

Exploring links—exposure to alcohol adverts on social media in relation to alcohol use among university students in Uganda

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Abstract

Aim: This study assessed the association between exposure to alcohol adverts on social media and alcohol use among university students in Uganda since alcohol consumption has severe effects, especially in countries with weak regulations for alcohol marketing.

Methods: In total, 996 undergraduate students at Makerere University responded to a questionnaire assessing exposure to alcohol advertising on social media (independent variable) and alcohol use (dependent variable). Adjusted multinomial logistic regression was used to analyse data.

Results: One in ten students reported hazardous drinking, while three in ten students were low-risk drinkers. Most students (70.1%) reported low exposure to alcohol adverts on social media, followed by high exposure (12.1%), and 17.8% reported no exposure. A key finding was that exposure to alcohol adverts on social media was significantly associated with alcohol use, especially the high exposure and hazardous drinking (odds ratio = 12.62, 95% confidence interval: 4.43–35.96). Students reporting high exposure to alcohol adverts on social media also had higher odds of low-risk drinking (odds ratio = 3.70, 95% confidence interval: 1.88–7.27) than those with low exposure (odds ratio = 1.77, 95% confidence interval: 1.09–2.87), in reference to no exposure.

Conclusion: Among Ugandan university students, exposure to alcohol adverts on social media is common and associated with alcohol use, in a dose-response manner. These findings suggest a need for a design and implementation of alcohol interventions for students using social media.

Keywords: alcohol use; social media; alcohol marketing; alcohol advert; university students; Uganda

Introduction

Alcohol marketing and alcohol use among young people

Alcohol consumption is a significant health burden globally, causing 2.6 million deaths per year (accounting for 4.7% of all deaths). Young people are disproportionately affected by alcohol-related health consequences. In 2019, the highest proportion (13%) of alcohol attributable deaths occurred among 20–39-year-olds (WHO 2024). Marketing/advertising of alcohol is a key factor associated with alcohol consumption, particularly among young people (Dumbili and Williams 2017; Finan et al. 2020; Hendriks and Strick 2020; Jackson and Bartholow 2020; Petticrew et al. 2020; Saffer 2020; Sargent and Babor 2020; Atkinson et al. 2021; WHO 2022).

Exposure to alcohol advertising/adverts among young people can create alcohol brand awareness and favourability, as well as positive attitudes regarding alcohol (Dumbili and Williams 2017; Jackson and Bartholow 2020). This exposure may subsequently lead to initiation of alcohol use as well as increased drinking among those who drink/existing

consumers (Anderson et al. 2009; Jackson and Bartholow 2020; Noel et al. 2020; Room et al. 2020; Sargent and Babor 2020; Steers et al. 2024). Furthermore, alcohol consumption and exposure to alcohol adverts can also reinforce each other, as suggested by Slater in the Reinforcing Spiral Model (Slater 2007). Slater indicates that a person's exposure to certain media can lead to attitudes/behaviours that influence their selection/attention to specific media content (in line with their attitudes and behaviours/media selectivity), hence creating a loop where media selectivity and its effects mutually reinforce each other (Slater 2007). Consequently, while exposure to alcohol adverts may influence alcohol consumption, people who drink may also select/seek for alcohol adverts (Slater 2007; Geber et al. 2021; Geusens and Beullens 2021).

During the last decade, the alcohol industry's advertising and marketing strategies have undergone a considerable expansion through the use of social media (Carah and Brodmerkel 2021). On social media platforms, alcohol companies target users via creative and interactive strategies such as collaborations with social media influencers (Carah and

Received 8 June 2024; Revised 18 October 2024; Accepted 13 November 2024

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Brodmerkel 2021; Vrontis et al. 2021), and directing persuasive messages to specific groups of users (Carah and Brodmerkel 2021; WHO 2022). By leveraging algorithmic predictions derived from users' interactions, both online and offline, social media platforms facilitate marketers in optimizing advertisement targeting while maintaining consumer engagement (Carah and Brodmerkel 2021). The alcohol industry has reported a high consumer-reach and investment returns (>500%) on marketing on social media (Noel et al. 2020). For instance, in a study among young adults in Hong Kong (Chan et al. 2024), exposure to alcohol marketing on social media in the previous month was reported by more than half (52.3%) of the respondents of which 68.6% were previous-month drinkers. Both direct/business-to-consumer (40.9%) and indirect/consumer-to-consumer (27.8%) exposure to alcohol marketing on social media were associated with alcohol consumption (Chan et al. 2024). A review of existing studies also indicates that exposure to alcohol advertisement on social media via active engagement is associated with increased alcohol consumption including binge/hazardous drinking among young people (Noel et al. 2020).

Alcohol adverts on social media and alcohol use among university students in a LMICs

Given that young people, including university students, are frequent users of social media and a key target group for alcohol marketing (Savolainen et al. 2020), they are at risk of extensive exposure to alcohol adverts (Noel and Babor 2017). Young people in low- and middle-income countries (LMICs) may be particularly at risk of exposure due to limited alcohol regulations in a context where the alcohol advertising industry is expanding business (Walls et al. 2020; WHO 2022). In Sub-Saharan Africa, the implementation of alcohol control measures, including pricing policies and marketing regulations, remains minimal. Increased government commitment is required to ensure that these measures are effective, especially given the alcohol companies' focus on the region (Walls et al. 2020; Morojele et al. 2021; WHO 2024). While displaying the highest alcohol consumption in Africa (WHO 2024), Uganda only recently (2019) adopted a national alcohol control policy (MOH 2019). This policy highlights the need to regulate alcohol production and aggressive promotion. However, among young people in Uganda, exposure to alcohol marketing is widespread (Swahn et al. 2022), with adverts on billboards, buildings such as bars, restaurants, and retail stores, and within educational environments including universities (Dia et al. 2021; Waira 2022). Although lower than the prevalence in high-income countries (Amare and Getinet 2020; Inaç et al. 2021), alcohol use among university students in African countries is increasingly concerning (Kamulegeya et al. 2020; Kintu et al. 2023).

In our recent study (2022), ~4 in 10 students at Makerere University reported alcohol use, which was also associated with social media use (Atusingwize et al. 2022). This prior study examined social media use in general rather than alcohol marketing on social media. Overall, the impact of alcohol marketing, particularly via social media, on alcohol consumption among students in LMICs remains underexplored (Noel et al. 2020; Room et al. 2020; Walls et al. 2020; Swahn et al. 2022). It is therefore pertinent to understand how exposure to largely unregulated alcohol advertisements on social media (WHO 2024) relates to alcohol consumption

among university students in these LMIC settings. This study aimed to assess the relationship between exposure to alcohol advertising on social media and alcohol use among Makerere University students in Uganda. We hypothesize that, similar to evidence from high-income countries (Noel et al. 2020; Room et al. 2020), alcohol use is associated with exposure to alcohol adverts among university students in LMIC settings.

Methods

Study design, participants, and setting

The participants in this cross-sectional study were undergraduate students (males and females) at Makerere University. Makerere is the largest and oldest university in Uganda and has ~36 000 undergraduate students across 9 colleges and a School of Law, all operating as semi-autonomous units. The university is located in an environment with residential and small- to large-scale commercial activities, where alcohol is easily accessible by students. University students in Uganda are generally at least 18 years old which is also the age for legal alcohol consumption in the country.

Sampling and data collection

Out of 1091 students who were invited to take part in the study, 996 students accepted to participate. Data were collected during January–March 2020 among students randomly sampled across the 10 semi-autonomous units. Six research assistants invited students to participate in the study. This was undertaken by randomly approaching students on campus, one by one, and introducing them to the study objectives. A questionnaire built in a KoBoCollect mobile app was administered by the research assistants in a face-to-face interview at places convenient to participants within the university premises. The research assistants attended a 2-day training to ensure that they understood the study objectives and questionnaire. Pre-testing of the questionnaire was conducted among selected university students and changes such as skip patterns were made accordingly. More details on data collection have been described elsewhere (Atusingwize et al. 2022).

Measures

Outcome variable—alcohol consumption: Participant's alcohol consumption was measured using the WHO validated 10-item Alcohol Use Disorder Identification Tool (AUDIT) which covers alcohol intake (items 1–3), dependence (items 4–6), and adverse consequences (items 7–10). A sum score was calculated for all 10 questions (range 0–40). Based on previous studies (Nadkarni et al. 2019), we categorized the scores into abstaining (those who scored 0/zero), low-risk drinking (score of 1–7), and hazardous drinking (score of 8–36).

Independent variable—exposure to alcohol adverts on social media: This was an eight-item student self-assessment of exposure to advertising of alcohol (such as beer, wine, vodka, spirits, fermented cider, local brew (such as *waragi, malwa*), or other liquor) on social media. This measure was developed based on insights from a literature review (Curtis et al. 2018). Students were asked questions about their exposure to alcohol adverts on social media. In particular, they were asked about how many times (or how often) they had received or seen updates from alcohol companies (or

bars, or other distributors) about alcohol; participated in contests/promotions about alcohol; downloaded alcohol-related photos, wallpapers/screen savers/widgets/videos; watched or seen alcohol advertisements; clicked on advertisements for alcohol; used a coupon for alcohol; and ordered and received alcohol-related giveaways or promotional materials (such as T-shirts, key chains, or beer mugs) through social media sites.

The response options were 'Never', scored as 0; 'Occasionally' (if less than once a month), scored as 1; 'Every month/monthly', scored as 2; 'Every week/weekly', scored as 3; 'Daily' (once a day), scored as 4, '2–9 times a day', scored as 5; '10 or more times a day', scored as 6; and the 'I don't know' alternative was treated as missing data. Therefore, a sum score (theoretical range 0–48 based on the eight questions) was expected for each respondent and the highest/maximum actual total sum score recorded was 24.

The sum score variable of exposure to alcohol adverts on social media was categorized as follows: (1) no exposure to adverts (score of 0); (2) low exposure to adverts (score of 1–8); (3) high exposure to adverts (score of >9). Notably, the low exposure category includes those who scored 1 = 'Occasionally/less than once a month' on each of the eight questions, or participants who scored >2 on at least one question, but have a total score of ≤8. The cut-offs/categories were informed by the actual scores from the eight questions with most students (31.4%, $n = 304$) scoring 0–1 and a maximum score of 8 for a student with the least exposure on each of the questions. The Cronbach's alpha was .65 (with average inter-item covariance = .15) for the eight advert-related questions and .85 (with average inter-item covariance = .22) for the alcohol questions (AUDIT).

Covariates

The *sociodemographic characteristics* of students included sex, age, parental education (education level of parent/guardian), student's employment status (whether involved in work or not), religious affiliation, and main accommodation. Other control variables were *alcohol related*, in particular alcohol use among friends and family. This included a 'Yes/No response' question on whether one had a (a) brother/sister, (b) male friend, (c) female friend, and (d) parent or guardian who drink alcohol (Table 1). In addition, *average time per day* spent on social media (Purba et al. 2023) was controlled/adjusted for. Students were asked how many hours (on average) they spend on social media per day with the response options of less than 1 hour, 1–2 hours; 3–5 hours, and 6–10 hours and more than 10 hours guided by previous literature (Curtis et al. 2018).

Data management and analyses

The data were exported from KoBocollect to STATA v.14 and checked for consistency and validity. The subsequent process of data analysis was all carried out using the same software. The differences between alcohol consumption (AUDIT) levels and social media and selected control variables were analysed using chi-squared test (statistical significance: P -value < .05). Multinomial logistic regressions were conducted to estimate the associations between student's exposure to alcohol adverts on social media and alcohol use (categories of AUDIT risk score). The reference groups for both the outcome and independent variables were 'abstaining' and 'no exposure' against which other categories were compared, respectively. All variables that demonstrated a statistically significant association

with the outcome in bivariate analyses, as determined by chi-squared test, were subsequently included in the adjusted model.

Ethical considerations

This study received ethical approval from Makerere University School of Public Health Higher Degrees Research and Ethics Committee (protocol no. HDREC 735), before registration with the Uganda National Council for Science and Technology (UNCST) (project number HS849ES). We also obtained permission to conduct the study from the Makerere University administration, and all students who participated in the study provided written informed consent.

Results

Sociodemographic characteristics of participants

Most students (54%, $n = 539$) were male, lived outside campus in rented accommodation (52%, $n = 514$), and the average age was 22 years (SD 2.43). A majority of students also reported having close male (81%, $n = 807$) and close female (62%, $n = 616$) friends who drink alcohol (Table 1).

Alcohol use

Approximately 60% ($n = 594$) of students were categorized as 'abstaining', 31% ($n = 306$) as 'low-risk drinking', and 10% ($n = 96$) as 'hazardous drinking'. Hazardous drinking was more common among male students than females (12% vs 6%, $P = .005$) (Table 1).

Exposure to alcohol adverts on social media

Overall, students frequently used different social media sites (97%, $n = 969$). Regarding time spent on social media daily, most of the students (71.3%, $n = 691$) spent ≥3 hours while 12% spent >10 hours. Some students reported high exposure to alcohol adverts on social media (12.1%, $n = 117$), although majority (70.1%, $n = 679$) reported low exposure followed by no exposure to the adverts (17.8%, $n = 173$) (Table 1). However, >6 in 10 students reported that they had received or seen updates from alcohol companies (or bars, or other distributors) about alcohol (62.9%, $n = 603$) and had watched or seen alcohol advertisements on social media sites (62.2%, $n = 601$) (Table 2).

Association of alcohol use and exposure to alcohol adverts on social media

Both low and high exposure to alcohol adverts on social media were significantly associated with low-risk and hazardous drinking. In the adjusted model (Table 3), low exposure to alcohol adverts was significantly associated with low-risk drinking (OR = 1.77, 95% CI: 1.09–2.87), but not with the hazardous drinking behaviour (OR = 1.81, 95% CI: .70–4.64). Those reporting high exposure to alcohol adverts on social media had higher odds of hazardous drinking (OR = 12.62, 95% CI: 4.43–35.96) and low-risk drinking (OR = 3.70, 95% CI: 1.88–7.27), in reference to abstaining.

The findings also indicate that nearly all forms of exposure to alcohol advertisements on social media were associated with alcohol use, particularly hazardous drinking. However, the forms of exposures that involved significant activity or engagement—such as using a coupon for alcohol found on social media, ordering alcohol through social media sites,

Table 1. Distribution of exposure to alcohol adverts on social media and alcohol use

Variables	Total, <i>n</i> (%)	Alcohol use, <i>n</i> (%)			P-value (χ^2)
	996 (100)	Abstaining 594 (59.6)	Low-risk drinking 306 (30.7)	Hazardous drinking 96 (9.6)	
Exposure to alcohol adverts on social media, <i>n</i> = 969					<.001
Not exposed	173 (17.8)	136 (78.6)	31 (17.9)	6 (3.5)	
Low exposure	679 (70.1)	406 (59.8)	224 (33.0)	49 (7.2)	
High exposure	117 (12.1)	32 (27.3)	47 (40.2)	38 (32.5)	
<i>Control variables</i>					
Average time per day on social media (hour)					.025
None	26 (2.7)	14 (53.9)	10 (38.5)	2 (7.7)	
Less than 1	46 (4.7)	24 (52.2)	12 (26.1)	10 (21.7)	
1–2	206 (21.3)	128 (62.1)	63 (30.6)	15 (7.3)	
3–5	324 (33.4)	209 (64.5)	93 (28.7)	22 (6.8)	
6–10	256 (26.4)	141 (55.1)	87 (34.0)	28 (11.0)	
More than 10	111 (11.5)	58 (52.3)	37 (33.3)	16 (14.4)	
Age (years), mean (SD)	22.2 (2.4)	22.0 (2.4)	22.5 (2.6)	22.4 (2.0)	.057
Gender					.005
Women	457 (45.9)	285 (62.4)	143 (31.3)	29 (6.4)	
Men	539 (54.1)	309 (57.3)	163 (30.2)	67 (12.4)	
Year of study					.117
One	233 (23.4)	154 (66.1)	59 (25.3)	20 (8.6)	
Two	332 (33.3)	201 (60.5)	100 (30.1)	31 (9.3)	
Three and above	431 (43.3)	239 (55.5)	147 (34.1)	45 (10.4)	
Employment status					.003
Not involved in work	878 (88.1)	539 (61.4)	262 (29.8)	77 (8.8)	
Involved in work	118 (11.9)	55 (46.6)	44 (37.3)	19 (16.1)	
Parental education					.090
Tertiary	624 (62.7)	359 (57.5)	208 (33.3)	57 (9.1)	
Secondary	276 (27.7)	172 (62.3)	78 (28.3)	26 (9.4)	
Primary	96 (9.6)	63 (65.6)	20 (20.9)	13 (13.5)	
Main accommodation					.041
Campus hall	241 (24.2)	142 (58.9)	75 (31.1)	24 (10.0)	
Home	241 (24.2)	163 (67.6)	63 (26.1)	15 (6.2)	
Rented spaces	514 (51.6)	289 (56.2)	168 (32.7)	57 (11.1)	
Religion					<.001
Catholic	313 (31.4)	133 (42.5)	140 (44.7)	40 (12.8)	
Muslim	112 (11.2)	97 (86.6)	9 (8.0)	6 (5.4)	
Anglican	339 (34.0)	178 (52.5)	118 (34.8)	43 (12.7)	
Pentecostal and others	232 (23.3)	186 (80.2)	39 (16.8)	7 (3.0)	
Parental occupation					.190
Employed/monthly salary	457 (45.9)	257 (56.2)	154 (33.7)	46 (10.1)	
Self-employed/business	426 (42.8)	271 (63.6)	119 (27.9)	36 (8.5)	
Peasant or others	113 (11.4)	66 (58.4)	33 (29.2)	14 (12.4)	
Parent/guardian drinks					<.001
No	536 (53.8)	416 (77.6)	94 (17.5)	26 (4.9)	
Yes	460 (46.2)	178 (38.7)	212 (46.1)	70 (15.2)	
Sister/brother drinks					<.001
No	616 (61.9)	453 (73.5)	141 (22.9)	22 (3.6)	
Yes	380 (38.1)	141 (37.1)	165 (43.4)	74 (19.5)	
Close female drinks					<.001
No	380 (38.2)	312 (82.1)	57 (15.0)	11 (2.9)	
Yes	616 (61.9)	282 (45.8)	249 (40.4)	85 (13.8)	
Close male drinks					<.001
No	189 (18.9)	172 (91.0)	16 (8.5)	1 (.5)	
Yes	807 (81.0)	422 (52.3)	290 (35.9)	95 (11.8)	

and downloading wallpapers, screensavers, widgets, or videos from social media sites—were most strongly linked to alcohol consumption (Table 2, Adjusted model).

Discussion

The findings indicate that university students in Uganda are highly exposed to alcohol adverts on social media, and that such exposure is significantly associated with alcohol use.

These findings need to be interpreted in relation to the increasing digital marketing of several products including alcohol (Noel et al. 2020; Dwivedi et al. 2021) where adverts are embedded in online and offline daily life relating to lifestyle, culture, friendships, and identities (Atkinson et al. 2022; WHO 2022). Exposure to adverts on social media is also enabled by a range of predictive models and reaction features on social media platforms such as likes and competitions that alcohol companies and their marketers explore to spread

Table 2. Types of exposure to alcohol adverts on social media and alcohol use (unadjusted and adjusted associations)

	Total, n (%)	Alcohol use			
		Unadjusted OR (CI)		Adjusted OR (CI)	
		Low-risk drinking	Hazardous drinking	Low-risk drinking	Hazardous drinking
Types of exposure to alcohol adverts					
Received or seen updates from alcohol companies (or bars, or other distributors) about alcohol	603 (62.9)	1.80 (1.34–2.42)	4.04 (2.27–7.19)	1.34 (.94–1.89)	2.51 (1.34–4.71)
Participating in contests/promotions about alcohol on social media sites	86 (8.9)	3.75 (2.13–6.60)	13.85 (7.41–25.88)	2.48 (1.30–4.71)	8.48 (4.07–17.65)
Downloading alcohol-related photos, wallpapers/screensavers/widgets/videos on social media sites	137 (14.2)	5.81 (3.59–9.38)	21.55 (12.20–38.06)	3.68 (2.17–6.26)	12.52 (6.61–23.70)
Watched or seen alcohol adverts on social media sites	601 (62.2)	2.79 (2.05–3.81)	3.31 (1.97–5.57)	2.34 (1.64–3.35)	2.63 (1.46–4.73)
Clicked on adverts for alcohol on social media sites	417 (43.4)	2.20 (1.66–2.93)	5.85 (3.54–9.68)	1.65 (1.18–2.30)	3.98 (2.28–6.93)
Used a coupon for alcohol found on social media sites	47 (4.9)	10.11 (3.42–29.85)	48.20 (16.19–143.52)	7.63 (2.34–24.88)	33.83 (9.86–16.07)
Ordered alcohol through social media sites?	42 (4.3)	4.26 (1.60–11.32)	32.02 (12.60–81.40)	2.48 (0.84–7.36)	16.02 (5.35–48.00)
Received alcohol-related giveaways or promotional materials (such as T-shirts, key chains, or beer mugs) through social media sites	62 (6.4)	3.77 (1.94–7.33)	12.39 (6.07–25.31)	2.35 (1.10–5.03)	5.89 (2.53–13.71)

Multinomial logistic regressions using Abstaining as reference category. Odds ratios (OR) at 95% confidence interval ^aAdjusted for alcohol use among family and friends, gender, age, student involvement in work, student accommodation, average time per day on social media, and religion

the adverts to users' feeds and networks (Carah and Brodmerkel 2021). Such capabilities of social media marketing may increase the users' exposure to alcohol adverts and related drinking.

The association between alcohol use and alcohol adverts on social media confirms previous studies in the high-income countries (Noel et al. 2020; Room et al. 2020). In line with existing research (Noel et al. 2020), our findings suggest that advert exposures including active engagement, such as use of coupons and alcohol ordering, are particularly strongly linked to alcohol use. This could be understood in light of the interactive capabilities of social media adverts, e.g. the purchasing decision options (Noel et al. 2020; Atkinson et al. 2021; Carah and Brodmerkel 2021). Based on previous research (Noel et al. 2020; Atkinson et al. 2021), such adverts could reinforce brand loyalty among consumers and impact drinking behaviours. Our findings also suggest that similar to a previously reported dose–response relationship between media and alcohol use (Anderson et al. 2009; Yoshida et al. 2023), the likelihood of reporting alcohol consumption was stronger among students reporting high (compared to low) exposure to alcohol adverts on social media.

High exposure to alcohol adverts on social media was especially associated with hazardous drinking, which is consistent with previous research (Noel et al. 2020), although conducted in other settings. Our findings also align with evidence that alcohol marketing often targets heavy and dependent alcohol users (WHO 2022), and that alcohol advertising usually appeals more to heavy drinkers (Noel et al. 2018; WHO 2022), suggesting a reverse causation (Purba et al. 2023) between alcohol use and exposure to the alcohol adverts. Moreover, alcohol advertising on social media encourages attendance at branded real-world alcohol events like club nights and sports that promote alcohol consumption (Atkinson et al. 2017; Room et al. 2020), which may be highly regarded by users with high exposure to such adverts. Given the alcohol industries' use of targeted advertising based on algorithmic predictions of users' interactions, both online and offline, exposure to adverts on social media may also increase after a drinking event (Noel et al. 2017; Noel and Babor 2017; Noel et al. 2020; Carah and Brodmerkel 2021). This type of exposure could result in more drinking for alcohol consumers based on their drinking venues and engagements.

Associations between alcohol advertisements on social media and alcohol use can be understood through the Reinforcing Spiral Model (Slater 2007; Geusens and Beullens 2021); the students exposed to adverts on social media (initial exposure) may develop more positive perceptions towards drinking behaviour, leading to increased alcohol consumption (low-risk or hazardous). This, in turn, may result in further exposure to similar alcohol advertisements through their selective media use (Slater 2007). Given the logics of social media marketing, a modelled selection process suggests that students who drink are more likely to be exposed to specific advertisements compared to those who do not drink, thereby enhancing the reinforcement process. Consequently, students' drinking behaviour could lead to a greater selectivity for alcohol advertisements on social media, driven by both the student's own media selectivity and the predictive models used by social media platforms. It is therefore reasonable to infer that those students who engage in hazardous drinking are highly exposed to alcohol advertisements on social media,

Table 3. Exposure to alcohol adverts on social media and alcohol use (unadjusted and adjusted associations)

Abstaining (base outcome)	Alcohol use			
	Unadjusted OR (CI)		^a Adjusted OR (CI)	
	Low-risk drinking	Hazardous drinking	Low-risk drinking	Hazardous drinking
Variables				
Exposure to alcohol adverts on social media				
No exposure	1.00	1.00	1	1.00
Low exposure	2.42 (1.59–3.69)	2.74 (1.15–6.53)	1.77 (1.09–2.87)	1.81 (.70–4.64)
High exposure	6.44 (3.55–11.68)	26.92 (10.48–69.13)	3.70 (1.88–7.27)	12.62 (4.43–35.96)
<i>Control variables</i>				
Age (years)	1.07 (1.01–1.13)	1.06 (.97–1.15)	1.07 (.99–1.15)	0.99 (.88–1.11)
Gender				
Women	1	1	1	1
Men	1.05 (.80–1.39)	2.17 (1.35–3.47)	1.14 (.81–1.60)	2.60 (1.48–4.59)
Employment status				
Not involved in work	1	1	1	1
Involved in work	1.64 (1.07–2.51)	2.47 (1.39–4.40)	1.44 (.86–2.43)	2.31 (1.11–4.78)
Main accommodation				
University hall	1	1	1	1
Home	0.75 (.50–1.13)	0.58 (0.29–1.17)	0.86 (.53–1.40)	0.56 (.25–1.23)
Rented spaces	1.11 (.79–1.57)	1.18 (.70–2.01)	1.23 (.82–1.83)	1.10 (.59–2.05)
Religion				
Catholic	2.84 (2.10–3.82)	2.36 (1.49–3.73)	2.13 (1.50–3.02)	1.71 (.99–2.95)
Parent/guardian drinks				
No	1	1	1	1
Yes	5.25 (3.88–7.11)	6.36 (3.89–10.40)	3.16 (2.23–4.49)	2.89 (1.61–5.20)
Sister/brother drinks				
No	1	1	1	1
Yes	3.74 (2.78–5.03)	10.29 (6.14–17.23)	1.64 (1.15–2.33)	4.68 (2.59–8.48)
Close female drinks				
No	1	1	1	1
Yes	4.78 (3.42–6.66)	9.02 (4.59–17.75)	2.62 (1.76–3.90)	3.72 (1.76–7.86)
Close male drinks				
No	1	1	1	1
Yes	7.65 (4.42–13.26)	1.00e+07 (0)	2.39 (1.26–4.55)	1 070 596 (0)
Average time per day on social media (h)	1.06 (.93–1.19)	1.11 (.91–1.34)	1.03 (.89–1.19)	1.11 (.88–1.40)

Multinomial logistic regressions using Abstaining as reference category. Odds ratios (OR) at 95% confidence interval. Significant associations in bold ^aBased on bivariate analyses reported in Table 1, the following control variables were adjusted for: average time spent on social media per day, gender, employment status, main accommodation, religion, and alcohol use among family and friends

which could further increase their alcohol consumption (Atkinson et al. 2017; Vrontis et al. 2021).

Study strengths and limitations

The primary strength of this study lies in its contribution to knowledge about young people's exposure to alcohol adverts by exploring this relatively unexamined domain of social media advertising and its association with alcohol consumption among university students in a low- and middle-income country. However, some limitations need consideration. Being cross-sectional, the study design limits any causal interpretations of the findings. Due to possible social desirability bias, self-reported exposure to alcohol adverts on social media and the alcohol use could have been underreported by the students (Johnson 2014). Another constraint relates to measurements. Although inspired by measures used in existing literature (Curtis et al. 2018) in order to enhance comparability and generalizability, the applied instrument on social media alcohol adverts is not standardized. Such measures should be further developed and studied in more detail (Savolainen et al. 2020). Moreover, we did not analyse the content of adverts on student's social media accounts.

The prevalence of hazardous drinking behaviour (10%) is transferrable to the Ugandan context (Kamulegeya et al.

2020; Otiike 2021; Kintu et al. 2023). However, hazardous drinking was considerably lower compared to the university students in high-income countries (Cooke et al. 2019; Verhoog et al. 2019; Inaç et al. 2021). This discrepancy could be attributed to restrictive religious beliefs regarding alcohol use in many African countries. However, trend analyses indicate an increase in alcohol consumption in the region, and intense alcohol marketing has been reported as a contributing factor (Walls et al. 2020; WHO 2022).

Study implications and future research

This study highlights a LMIC context of the increase in social media alcohol advertisement that present new challenges to current alcohol regulation approaches globally especially in relation to the cross-border nature of social media platforms (Room and O'Brien 2021; WHO 2022). Considering the common exposure to alcohol adverts on social media and its association with alcohol consumption (even at low level of exposure), it can be justified to consider implementing regulations on restricting alcohol advertising on social media (WHO 2024), not least when it comes to young people including students. As an example, regulatory efforts that monitor and address the challenges presented by the cross-border/digital marketing and collaborations between

alcohol and social media companies/platforms are necessary (Noel et al. 2020; Galkus et al. 2022; WHO 2022). Regulations could also aim to particularly target the alcohol adverts that actively engage students on social media since these seem to be especially associated with hazardous drinking.

The findings point at the need of future research that can enable an elaborated understanding of the observed relationships between social media and alcohol use among young people. This could be done through in-depth considerations of the interpersonal connections and cultures within the social media landscape (Alhabash et al. 2022). Given the flaws in the cross-sectional design, a longitudinal survey on social media alcohol adverts and alcohol consumption would be of interest to understand causation. This could be complemented with focus group discussions on contents of specific alcohol adverts on social media. Qualitative approaches could provide a more in-depth understanding of these associations to effectively contribute to future interventions, including policy and regulations to better control exposures to alcohol adverts on social media and related health consequences in LMIC settings.

Conclusions

Among Ugandan university students, exposure to alcohol adverts on social media is common and associated with alcohol use, in a dose–response manner. The findings could inform future research alongside policy and regulations regarding alcohol adverts on social media.

Acknowledgements

We acknowledge support of the students who participated in the study and the Research Assistants that helped to collect data. The support provided by Umeå University Department of Epidemiology and Global Health, Sweden, and Makerere University School of Public Health, Uganda, is appreciated. Assoc. Prof. John Ssempebwa of Makerere University School of Public Health, Department of Disease Control and Environmental Health is acknowledged for his mentorship support. We appreciate Prof. Miguel San Sebastián of Umeå University Department of Epidemiology and Global Health for the support during data analysis.

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Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This work was funded by the donation from Erling Persson's Family Foundation (EP) to the Department of Epidemiology and Global Health (EpiGH), Umeå University. Data collection was supported by Makerere University School of Public Health under the Small Grants Programme [Grant Number: MakSPH-GRCB/18-19/01/02].

Data availability

The data that support the findings of this study are available on reasonable request.

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