.44-0.75)	<0.001***	0.7(0.52-0.99)	0.048*
Religion						
Affiliation						
Catholic	140(23.06)	467(76.94)	1.0		1.0	
Protestant	120(17.88)	551(82.12)	0.7(0.55-0.95)	0.022*	0.7(0.50-0.97)	0.033*
Muslim	23(12.78)	157(87.22)	0.5(0.30-0.79)	0.003**	0.5(0.28-0.87)	0.014*
Pentecostal	22(8.98)	223(91.02)	0.3(0.20-0.53)	<0.001***	0.4(0.22-0.69)	0.001**
SDA	4(22.22)	14(77.78)	0.9(0.31-2.94)	0.933	1.2(0.36-3.98)	0.764
Other	6(21.43)	22(78.57)	0.9(0.36-2.28)	0.841	0.8(0.27-2.64)	0.778
Religiosity						
Very	125(12.99)	837(87.01)	1.0		1.0	
Somehow	171(23.23)	565(76.77)	2.0(1.57-2.61)	<0.001***	1.8(1.34-2.49)	<0.001***
Not	19(35.85)	34(64.15)	3.7(2.07-6.76)	<0.001***	4.0(1.97-8.49)	<0.001***
Liking places of entertainment						
No	42(9.19)	415(90.81)	1.0		1.0	
Yes	234(20.54)	905(79.46)	2.6(1.80-3.62)	<0.001***	2.2(1.50-3.30)	<0.001***
Media						
No	78(13.09)	518(86.91)	1.0		1.0	
Occasion						
Often	105(17.50)	495(82.50)	1.4(1.03-1.93)	0.035*	1.0(0.68-1.53)	0.920
Often	128(23.40)	419(76.60)	2.0(1.49-2.76)	<0.001***	1.6(1.09-2.40)	0.018*
Number of friends						
None	9(25.00)	27(75.00)	1.0		1.0	
1	22(26.51)	61(73.49)	1.1(0.44-2.66)	0.864	1.8(0.48-6.63)	0.382
≥2	284(17.39)	1,349(82.61)	0.6(0.29-1.36)	0.239	0.9(0.28-2.98)	0.899

Table 4. Prevalence and socio-demographic determinants of spirits use among students in Ugandan public schools

*P<0.05; **P<0.01; ***P<0.001

The prevalence of consumption of spirits was 18.08%. The socio-demographic correlates of consumption of spirits were gender, religious affiliation, religiosity, love of being in places of entertainment, and use of social media. The likelihood of consumption of spirits was 0.7 times lower among females compared to males (AOR = 0.7, 95% CI: 0.52-0.99, P < .05). Compared to students from the Roman Catholic affiliation, there was a lower likelihood of consumption of spirits among students affiliated with other denominations (Anglican, AOR = 0.7, 95% CI: 0.50-0.97, P < .05;

Muslims, AOR = 0.5, 95% CI: 0.28-0.87, P < .05; Pentecostal, AOR = 0.4, 95% CI: 0.22-0.69, P = 0.001). Moreover, a lower extent of religiousness was associated with a higher likelihood of consumption of spirits (Somewhat Religious, AOR = 1.8, 95% CI: 1.34-2.49, P < 0.001; Not Religious, AOR = 4.0, 95% CI: 1.97-8.49, P < 0.001). Additionally, students who liked being in places of entertainment were more than two-fold more involved in the consumption of spirits (AOR = 2.2, 95% CI: 1.50-3.30, P < 0.001). Regarding the use of social media, students who often used media were 1.6 times more likely to be involved in the consumption of spirits compared to those who did not (AOR = 1.6, 95% CI: 1.09-2.40, P < .05).

Determinants	Polyalcohol use		UOR (95%CI)	P-value	AOR (95%CI)	P-value
	≥2	1				
	1,291(85.38)	221(14.62)				
Class						
S2	264(86.84)	40(13.16)	1.0		1.0	
S3	277(85.49)	47(14.51)	0.9(0.57-1.40)	0.625	1.1(0.65-1.91)	0.683
S4	240(85.71)	40(14.29)	0.9(0.57-1.46)	0.692	1.1(0.59-1.98)	0.785
S5	244(81.61)	55(18.39)	0.7(0.43-1.05)	0.079	0.8(0.45-1.57)	0.584
S6	226(86.26)	36(13.74)	0.9(0.59-1.54)	0.839	1.1(0.52-2.30)	0.813
Sex						
Male	722(83.37)	144(16.63)	1.0		1.0	
Female	564(87.99)	77(12.01)	1.5(1.08-1.97)	0.013*	1.0(0.87-1.13)	0.916
Religion						
Affiliation						
Catholic	397(78.46)	109(21.54)	1.0		1.0	
Protestant	491(85.69)	82(14.31)	1.6(1.19- 2.25)	0.002**	1.5(1.08-2.19)	0.016*
Muslim	148(91.36)	14(8.64)	2.9(1.61- 5.22)	<0.001***	2.9(1.51-5.57)	0.001**
Others	249(94.32)	15(5.68)	4.6(2.59- 7.99)	<0.001***	5.9(2.92-11.88)	<0.001***
Religiosity						
Very	764(88.63)	98(11.37)	1.0		1.0	
Somewhat	492(81.05)	115(18.95)	0.5(0.40-0.74)	<0.001***	0.7(0.47-0.91)	0.013*
Not	30(78.95)	8(21.05)	0.5(0.21-1.08)	0.076	0.5(0.16-1.30)	0.145
Liking places of entertainment						
No	385(89.74)	44(10.26)	1.0		1.0	
Yes	799(83.66)	156(16.34)	0.6(0.41-0.83)	0.003	0.8(0.52-1.13)	0.173
Media						
No	475(88.79)	60(11.21)	1.0		1.0	
Occasion	444(85.06)	78(14.94)	0.7(0.50-1.03)	0.073	0.7(0.42-1.02)	0.060
Often	363(81.57)	82(18.43)	0.6(0.39-0.80)	0.002**	0.6(0.38-0.94)	0.025*
Number of friends						
0	24(85.71)	4(14.29)	1.0		1.0	
1	58(89.23)	7(10.77)	1.4(0.37-5.16)	0.631	1.0(0.23-4.61)	0.981
≥2	1,206(85.23)	209(14.77)	1.0(0.33-2.80)	0.943	1.1(0.31-4.09)	0.853

Table 5. Prevalence and socio-demographic determinants of polyalcohol use among students in Ugandan public schools

*P<0.05; **P<0.01; ***P<0.001

After excluding the non-consumers, it was found that students who consumed more than two types of alcohol were 85.38%. The socio-demographic correlates of polyalcohol type consumption were religious affiliation, religiousness, and use of social media. Compared to students from the Roman Catholic affiliation, there was a higher likelihood of polyalcohol type consumption among other religions (Anglican, AOR = 1.5, 95% CI: 1.08-2.19, P <.05; Muslims, AOR = 2.9, 95% CI: 1.51-5.57, P = 0.001; Others, AOR = 5.9, 95% CI: 2.92-11.88, p < 0.001). Moreover, a lower religiousness was associated with a lower likelihood of polyalcohol type consumption (Somewhat, AOR = 0.7, 95% CI: 0.47-0.91, P <.05; Not religious, AOR = 0.5, 95% CI: 0.16-1.30). Additionally, students who often used social media were less likely to be involved in polyalcohol type consumption (AOR = 0.6, 95% CI: 0.38-0.94, P <.05).

4. Discussion

The aim of this paper is to use the socio-ecological model to expound on the findings of the prevalence and socio-demographic correlates of alcohol consumption among school adolescents. Percentages and logistic regressions were used in achieving the study objective. Our study revealed that consumption of wines and beers was higher compared to the use of spirits. The study further revealed that at the multivariate level, some socio-ecological factors could account for differential alcohol consumption among the students. Further, individual student-level factors such as gender and the institutional factor of religion could explain alcohol consumption among the students. Specifically, gender and religion were significantly associated with alcohol consumption. The results further indicate that loving to be in places of entertainment and using social media significantly predicted alcohol consumption, and loving places of entertainment was significant for the three types of alcohol consumed among students. The results regarding socio-demographic correlates of alcohol consumption were significant at both the individual and institutional ecological levels.

The findings regarding prevalence of consumption of the different types of alcohol may not be surprising, as the students considered in this study were largely in urban and day schools. Possibly, such settings constitute an alcohol-rich ecosystem that aligns with the students' desires and opportunities to drink. The prevalence is ecologically manifested in previous studies that proved alcohol is readily available to Ugandan youth. Apparently, alcohol is abundant within students' ecological environment, both in local and industrially made brews (Kafuko & Bukuluki, 2008; Kalema et al., 2015). Following the abundance of different types of alcohol, the WHO GSHS survey among students in Uganda approximates that 12.8% of the students had at least one alcoholic drink on one or more days during the past 30 days (YEAH, 2007). Thus, the rate was expected to be a little higher in a study conducted a decade later.

Possibly, the result that consumption of alcoholic beverages was high could imply that micro-system contexts of alcohol availability may have supported students' interface with alcohol and enabled high prevalence of drinking among students. For that, students get access to high-density alcohol outlets in their local contexts, which outlets might sell both regulated and unregulated beverages. Production of locally made alcohol in Uganda is practically not regulated, as many youths turn to alcohol consumption within their respective niches in the ecosystem. It has previously been reported that many homesteads ferment and distil local brands from the abundant fruits (YEAH, 2007). In addition to alcohol availability, the individual socio-ecological attributes, such as differentials in age and other individual-based characteristics, could explain interface with alcohol and the relatively high rates of drinking among students.

Religion is one of the micro-system level factors predicting differentials in alcohol consumption among the youth. Indeed, our study found significant results in the religious affiliations of students. In this study, the variations in religious affiliation and students' alcohol consumption come after a fair body of literature relating religion and alcohol consumption among the youth. For instance, previous studies show that religious inclination and particular faiths tend to influence youths' decisions to consume or not consume alcohol (Al-Ansari, Day, Thow, & Conigrave, 2016; Sinha et al., 2007). Accordingly, studies show that attendance at church during childhood was protective against the early onset of alcohol consumption. Church attendance further protects the youths against the later development of alcohol-related problems (Mason & Windle, 2015; Porche, Fortuna, Wachholtz, & Stone, 2015). Consequently, youths who self-identified as having a strong commitment to particular faiths were evidently less likely to consume alcohol (Marsiglia, Ayers, & Hoffman, 2012).

Alternatively, students could be accessing alcohol through cultural rituals and ceremonies. Consumption of church wine, for example, is well ritualized among the Christian faithful, and often, alcohol is integrated into religious ceremonies (Luczak et al., 2014). Notably, the findings could be located in the socio-ecological theory of alcohol use. According to the theory, individual students' behaviours interact with the institutions to which the adolescents belong (Connell et al., Hickey et al., 2012; Tholen et al., 2020). Churches and their ritualized ceremonies may not be the exception.

All the same, the present study's findings on the prevalence of alcohol consumption are supported by similar studies elsewhere. Accordingly, alcohol is the most consumed substance among adolescents in developing countries (Newton, Harvard, & Teesson, 2011; Sanhueza, Delva, Bares, & Grogan-Kaylor, 2013), and in highly developed countries (Anderson, Ramo, Cummins, & Brown, 2009; Fuhr et al., 2013). In the neighbourhood of Uganda – Kenya, Othieno & Ofula (2009) support the present study's results – reporting that alcohol consumption among students was most prevalent. Similar studies predict that alcohol consumption among adolescents is higher than the consumption of other drugs (Beck et al., 2012; Fuhr et al., 2013).

In further terms of the social ecological model of alcohol consumption, religion, as an institution and part of the mesosystem, predicts or protects students against alcohol consumption. It explains the interaction between the innermost aspects of a student and the factors in the surroundings related to alcohol consumption. On the other hand, religiousness is reflected in the "inner self" of the students and represents core values that protect against or promote alcohol consumption. Institutional ecological factors are compared with Vantamay (2009). The study found that students

in Muslim and Pentecostal dominions were less likely to consume beers, wines, and spirits than their Catholic and Anglican counterparts. Roman Catholics, in particular, had higher odds of alcohol consumption than any other religion. The result that Roman Catholics were more likely to consume alcohol than other religions conforms to common practices and previous literature.

Practically, some religions, such as Pentecostals, unequivocally loathe the consumption of alcohol among their faithful. To the end of the Islamic faith, the consumption of alcohol is strictly taboo. Islam is generally considered to have strong proscriptive norms against the consumption of all types of alcohol (Sinha et al., 2014). The Roman Catholic Church, on the other hand, neither condemns nor discourages alcohol consumption among the faithful (Sinha et al., 2014). That could be the reason why, compared to other religions, more students who identified with the dominion were more likely to consume alcohol than students from other religions. Indeed, evidence shows that youth who prescribe to the Roman Catholic dominion are at a greater risk of falling victim to alcohol abuse and associated problems (Engs, 2004).

On the other hand, belonging to the Muslim dominion is protective against alcohol consumption (Al-Ansari et al., 2016; Hahn et al., 2014; Kalema, Vanderplassen, Vindevoel, & Derluyn, 2016). Furthermore, Stafström and Agardh (2012), in their study to assess socio-economic determinants of alcohol consumption among Ugandan university students, found that being a Muslim was negatively associated with alcohol consumption. However, Stafström and Agardh (2012) made a rare observation that male Muslims were at a significant risk of engaging in monthly heavy episodic drinking, an observation the present study was unable to adduce.

Gender differentials constitute part of the meso – system level of the ecological model. In this study, adjusted logistic regression models revealed significant gender differences in the consumption of beers and spirits, but not in the consumption of wines. In addition, males had higher odds of consuming beers and spirits. The gender differences in alcohol consumption have been reported previously and align well with the socio – ecological model's mesosystem framework, indicating a patriarchal construct. For that, Rodham et al. (2005) found that more males than females reported drinking. Hahn et al. (2014) also found significant gender differences in current hazardous and non-hazardous drinking.

Particularly with gender differences, relevant literature indicates that male students were more likely than females to report drinking, although only by a relatively small margin (O'Malley et al., 1998). Kabwama et al. (2016) found that, in comparison with their female counterparts, males were more likely to be medium and high alcohol consumers. The findings regarding gender could be explained based on socio – ecological theory. At the nucleus of the socio-ecological model, students' micro-characteristics, including gender, define differences between males and females and between individuals of a particular gender as well. Moreover, the model seems to account for the way the microsystem nurtures different genders, hence the difference in the consumption of alcoholic beverages. However, the present study's findings contradict those of Wu et al. (2014) in their study to establish correlates of protective motivation theory to adolescents' drug use intention.

Nevertheless, the present study's results affirm previous studies in revealing that being male was a risk factor for alcohol consumption (Lorant et al., 2013; Osman et al., 2016; Swahn et al., 2013). The female gender, on the other hand, was protective against alcohol consumption (Hahn et al., 2014; Lorant et al., 2013; Manyike et al., 2016; Osman et al., 2016; Swahn et al., 2013). Relatedly, Manyike et al. (2016) found that male students were about six times more likely to use psychoactive substances than females. In fact, Manyike and colleagues pointed out that the male gender and living in hostels were associated with alcohol consumption. The present study, however, significantly differs from the preceding report, as we did not consider living in a hostel as a risk or protective factor. The differentials in gender could be attributable to the first level of the ecological model. For instance, differential parenting, interpersonal, and institutional norms might nurture drinking more in males than in females.

Hangout places are aligned with the mesosystem level of the ecological model. For this study, loving to be in places of entertainment and using social media significantly predicted alcohol consumption. In fact, loving places of entertainment was significant for the three types of alcohol consumed. In terms of the socio-ecological model, the two correlates

explained alcohol consumption at the level of interaction between the students, the mesosystemic, and the exosystemic environment. Indeed, activity in places of entertainment could be accompanied by alcohol consumption and other social behaviours. Therefore, it is likely that those adolescents who love such places could be drinkers as well. Moreover, students who go to places of entertainment have high chances of meeting their peers who influence them towards drinking. In addition, it could be possible that students who use social media interface with alcohol-related messages that stimulate students' drinking, as several studies (e.g., Moreno & Whitehill, 2014; Winpenny, Marteau, & Nolte, 2014) have suggested. Generally, the socio-ecological model explicates the significant study results in terms of the variables in the immediate and extant student environment.

Definitely, factors at the different levels of the model could interact to predict the rate and differentials in alcohol consumption among students. As individuals, students' motives to drink may influence the rate of drinking, yet such motives may be exacerbated by the microsystem and mesosystemic factors, such as availability of alcohol outlets in families and in the neighborhoods. The chain of rates of alcohol consumption is possibly influenced by the exo-system and macro-system, the levels that account for exposure to alcohol in the media and drinking cultures in society, respectively.

4.1. Limitations and Recommendations

Like many other surveys, the present study does not go without setbacks. In the first instance, the study relies on self-reported experiences from students. As Hahn et al. (2014) asserted, self-reported results could have suffered from under-reporting. The possibility of under-reporting becomes prominent in the investigation of a controversial subject like alcohol consumption. Second, a cross-sectional study of this type falls short of causal comparison of correlates of alcohol consumption. Causal inferences would have been best to inform policy in adolescent health and social well-being.

For the present study, some of the dynamics of the socio-ecological model, such as familial influence, were not given attention due to the nature of the dataset. Hitherto, the influence of family dynamics, such as family type, family structure, psychosocial family environment, parental education, family neighborhood, and family socio-economic status, could be predictive of alcohol consumption among young people.

Further, in using the socio-ecological model for this study, the influence of peers and groups was studied in part. The frequency of meetings with friends, for example, and consumption of alcohol by peers could have been significantly associated. We recommend that future studies explore such factors in sufficient detail, as well as using more detailed measures of alcohol consumption among students in public schools, such as quantities consumed, types of alcohol, frequency of alcohol misuse, and availability of alcohol in the neighbourhood.

4.2. Conclusions

The social ecological theory could account for the correlates of alcohol consumption among students. Individual student-level factors and institutional factors expound on alcohol consumption among the students. Specifically, gender, religion, religiousness, loving to be in places of entertainment, and use of social media significantly predicted alcohol consumption among students. Gender-specific and religious-related interventions could mitigate alcohol consumption among students.

4.3. Implications for Policy

Significant study findings on the consumption of different types of alcohol bear educational and adolescent mental health implications. The results may demand benchmarking ecologically specific advocacy against alcohol consumption in schools. In comparison with the socio-ecological model, the study results imply that the alcohol industry could include not only the producers of alcohol but also a large network of distributors, wholesalers, bars, and advertisers (Babor & Robaina, 2013). Therefore, interventions for in-school youth drinking may need to be developed by benchmarking with and involving institutions at different levels of the ecological model, such as religious institutions, healthcare services, media, and village councils. Moreover, "gendered models" could be explored to have some gender-specific messages that bring out the negative consequences of youth

drinking. Further, the gender-specific messages could focus on the differential effects of drinking among girls and boys.

5. Declarations

5.1. Ethical Approval and Consent to Participate

Permission to conduct the present study was duly obtained from the then Mbarara University of Science and Technology Institutional Review Committee (now Research Ethics Committee, REC), approval number 05/05-13. The Uganda National Council ratified institutional approval for Science and Technology under number SS 3423, and the office of the President of the Republic of Uganda (number ADM 154/212/01). At data collection, students' consent was obtained using the approved Institutional Review Committee consent form version number 13. For students under the age of 18, their respective school head teachers provided consent on behalf of their parents.

5.2. Competing Interests

We declare no competing interests regarding the authorship of this research or the content reported herein.

5.3. Funding

The German Academic Exchange Service (DAAD) provided the funds used to initiate and complete this study. However, the data or views and opinions expressed herein are those of the field correspondents and authors. They do not in any way represent the views of the funding agency, DAAD.

Statements and Declarations

Authors' Contributions

AR conceived the study idea, collected and analysed the data, and wrote the manuscript for publication. GK guided the writing of the concept, data collection, and analysis. She participated in the writing of the manuscript. AM participated in writing the discussion of results and reviewed the final manuscript.

References

- Abbo, C., Okello, E. S., Muhwezi, W., Akello, G., Ovuga, E., & Makinodan, M. (2016). Alcohol, substance use and psychosocial competence of adolescents in selected secondary schools in Uganda: A cross sectional survey. *International Neuropsychiatric Disease Journal*, 7(2), 1-20. <https://doi.org/10.9734/IJNDJ/2016/25387>
- Ahlström, S. K., & Österberg, E. L. (2004). International perspectives on adolescent and young adult drinking. In *Global Status Report: Alcohol Policy*. Geneva: World Health Organization.
- Agwu, P., Okoye, U., Ebingbo, S., Agbawodikeizu, U., & Ijeoma, I. (2018). Adopting an ecological health model to harmful alcohol use in Nigeria's Niger State. *European Journal of Mental Health*, 13, 211-222. <https://doi.org/10.5708/EJMH.13.2018.2.6>
- Al-Ansari, B., Day, C. A., Thow, A., & Conigrave, K. M. (2016). Civil alcohol policy in Muslim majority countries: Need for global tools, expert support, and local partnerships. *Addiction*, 111, 1718-1719. <https://doi.org/10.1111/add.13159>
- Anderson, K. G., Ramo, D. E., Cummins, K. M., & Brown, S. A. (2009). Alcohol and drug involvement after adolescent treatment and functioning during emerging adulthood. *Drug and Alcohol Dependence*, 107, 171-181. <https://doi.org/10.1016/j.drugdep.2009.10.005>
- Atilola, O., Stevanovic, D., Balhara, Y. P. S., Avicenna, M., Kandemir, H., Knez, R., Petrov, P., ... & Vostanis, P. (2014). Role of personal and family factors in alcohol and substance use among adolescents: An international study with focus on developing countries. *Journal of Psychiatric and Mental Health Nursing*. Advance online publication. <https://doi.org/10.1111/jpm.12133>
- Austin, G., & Skager, R. (2011). *Results of the 13th Biennial California Student Survey, 2009-2010: Highlights: Drug, Alcohol, and Tobacco Use Among California Secondary Students*. San Francisco: WestEd.
- Austin, G., Skager, R., Bailey, J., & Bates, S. (2007). *Results of the 10th Biennial Student Survey, 2003-2004: Heavy Alcohol and Drug Use among*

High School Students. Sacramento: Office of the Attorney General.

- Babor, T. F., & Robaina, K. (2013). Public health, academic medicine, and the alcohol industry's corporate social responsibility activities. *American Journal of Public Health, 103*, 206–214. <https://doi.org/10.2105/AJPH.2012.300847>
- Beck, K. H., Caldeira, K. M., Vincent, K. B., & Arria, A. M. (2012). Social contexts of drinking and subsequent alcohol use disorder among college students. *The American Journal of Drug and Alcohol Abuse, 39*(1), 38–43. <https://doi.org/10.3109/00952990.2012.694519>
- Biddle, C., & Schafft, K. A. (2015). Axiology and anomaly in the practice of mixed methods work: Pragmatism, valuation, and the transformative paradigm. *Journal of Mixed Methods Research, 9*, 320–334. <https://doi.org/10.1177/1558689814533157>
- Bliss, D. L. (2007). Empirical research on spirituality and alcoholism: A review of the literature. *Journal of Social Work Practice in the Addictions, 7*(4), 5–20. https://doi.org/10.1300/J160v07n04_02
- Bogg, T., & Finn, P. R. (2009). An ecologically based model of alcohol-consumption decision making: Evidence for the discriminative and predictive role of contextual reward and punishment information. *Journal of Studies on Alcohol and Drugs, 70*(4), 446–457.
- Bohnert, A. S. B., Perron, B. E., Jarman, C. N., Vaughn, M. G., Chatters, L. M., & Taylor, R. J. (2010). Use of clergy services among individuals seeking treatment for alcohol use problems. *The American Journal on Addictions, 19*(4), 345–351. <https://doi.org/10.1111/j.1521-0391.2010.00050.x>
- Cheloti, S. K., & Gathumbi, A. M. (2016). Curbing drug and substance abuse in secondary schools in Kenya; The disconnect in school community intervention strategies. *Elixir Education Technology, 95*, 40881–40888.
- Cho, Y., Johnson, T., & Graf, J. (2000). *Alcohol, tobacco, and other drug use among youth entering juvenile correctional facilities in Illinois: Prevalence and treatment need*. Illinois Department of Human Services, Office of Alcoholism and Substance Abuse.
- Connell, C. M., Gilreath, T. D., Aklon, W. M., & Brex, R. A. (2014). Social-ecological influences on patterns of substance use among non-metropolitan high school students. *American Journal of Community Psychology, 53*(1-2), 36–48. <https://doi.org/10.1007/s10464-009-9289-x>
- Conway, K. P., Vullo, G. C., Nichter, B., Wang, J., Compton, W. M., Iannotti, R. J., & Simons-Morton, B. (2013). Prevalence and patterns of poly-substance use in a nationally representative sample of 10th graders in the United States. *Journal of Adolescent Health, 52*(6), 716–723. <https://doi.org/10.1016/j.jadohealth.2012.12.006>
- Crooke, A. H. D., Reid, S. C., Kauer, D. P. M., Hearps, S. J. C., Khor, A. S., & Forbes, A. B. (2013). Temporal mood changes associated with different levels of adolescent drinking: Using mobile phones and experience sampling methods to explore motivations for adolescent alcohol use. *Drug and Alcohol Review, 32*(3), 262–268. <https://doi.org/10.1111/dar.12034>
- Donovan, J. E. (2004). Adolescent alcohol initiation: A review of psychosocial risk factors. *Journal of Adolescent Health, 35*(6), 529.e7–529.e18. <https://doi.org/10.1016/j.jadohealth.2004.02.003>
- Egbuonu, A. C. C., Onyinye, N. C., Egbuonu, N. C. O., & Effiong, S. S. (2015). The prevalence of some psychoactive substances use among secondary school adolescents in Bosso Local Government Area, Nigeria. *Journal of Environmental Toxicology and Public Health, 1*(1), 6–10.
- Engs, R. C. (2004). *Protestants and Catholics: Drunken barbarians and mellow Romans*. University of Indiana.
- Fuhr, D. C., Fleischmann, A., Riley, L., Kann, L., & Poznyak, V. (2013). Alcohol and other psychoactive substances in Africa and the Americas: Results from the WHO Global School-based Student Health Survey. *Journal of Substance Use, 19*(1-2), 55–64. <https://doi.org/10.3109/14659891.2013.824038>
- Gruenewald, P. J., Remer, L. G., & LaScala, E. A. (2014). Testing a social ecological model of alcohol use: The California 50 city study. *Addiction, 109*(5), 736–745. <https://doi.org/10.1111/add.12438>
- Hahn, J. A., Fatch, R., Wanyenze, R. K., Baveewo, S., Kamya, M. R., Bangsberg, D., & Coates, T. J. (2014). Decreases in self-reported alcohol consumption following HIV counseling and testing at Mulago Hospital, Kampala, Uganda. *BMC Infectious Diseases, 14*, 403. <https://doi.org/10.1186/1471-2334-14-403>
- Handren, L. M., Donaldson, C. D., & Crano, W. D. (2016). Adolescent alcohol use: Protective and predictive parent, peer, and self-regulated factors. *Prevention Science, 17*(6), 720–729. <https://doi.org/10.1007/s1121-016-0695-7>
- Hickey, N., Harrison, L., & Sumsion, J. (2012). Using a socioecological framework to understand the career choices of single- and double-degree nursing students and double-degree graduates. *ISRN Nursing, 2012*, Article 748238. <https://doi.org/10.5402/2012/748238>
- Jiloha, R. C. (2009). Social and cultural aspects of drug abuse in adolescents. *Delhi Psychiatry Journal, 12*(2), 167–175.
- Johnson, R. B., & Onwuegbuzie, A. J. (2007). Toward a definition of mixed methods research. *Journal of Mixed Methods Research, 1*(2), 112–133. <https://doi.org/10.1177/1558689806298224>
- John-Langba, J., Ezeh, A., Guiella, G., Kumi-Kyereme, A., & Neema, S. (2006). Alcohol, drug use, and sexual-risk behaviours among adolescents in four Sub-Saharan African countries. In *Proceedings of the Population Association of America 2006 Annual Meeting Program* (Los Angeles, California, March 30 to April 1, 2006). Retrieved from <http://paa2006.princeton.edu/papers/61153>
- Kabwama, S. N., Ndyabangi, S., Mutungi, G., Wesonga, R., Bahendeka, S. K., & Guwatudde, D. (2016). Alcohol use among adults in Uganda: Findings from the countrywide non-communicable diseases risk factor cross-sectional survey. *Global Health Action, 9*, 31302. <https://doi.org/10.3402/gha.v9.31302>
- Kafuko, A., & Bukuluki, P. (2008). *Qualitative research in Uganda on knowledge, attitudes, and practices concerning alcohol*. A report prepared for USAID.
- Kalema, D., & Vanderplasschen, W. (2015). Features and challenges of alcohol abuse treatment in Uganda. *African Journal of Drug & Alcohol Studies, 14*(2), 125–135.
- Kalema, D., Vanderplasschen, W., Vindevogel, S., & Derluyn, I. (2016). The role of religion in alcohol consumption and demand reduction in Muslim majority countries. *Addiction, 111*(10), 1714–1719. <https://onlinelibrary.wiley.com/doi/10.1111/add.13333/epdf>
- Kalema, D., Vindevogel, S., Baguma, P. K., Derluyn, I., & Vanderplasschen, W. (2015). Alcohol misuse, policy and treatment responses in Sub-Saharan Africa: The case of Uganda. *Drugs: Education, Prevention and Policy, 22*(6), 470–476. <https://doi.org/10.3109/09687637.2015.1006180>
- Lakew, A., Tariku, B., Deyessa, N., & Reta, Y. (2014). Prevalence of *Catha edulis* (khat) chewing and its associated factors among Ataye secondary school students in Northern Shoa, Ethiopia. *Advances in Applied Sociology, 4*(10), 225–233. <https://doi.org/10.4236/aasoci.2014.410027>
- Lea, T., Reynolds, R., & De Wit, J. (2013). Alcohol and other drug use, club drug dependence, and treatment-seeking among lesbian, gay, and bisexual young people in Sydney. *Drug and Alcohol Review, 32*(3), 303–311. <https://doi.org/10.1111/dar.12016>
- Leung, S. F., Arthur, D., & Martin, G. (2013). Substance use and treatment seeking among lesbian, gay, and bisexual young people in Sydney. *Drug and Alcohol Review, 32*, 303–311. <https://doi.org/10.1111/dar.12004>
- Leslie, J. C. (2002). *Essential behavior analysis*. New York: Oxford University Press.
- Lin, E., Wang, J., Klecka, C. L., Odell, S. J., & Spalding, E. (2010). Judging research in teacher education. *Journal of Teacher Education, 61*, 295–301. <https://doi.org/10.1177/0022487110374013>
- Lorant, V., Nicaise, P., Soto, V. E., & d'Hoore, W. (2013). Alcohol drinking among college students: college responsibility for personal troubles. *BMC Public Health, 13*, 615. <https://www.biomedcentral.com/1471-2458/13/615>
- Luczak, S. E., Prescott, C. A., Dalais, C., Raine, A., Venables, P. H., & Mednick, S. A. (2014). Religious factors associated with alcohol involvement: results from the Mauritian joint child health project. *Drug and Alcohol Dependence, 135*, 37–44. <https://doi.org/10.1016/j.drugalcdep.2013.10.028>
- Manu, E., Maluleke, X. T., & Mbuyiselo, D. (2016). Knowledge of high school learners regarding substance use within high school premises in the Buffalo Flats of East London, East Cape Province, South Africa. *Journal of Child and Adolescent Substance Abuse, 25*(5), 1–10. <https://doi.org/10.1080/1067828X.2016.1175984>
- Manyike, P. C., Chinawa, A. T., Obu, H. A., Nwokocho, A. R. C., & Odetunde, O. I. (2016). Correlates of psycho-active substance use among

- boarding secondary school adolescents in Enugu, South East, Nigeria. *BMC Pediatrics*, 16, 78. <https://doi.org/10.1186/s12887-016-0615-9>
- Marsiglia, F. E., Ayers, S. L., & Hoffman, S. (2012). Religiosity and adolescent substance use in Central Mexico: Exploring the influence of internal and external religiosity on cigarette and alcohol use. *American Journal of Community Psychology*, 49(1-2), 87-97. <https://doi.org/10.1007/s10464-011-9439-9>
 - Mason, W. A., & Windle, M. (2001). Family, religious, school and peer influences on adolescent alcohol use: a longitudinal study. *Journal of Studies on Alcohol and Drugs*, 62(1), 44-53. <https://doi.org/10.15288/jasa.2001.62.44>
 - McLeod, S. (2023, February 20). Child psychology and development. Retrieved April 18, 2023, from Simply Psychology: <https://www.simplypsychology.org/Bronfenbrenner.html>
 - Moreno, M. A., & Whitehill, J. M. (2014). Influence of social media on alcohol use in adolescents and young adults. *Alcohol Research: Current Reviews*, 36(1), 91-100. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4432862/>
 - Naamara, W., & Muhwezi, W. W. (2014). Factors associated with alcohol dependence among adult male clients in Butabika Hospital, Uganda. *Journal of Social Work Practice in Addictions*, 14, 322-326. <https://doi.org/10.1080/1533256X.2014.936251>
 - Natasha, K. N., Newton, N. C., Barrett, E. L., Slade, T., Conrod, P. J., Baillie, A. J., Champion, K.E., & Teesson, M. (2016). Personality and early adolescent alcohol use: Assessing the four factor model of vulnerability. *Journal of Addiction and Prevention*, 4(2), 6.
 - Newton, N.C., Harvad, A., & Teesson, M. (2011). The association between moral disengagement, psychological distress, resistive self-regulatory efficacy and alcohol and cannabis use among adolescents in Sydney, Australia. *Journal of Addiction Research and Theory*. ISSN 1606-6359.
 - Odejide, A.O. (2006). Status of drug use/abuse in Africa: A review. *International Journal of Mental Health and Addiction*, 4, 87-102. <https://doi.org/10.1007/s11469-006-9015-y>
 - Oman, R. F., Tolma, E. L., Vesely, S. K., & Aspy, C. B. (2013). Youth gender differences in alcohol use: A prospective study of multiple youth assets and the neighborhood environment. *Open Journal of Preventive Medicine*, 3(2), 219-227. <https://doi.org/10.4236/ojpm.2013.32030>
 - O'Malley, P.M., Johnston, L.D., & Bachman, J.G. (1998). Alcohol use among adolescents. *Alcohol Health and Research World*, 22(2), 85-94.
 - Onya, H.E., & Flisher, A.J. (2008). Prevalence of substance use among rural high school students in Limpopo province, South Africa. *African Journal of Drug and Alcohol Studies*, 7(2), 71-80.
 - Othieno, A.O., & Ofula, A.V.O. (2009). Drug abuse in Kisumu town western Kenya. *African Journal of Food, Agriculture, Nutrition and Development*, 9, 847-856.
 - Osman, T., Victor, C., Abdulmoneim, A., Mohammed, H., Abdalla, F., Ahmed, A., Ali, E., & Mohammed, W. (2016). Epidemiology of substance use among university students in Sudan. *Journal of Addiction*, 2016, 1-8. <https://doi.org/10.1155/2016/2476164>
 - Pedrero-García, E. (2018). Nightlife and alcohol consumption among youths: The botellón phenomenon in Spain. *SAGE Open*, 2018, 1-7. <https://doi.org/10.1177/2158244018800903>
 - Pengpid, S., & Peltzer, K. (2013). Prevalence and psychosocial correlates of illicit drug use among school-going adolescents in Thailand. *Journal of Social Sciences*, 34, 269-275.
 - Piazza-Gardner, A.K., Barry, A.E., & Merianos, A.L. (2016). Assessing drinking and academic performance among a nationally representative sample of college students. *Journal of Drug Issues*, 2016, 1-7. <https://doi.org/10.1177/0022042616659757>
 - Porche, M.V., Fortuna, L.R., Wachholtz, A., & Stone, R.T. (2015). Distal and proximal religiosity as prospective factors for adolescent and emerging adult alcohol use. *Religions*, 6, 365-384. <https://doi.org/10.3390/rel6020365>
 - Rodham, K., Hawton, K., Evans, E., & Weatherall, R. (2005). Ethnic and gender differences in drinking, smoking and drug taking among adolescents in England: a self-report school-based survey of 15 and 16 year olds. *Journal of Adolescence*, 28, 63-73.
 - Rukundo, A., Ayebare, D. S., Kibanja, G., & Steffens, K. (2020). Family factors associated with consumption of spirits: A comparative gender - based study of Ugandan students in public secondary schools. *Education Research International*, 2020(5432545), 1 - 6. Doi: <https://doi.org/10.1155/2020/5432545>
 - Hibell, B., Guttormsson, U., Ahlström, S., Balakireva, O., Bjarnason, T., Kokkevi, A., & Kraus, L. (2005). The 2003 ESPAD report: Alcohol and other drug use among students in 35 European countries. *Journal of Adolescence*, 28, 63-73. <http://www.ncbi.nlm.nih.gov/pubmed/15683635>
 - Sanhueza, G. E., Delva, J., Bares, C. B., & Grogan-Kaylor, A. (2013). Alcohol consumption among Chilean adolescents: Examining individual, peer, parenting and environmental factors. *International Journal of Alcohol and Drug Research*, 2(1), 89-97. <https://doi.org/10.7895/ijadr.v2i1.71>
 - Sinha, J. W., Cnaan, R. A., & Gelles, R. W. (2007). Adolescent risk behaviors and religion: Findings from a national study. Retrieved from http://repository.upenn.edu/spp_papers/54
 - Slater, M. E., Haughwout, S. P., & Castle, I. P. (2015). Trends in substance use among reproductive-age females in the United States, 2002-2013. National Institute on Alcohol Abuse and Alcoholism: Surveillance Report Number 103.
 - Stafström, M., & Agardh, A. (2012). Socio-economic determinants for alcohol consumption and heavy episodic drinking in a Ugandan student population. *International Journal of Alcohol and Drug Research*, 1(1), 57-67. <https://doi.org/10.7895/ijadr.v1i1.40>
 - Sudhinaraset, M., Wigglesworth, C., & Takeuchi, D. T. (2016). Social and cultural contexts of alcohol use. *Alcohol Research: Current Reviews*, 38(1), 35-45.
 - Swahn, M. H., Haberlen, M., Palmier, J. B., & Kasirye, R. (2014). Alcohol and drug use and other high-risk behaviors among youth in the slums of Kampala, Uganda: Perceptions and contexts obtained through focus groups. *International Journal of Alcohol and Drug Research*, 3, 289-295. <https://doi.org/10.7895/ijadr.v3i4.171>
 - Swahn, M. H., Palmier, J. B., & Kasirye, R. (2013). Alcohol exposures, alcohol marketing, and their associations with problem drinking and drunkenness among youth living in the slums of Kampala, Uganda. *ISRN Public Health*, 2013, 1-9. <https://doi.org/10.1155/2013/948675>
 - Swahn, M. H., Palmier, J. B., Benegas-Segarra, A., & Sinson, F. A. (2013). Alcohol marketing and drunkenness among students in the Philippines: Findings from the nationally representative Global School-based Student Health Survey. *BMC Public Health*, 2013, 1-8.
 - Surujlal, J., & Keyser, E. (2014). Exploring differences in demographic variables and alcohol consumption amongst university student-athletes. *Mediterranean Journal of Social Sciences*, 5, 820-826. <https://doi.org/10.5901/mjss.2014.v5n23p820>
 - Tholen, R., Wouters, E., Ponnet, K., De Bruyn, S., & Van Hal, G. (2020). A social ecological approach to hazardous alcohol use among Flemish higher education students. *International Journal of Environmental Research and Public Health*, 2020, 1-13. <https://doi.org/10.3390/ijerph17218288>
 - Tumwesigye, N. M., Atuyambe, L., Kibira, P. S., Wabwire, F., Tushemerirwe, F., & Wagner, G. J. (2013). Do religion and religiosity have anything to do with alcohol consumption patterns? Evidence from two fish landing sites on Lake Victoria. *Substance Use & Misuse*, 48, 1130-1137. <https://doi.org/10.3109/10826084.2013.808464>
 - Tumwesigye, N. M., Kasirye, R., & Nansubuga, E. (2009). Is social interaction associated with alcohol consumption in Uganda? *Drug and Alcohol Dependence*, 103, 9-15. <https://doi.org/10.1016/j.drugalcdep.2009.01.016>
 - United Nations Office on Drugs and Crime. (2003). *Conducting school surveys on drug abuse: Global assessment programme on drug abuse, toolkit module 3*. New York: United Nations.
 - Vantamay, S. (2009). Alcohol consumption among university students: Applying a social ecological model approach for multi-level prevention. *Southeast Asian Journal of Tropical Medicine and Public Health*, 40(2), 354-369. Retrieved September 21, 2021, from <http://www.tm.mahidol.ac.th/seameo/2009-4.0-2/14-4861.pdf>
 - Wallace, J. M., Brown, T. N., Bachman, J. G., & LaVeist, T. A. (2003). *Religion, race, and abstinence from drug use among American adolescents* (Monitoring the Future Occasional Paper No. 58). Institute for Social Research, University of Michigan.
 - Warren, J. C., Smalley, K. B., & Barefoot, K. N. (2015). Perceived ease of access to alcohol, tobacco, and other substances in rural and urban US students. *Rural and Remote Health*, 15(4), 1-8. Retrieved from <http://www.rrh.org.au/journal/article/3429>
 - World Health Organization. (2005). *Alcohol, gender, and drinking problems: Perspectives from low and middle-income countries*. Geneva,

Switzerland: WHO Library Cataloguing-in-Publication Data.

- Williams, R. D., Perko, M. A., Belcher, D., Leaver-Dunn, D. D., Usdan, S. L., & Leeper, J. D. (2006). Use of social ecology model to address alcohol use among college athletes. *American Journal of Health Studies*, 21(4), 228–237.
- Wills, T. A., Pokhrel, P., Morehouse, E., & Fenster, B. (2011). Behavioral and emotional regulation and adolescent substance use problems: A test of moderation effects in a dual-process model. *Psychology of Addictive Behaviors*, 25(2), 279–292. <https://doi.org/10.1037/a0022870>
- Windle, M. (2003). *Alcohol use among adolescents and young adults*. National Institute on Alcohol Abuse and Alcoholism.
- Wimpenny, E. M., Marteau, T. M., & Nolte, E. (2014). Exposure of children and adolescents to alcohol marketing on social media websites. *Alcohol and Alcoholism*, 49(2), 154–159. <https://doi.org/10.1093/alcalc/agt174>
- Wu, S. T. C., Wong, H. T., Chou, L. Y., To, W. P. B., Lee, W. L., & Loke, A. Y. (2014). Correlates of protective motivation theory (PMT) to adolescents' drug use intention. *International Journal of Environmental Research and Public Health*, 11, 671–684. <https://doi.org/10.3390/ijerph110100671>
- Youth Engagement in Health and Humanitarian Affairs (YEAH). (2007). Alcohol consumption in Uganda: Literature review. Retrieved from <https://www.k4health.org/sites/default/files/Alcohol%20Consumption%20Literature%20Review.pdf>

Declarations

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