Alcohol consumption patterns, suppliers and online alcohol marketing: Before and during COVID-19 alcohol bans

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COVID-19-related alcohol sales bans and stay-at-home orders prompted the alcohol industry in South Africa to increase their online alcohol sales promotions. We investigated changes in alcohol-related behaviour and the drivers of illegal alcohol sales through a self-reported Facebook survey that ran from July to November 2020. Questions included socio-demographics and comparison of alcohol purchasing behaviour and intake during 2019 and 2020. Statistical tests were applied to find associations between illegal alcohol purchasing and alcohol-related behaviours. A total of 792 participants took part in the survey, 69.7% of whom were female. During lockdown periods, most participants (55.3%) bought alcohol illegally from illegal outlets or friends. Online alcohol-delivery marketing increased by 20 percentage points from 2019 to 2020, with participants stating that they saw a lot of advertisements per day and 80% of persons under 25 years were not asked to verify their age in 2020 upon delivery. Home-brewed beer and vodka intake increased in 2020 during the alcohol sales bans. Men from the Western Cape who engaged in daily or weekly heavy episodic drinking were more prone to purchase alcohol illegally. The Western Cape, which is South Africa's most prolific wine-producing region, had the highest odds of people buying alcohol illegally, with wine being found to be the most frequently bought alcohol online and consumed by these participants. There is a need for further research into the differences in alcohol-related behaviour affecting illegal alcohol purchasing according to income group, proximity to alcohol producers and underage alcohol sales and marketing through online applications.

Significance:

- Alcohol sales bans have the potential to reduce and stop the alcohol intake of moderate drinkers, but may make heavy episodic drinkers drink more than usual.
- During COVID-19 lockdown, illegal alcohol sales were taking place through unlicenced alcohol outlets and friends, and not through licenced online applications.
- Unlicenced alcohol outlets need to be addressed to prevent future illegal alcohol sales.
- Stricter regulations aimed at legal online alcohol sales applications should be put in place to prevent alcohol sales to minors and those who have already consumed too much alcohol.
- There should be a ban on marketing of addictive substances, such as alcohol.

Introduction

South Africa implemented four alcohol sales bans of varying lengths, on both on- and off-premises sales, including the sale of alcohol online, during the COVID-19 pandemic in 2020 and 2021. These alcohol sales bans were an attempt to reduce the pressure on the intensive care units (ICU) in hospitals in the country. Given the impact of harmful alcohol use on the number of trauma-related injuries presenting to health facilities, these bans attempted to free up hospital space for COVID-19 patients by reducing the alcohol-related trauma burden.[1] As a result of these bans, less alcohol was consumed and there were significantly lower levels of alcohol-related injury and trauma during the sales bans.[2]

The most frequently consumed type of alcohol in South Africa is beer, followed by wine and then spirits, with approximately a third of all alcohol consumed in South Africa being sold from unlicenced vendors – in other words, illegal alcohol sales or home production.[3] South Africa has a history of selective prohibition (1948–1994), which allowed the illegal/unlicenced alcohol market to embed itself into some communities and is continuing to this day.[4] These illegal alcohol markets seemed to thrive during the COVID-19 pandemic, with 55% of surveyed South Africans reporting that they bought alcohol illegally during the alcohol sales bans in 2020.[5]

According to the World Health Organization's (WHO) Global Status Report on Harmful Use of Alcohol, 65.4% of people who drink alcohol in South Africa are heavy episodic drinkers (HED).[3] Research shows that both alcohol-outlet density and marketing frequency increase alcohol intake in those populations living in the most outlet-dense areas, and particularly influence the youth.[6,7] Increased ease of access to online alcohol purchasing and marketing have become the global norm[8], and may increase the availability of alcohol even more in many countries[9,10]. There are a large variety of negative health outcomes related to alcohol use and particularly HED.[3,11-13]

While people were ordered to stay at home during the COVID-19 pandemic, alcohol manufacturers around the world increased their digital marketing.[14] Online marketing may be seen by anyone using social media, including children

and people struggling with addiction, leading to the normalisation of alcohol consumption and increasing alcohol-related harm in future.[9,10] The WHO emphasises that the United Nations convention should uphold children's right to health, and protection from exploitation by alcohol manufacturers that invade digital social media spaces to market their products.[9] Women and youth in Africa are also being targeted by the alcohol industry.[13]

A national survey in South Africa found that significantly more HEDs than moderate drinkers reported drinking more alcohol during lockdown restrictions, while the majority of moderate drinkers drank less or stopped consuming alcohol completely.[5,15]

The purpose of our study was to explore and describe alcohol purchasing behaviours, and specifically alcohol purchasing changes between 2019 pre-COVID and 2020 during different periods of COVID-19 lockdown in South Africa, as well as to investigate possible drivers of illegal alcohol purchasing.

Methods

Design

A cross-sectional online survey was undertaken.

Procedure

This self-reported survey was conducted online and is described in detail in a previous research paper.[5] The survey ran from 28 July 2020 to 28 November 2020 using the social media platform Facebook. The survey is provided in the Appendix in the Supplementary material and included questions on socio-demographics and alcohol purchasing behaviours before and during COVID-19.

Analysis

Data cleaning and checking were done using Microsoft Excel (2018) and data were imported into the Statistical Package for the Social Sciences software (27.0 edition). Data were analysed in an iterative way by first doing basic descriptive analyses with selected variables and then searching for associations using chi-square tests for categorical data. After identifying variables that were significantly associated with the binary variable (yes/no) to the question of "Did you purchase alcohol illegally during the COVID-19 pandemic restrictions?", significant variables ($p<0.05$) were used to compile a standard multiple logistic regression in Statistical Software for Data Science (17th edition). The variables entered into the model to calculate the adjusted odds ratio (AOR) were the following: age category, sex, province, retired or not, frequency of consuming alcohol, frequency of HED episodes, purchasing more alcohol than usual during restrictions, having less money to purchase alcohol during restrictions, no longer purchasing alcohol during restrictions, and the ease of purchasing alcohol online compared to purchasing groceries. Multicollinearity was assessed by examining correlations between independent variables. No two predictors had a correlation of more than 0.5. Model fit was checked using an adaptation of Hosmer–Lemeshow's goodness-of-fit test, and all models indicated appropriate fit.

Ethics

The study was conducted according to the guidelines of the Declaration of Helsinki, and was approved by the Human Research Ethics Committee of the South African Medical Research Council (EC017-6/2020, 20 July 2020) and of the Biomedical Science Research Ethics Committee of the University of the Western Cape (BM21/5/11, 12 July 2021).

Results

Socio-demographic description of participants in the survey

A total of 792 participants took part in the survey, of whom 69.7% were female (Table 1). The majority of participants (55.3%) reported buying alcohol illegally during the COVID-19 alcohol sales bans in 2020 and were over the age of 55, of the white population group, working full time, and living in Gauteng or the Western Cape Provinces. Nearly 20% of participants stated they were able to work remotely, 16% said they had lost income and 13% reported being essential workers during the COVID-19 lockdown period. When comparing the proportions in each age category, there was a significantly higher frequency of people between the ages of 45 and 54 who purchased alcohol illegally, with the opposite being true for those who were 65 years and older.

Table 1: Comparison of the socio-demographics of people purchasing alcohol illegally and those who did not purchase alcohol illegally

Variables	Total alcohol consumers *n*(%) 95% CI	Purchased illegally *n*(%) 95% CI	Did not purchase illegally *n*(%) 95% CI	*p*-value (chi²)
Age				
18–34	108(13.8) 11.5–16.4	67(15.5) 12.4–19.2	41(11.7) 8.6–15.4	<0.001
35–44	144(18.4) 15.8–21.2	84(19.5) 16.0–23.4	60(17.1) 13.4–21.3	
45–54	162(20.7) 18.0–23.7	105(24.4) 20.5–28.6	57(16.2) 12.7–20.4	
55–64	229(29.3) 26.2–32.5	124(28.8) 24.6–33.2	105(29.9) 25.3–34.9	
≥65	139(17.8) 15.2–20.6	51(11.8) 9.0–15.1	88(25.1) 20.8–29.8	
Population group[a]				
Black African	77(9.6) 7.7–11.8	36(8.1) 5.9–11.0	41(11.4) 8.4–15.0	0.344
Coloured	37(4.6) 3.3–6.2	18(4.1) 2.5–6.2	19(5.3) 3.3–8.0	
White	662(82.5) 79.8–85.1	374(84.6) 81.0–87.7	288(80.0) 75.6–83.9	
Asian/other	26(3.2) 2.2–4.6	14(3.2) 1.8–5.1	12(3.3) 1.8–5.6	
Sex				
Male	240(30.3) 27.2–33.6	146(33.3) 29.0–37.8	94(26.6) 22.2–31.3	0.039
Female	552(69.7) 66.4–72.8	292(66.7) 62.2–71.0	260(73.4) 68.7–77.8	
Province				
Eastern Cape	65(8.1) 6.3–10.1	29(6.5) 4.5–9.1	36(10.0) 7.2–13.4	
Free State	31(3.9) 2.7–5.3	20(4.5) 2.9–6.7	11(3.1) 1.6–5.2	

Variables	Total alcohol consumers *n*(%) 95% CI	Purchased illegally *n*(%) 95% CI	Did not purchase illegally *n*(%) 95% CI	*p*-value (chi²)
Gauteng	321(39.9) 36.5–43.3	181(40.7) 36.2–45.3	140(38.9) 34.0–44.0	
KwaZulu-Natal	121(15.0) 12.7–17.6	56(12.6) 9.7–15.9	65(18.1) 14.3–22.3	
Mpumalanga	32(4.0) 2.8–5.5	20(4.5) 2.9–6.7	12(3.3) 1.8–5.6	
Limpopo	27(3.4) 2.3–4.8	12(2.7) 1.5–4.5	15(4.2) 2.5–6.6	0.034
Northern Cape	10(1.2) 0.6–2.2	8(1.8) 0.9–3.4	2(0.6) 0.1–1.8	
North West	22(2.7) 1.8–4.0	10(2.2) 1.2–3.9	12(3.3) 1.8–5.6	
Western Cape	176(21.9) 19.1–24.8	109(24.5) 20.7–28.6	67(18.6) 14.9–22.9	
Are you any of the following: aged 70+, have a serious underlying medical condition or immunocompromised?				
Yes	98(12.6) 10.4–15.1	46(10.7) 8.1–13.9	52(14.9) 11.5–18.9	0.081
No	680(87.4) 84.9–89.6	383(89.3) 86.1–91.9	297(85.1) 81.1–88.5	
Which COVID-19 pandemic restrictions are you currently in?[b]				
1 Total restriction	13(1.2) 0.7–1.9	5(0.8) 0.3–1.7	8(1.6) 0.8–3.0	
2 Very restricted	134(12.0) 10.2–14.0	71(11.3) 9.0–14.0	63(12.8) 10.1–16.0	
3 Moderate restriction	557(49.7) 46.8–52.7	317(50.5) 46.6–54.4	240(48.8) 44.4–53.2	0.156
4 Limited restriction	357(31.9) 29.2–34.6	194(30.9) 27.4–34.6	163(33.1) 29.1–37.4	
5 Social distancing only	30(2.7) 1.9–3.7	19(3.0) 1.9–4.6	11(2.2) 1.2–3.8	
6 No restriction	29(2.6) 1.8–3.6	22(3.5) 2.3–5.2	7(1.4) 0.6–2.8	
What was your employment status before the COVID-19 pandemic (i.e. before the COVID-19 restrictions)? (yes)				
Working full-time	408(36.3) 33.5–39.1	241(38.2) 34.5–42.0	167(33.8) 29.7–38.1	0.129
Working part-time	43(3.8) 2.8–5.1	27(4.3) 2.9–6.1	16(3.2) 1.9–5.1	0.367
[Self-employed / contractor][c]	137(12.2) 10.4–14.2	83(13.2) 10.7–16.0	54(10.9) 8.4–13.9	0.258
[Student/homemaker/ unemployed/unable to work due to disability/ volunteer]	93(8.3) 6.8–10.0	49(7.8) 5.9–10.0	44(8.9) 6.6–11.7	0.490
Retired	156(13.9) 11.9–16.0	61(9.7) 7.5–12.2	95(19.2) 15.9–22.9	<0.001
How has your work status currently been impacted by the COVID-19 pandemic restrictions? (yes)				
I am considered an essential worker	151(13.4) 11.5–15.5	93(14.7) 12.1–17.7	58(11.7) 9.1–14.8	0.143
Able to work remotely	206(18.3) 16.1–20.7	116(18.4) 15.5–21.5	90(18.2) 15.0–21.8	0.943
I am unable to transition to work my usual role remotely	31(2.8) 1.9–3.8	19(3.0) 1.9–4.6	12(2.4) 1.3–4.1	0.554
I have lost income	179(15.9) 13.9–18.1	110(17.4) 14.6–20.5	69(14.0) 11.1–17.2	0.115
Change of employer or position	59(5.2) 4.1–6.7	38(6.0) 4.4–8.1	21(4.3) 2.7–6.3	0.186

[a]These terms originate from the apartheid era. They refer to demographic markers and do not signify inherent characteristics. They refer to people of European, African, Asian and mixed (African, European and/or Asian) ancestry, respectively. These markers were chosen for their historical significance. Their continued use in South Africa is important for monitoring improvements in health and socio-economic disparities, identifying vulnerable sections of the population, and planning effective prevention and intervention programmes.

[b]1 Stay at home – cannot leave house (or only for essentials with permission). 2 Stay at home – can leave for food/medical/exercise. Non-essential businesses/schools are closed. Public gatherings banned. Physical distancing required. 3 Stay at home – can interact with a few people outside your household. Some businesses are open. School may/may not be open. Public gatherings banned. Physical distancing required. 4 Most businesses, schools, workplaces open, gatherings of people allowed but size restricted, physical distancing required. 5 Physical distancing only required. 6 Life as normal.

[c]Square brackets indicate the variables that were combined into one variable.

Women and people who were retired were significantly less prone to purchase alcohol illegally. People in the Western Cape Province had a significantly higher frequency of illegal alcohol purchasing, while participants from KwaZulu-Natal had a lower frequency of illegal alcohol purchasing.

Comparison of online alcohol purchasing behaviour

The majority of both those who bought alcohol illegally during COVID-19 pandemic restrictions and those who did not, responded that they 'never' bought more alcohol online to continue drinking when their alcohol ran out, while a third (27%) said that they did buy alcohol online to continue drinking (Table 2). This was also true for HED and moderate drinkers. Unfortunately, too few respondents answered this question to determine a significant difference between the groups for this question.

Significantly more moderate drinkers than HED said they switched to buying alcohol online during the pandemic, while there was no difference found for buying alcohol online between illegal or non-illegal purchasers. Additionally, purchasing less alcohol than usual was only significantly higher for moderate drinkers, with no difference found between illegal and non-illegal purchasers. However, significantly more HED and illegal alcohol purchasers reported buying more alcohol than usual during alcohol sales restrictions, even though both HED and illegal alcohol purchasers also reported to have less money to purchase alcohol. Those who reported that they stopped purchasing alcohol during the pandemic restrictions were significantly more likely to be people who drank alcohol in moderation and those who did not buy alcohol illegally.

Significantly more participants who bought alcohol illegally said that it was 'more difficult' to buy alcohol online than it was to buy groceries online, while the majority of those who did not buy alcohol illegally did not notice any difference in difficulty. There was a similar trend seen for HED and moderate drinkers; however, these frequencies were found to be not significantly different.

Alcohol purchasing practices

In relation to where respondents purchased alcohol between 2019 (before the COVID-19 pandemic) and 2020, we found an estimated 40, 32 and 29 percentage point decreases in alcohol being bought from liquor stores or alcohol shops, supermarkets, and on-licence types of shops, respectively, in 2020 (Figure 1). Purchasing alcohol from unlicenced/illegal outlets and from friends increased by 21 and 14 percentage points, respectively, while online/home delivery decreased by 2 percentage points between 2019 and 2020. People who stated that they did not buy any alcohol in 2020 went up by 13 percentage points, compared to 2019.

Types of alcohol purchased online

There was an overall reduction in online purchasing of all types of alcohol between 2019 and 2020 (Figure 2). The type of alcohol purchased most frequently online did not differ from 2019 to 2020, with wine and sparkling wine being the most frequently bought alcohol online. Spirits were the second most frequently type of alcohol bought online, with beer third and ciders/alco-pops coming in fourth place.

Table 2: Comparison of online alcohol purchasing behaviour and household purchasing changes between those that consume alcohol who purchased alcohol illegally during COVID-19 restrictions and those who did not, as well as between heavy episodic drinkers (HED) and moderate drinkers

Variables	Total alcohol consumers *n*(%)	Purchased illlegally *n*(%)	Did not purchase illegally *n*(%)	*p*-value (chi²)	Total alcohol consumers *n*(%)	HED *n*(%)	Moderate drinkers *n*(%)	*p*-value (chi²)
If your alcohol has run out while you were in the middle of drinking, have you sometimes ordered more alcohol online to keep drinking during the COVID-19 pandemic restrictions?								
Often/sometimes	40(26.7)	20(29.4)	20(24.4)		34(27.4)	13(34.2)	21(24.4)	
Never	71(47.3)	29(42.6)	42(51.2)	0.574	57(46.0)	14(36.8)	43(50.0)	0.363
Not applicable	39(26.0)	19(27.9)	20(24.4)		33(26.6)	11(28.9)	22(25.6)	
Have the COVID-19 pandemic restrictions affected your, or your household's, alcohol purchasing behaviour in the following ways? (yes)								
Switched to purchasing online	274(24.4)	144(22.8)	130(26.3)	0.175	200(26.4)	80(21.8)	120(35.8)	0.006
Purchasing more alcohol than usual during the restrictions	384(34.1)	250(39.6)	134(27.1)	<0.001	288(38.0)	178(48.5)	110(28.1)	<0.001
Less money to purchase alcohol	444(39.5)	292(46.3)	152(30.8)	<0.001	298(39.3)	164(44.7)	134(34.3)	0.003
Purchasing less alcohol than usual during the restrictions	501(44.5)	282(44.7)	219(44.3)	0.904	348(45.9)	143(39.0)	205(52.4)	<0.001
No longer purchasing alcohol	260(23.1)	59(9.4)	201(40.7)	<0.001	143(18.9)	46(12.5)	97(24.8)	<0.001
During the COVID-19 pandemic restrictions, was/is it easier to get alcohol delivered online than fresh food/groceries?								
Easier	72(23.7)	51(28.3)	21(16.9)		48(21.1)	27(32.5)	21(18.8)	
Haven't noticed any difference	107(35.2)	50(27.8)	57(46.0)	0.003	85(37.4)	36(31.3)	49(43.8)	0.152
More difficult	125(41.1)	79(43.9)	46(37.1)		94(41.4)	52(45.2)	42(37.5)	

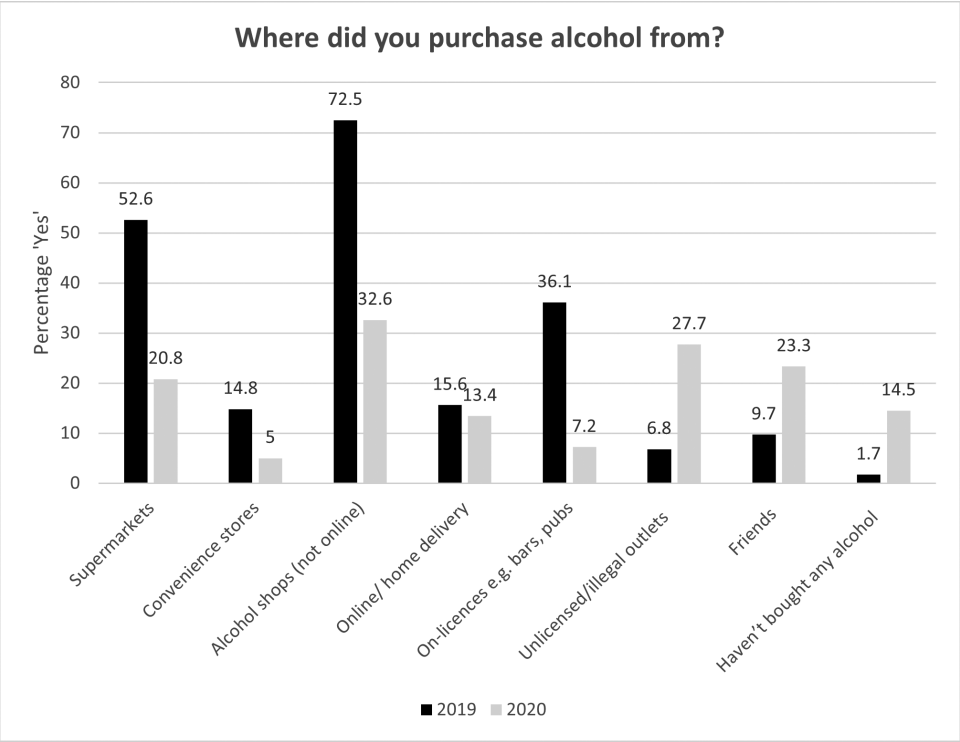

Figure 1: Comparison of alcohol purchasing venue/method between 2019 pre-COVID and 2020 during COVID (all respondents).

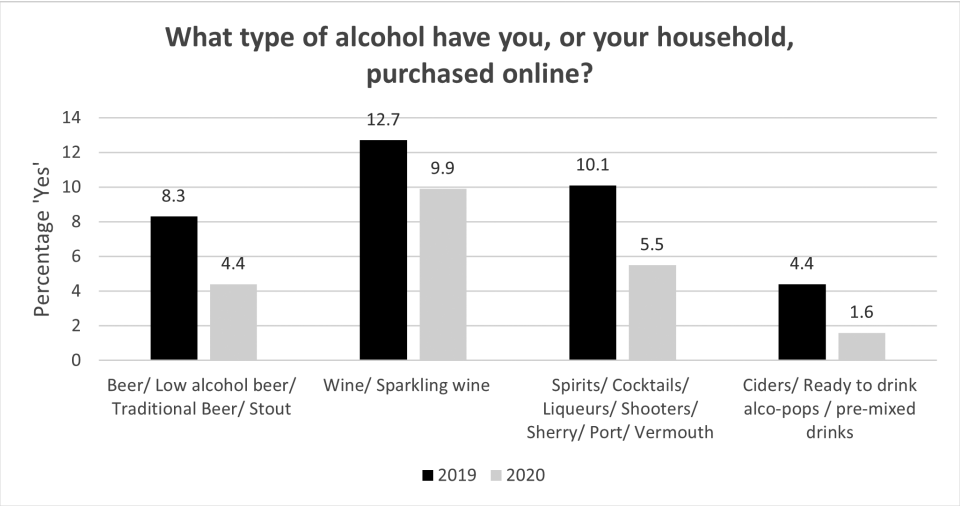

Figure 2: Comparison of types of alcohol purchased online between 2019 pre-COVID and 2020 during COVID (all respondents).

Types of alcoholic drinks consumed on a typical drinking occasion

In 2019 wine was the most popular alcohol type consumed at 44%, followed by spirits at 35%, beer at 28% and ciders at 15% (Figure 3). All these alcohol types saw a reduction in consumption during the alcohol sales bans of 2020. However, home-brewed beer and home-brewed vodka increased by 5 and 2 percentage points, respectively.

Alcohol intake, online alcohol delivery and digital marketing of online delivery

The frequency of drinking alcohol seemed to be similar between 2019 and 2020, with only slight decreases for the categories 'drinking more than once a day' and '1–6 times per week' in 2020 (Table 3). When asked how often respondents consumed more than six drinks on one occasion, responses indicated a decrease of 13 percentage points for 'weekly', and an increase of 18 percentage points for 'never', between 2019 and 2020. Having more than six drinks per occasion went up for the 'daily' category by 1 percentage point in 2020. Due to the reduction in excessive consumption of alcohol, the percentage of people classified as HED decreased by 5 percentage points.

Online alcohol delivery times seemed to slow down during 2020, with a 20 percentage point increase in respondents stating that it took more than 2 days for their alcohol to be delivered compared to 2019. Verifying age on delivery worsened, with 65% and 83% of people under 25 years stating that their identity document was not requested at the delivery of alcohol bought online in 2019 and 2020, respectively. There was a 20 percentage point increase in the proportion of respondents stating that they saw 'a lot of online alcohol delivery advertisements' in 2020 compared to 2019.

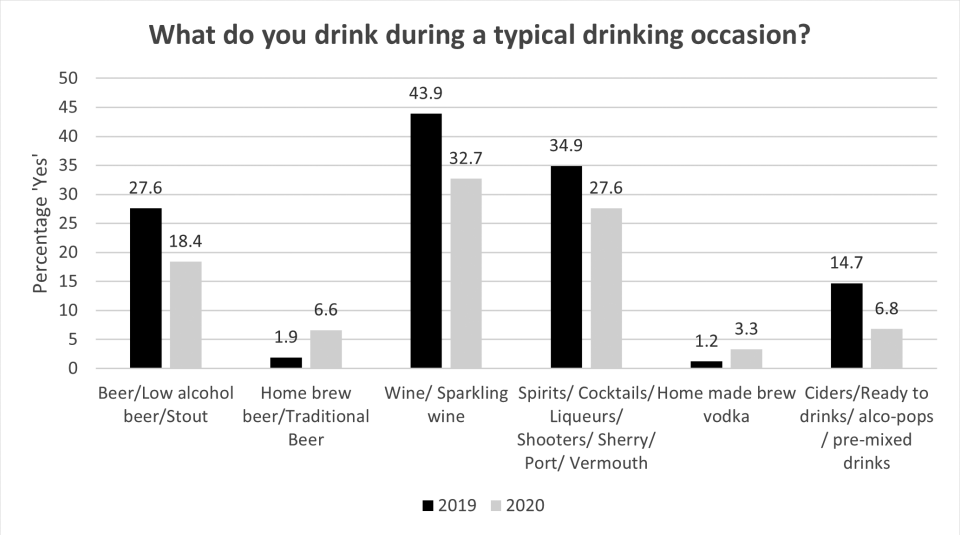

Figure 3: Comparison of types of alcoholic drinks that were consumed on a typical drinking occasion between 2019 pre-COVID and 2020 during-COVID (all respondents).

Predictors of illegal alcohol purchasing during the COVID-19 pandemic in 2020

Multiple logistic regression analysis showed that, compared to 18–34 year olds, people who were 65 years and older had significantly lower odds of purchasing alcohol illegally (Table 4). Compared to men, women had significantly lower odds, and compared to the Eastern Cape Province, people in the Western Cape showed double the likelihood of buying alcohol illegally. Compared to retired people, those who were not retired also had a significantly higher likelihood of illegal alcohol purchasing. Compared to participants who reported that the COVID-19 pandemic restrictions affected their household's alcohol purchasing behaviour by no longer purchasing alcohol, those who continued to purchase alcohol were six times more likely to buy alcohol illegally.

There was a threshold of significantly reduced odds of purchasing alcohol illegally: as soon as someone drank only monthly, less than once a month, and less than four times a year, compared to people who drank daily, and when people reported drinking heavily monthly or less than monthly, compared to people who drank heavily daily.

Regarding purchasing behaviour, we found that the following factors significantly reduced the odds of purchasing alcohol illegally: participants who said that they bought less alcohol than usual, who said they had enough money to buy alcohol, and those who said that there was no difference in the difficulty between grocery shopping and alcohol shopping online.

Discussion

During the COVID-19 pandemic lockdown restrictions and alcohol sales bans of 2020, it is evident that, even though alcohol consumption was reduced, more than half the participants of this survey reported buying alcohol illegally from friends or illegal/unlicenced on-site outlets. Even though 25.4% of participants switched to purchasing alcohol online during the COVID-19 restrictions, illegal alcohol sales were not taking place on licenced online alcohol applications. Factors that significantly increased the odds of people buying alcohol illegally were, in order of highest to lowest strength of the adjusted odds ratio: (1) being male, (2) buying more alcohol than usual during the restrictions, (3) not having enough money to buy alcohol, (4) drinking alcohol weekly or more often, (5) having HED episodes weekly or more often, and (6) having the perception that buying alcohol online is easier than buying groceries online.

Previous research on this data set found that HEDs were significantly more prone to buying alcohol illegally than were moderate drinkers.[5] HEDs and those who bought alcohol illegally were also significantly more prone to report buying more alcohol than usual during the COVID-19 pandemic restrictions, as well as report having less money to buy alcohol than moderate drinkers and those who did not buy alcohol illegally. This finding may be due to the addictive nature of alcohol, which leads people to spend their money on their addiction rather than on essential goods.[16]

We would expect those provinces with the highest frequency of HEDs to be the provinces with the highest frequency of illegal alcohol purchasing. However, this is not what we found. The finding that people residing in the Western Cape were significantly more likely to buy alcohol illegally, is in contradiction with the 2016 South African Demographic and Health Survey (SADHS), which reported that the highest frequency of male and female HEDs resided in Gauteng and the Northern Cape, respectively.[17] The finding that people residing in the Western Cape had twice the odds of buying alcohol illegally may be due to the small sample size of participants in the other provinces or that the Western Cape has an abundance of more than 2600 wine producers, producing more than 900 million litres of wine in 2021, making it easier to find alcohol being sold illegally during the alcohol sales bans.[18]

Our research found that wine and sparkling wine were the most frequently consumed and bought types of alcohol reported by participants. Strong liquor was consumed second most, while beer and cider were the third and fourth most frequently consumed, respectively. These trends stayed the same between 2019 and 2020. These alcohol statistics differ from the WHO statistics, which show that beer is sold most frequently in South Africa, then wine, and, thirdly, spirits.[3] This discrepancy could be due to the higher income level of respondents of this survey, which was only accessible to people with Internet, which is not freely available in South Africa. According to the Brand Mapp survey, wine is the preferred type of alcohol for older generations who earn more than ZAR10 000 per month (USD631) in South Africa and who are more likely to have Internet access.[19]

During the alcohol sales restrictions, there was a slight increase in the consumption of home-brewed types of alcoholic beverages, such as home-made beer and vodka. In South Africa, the price of pineapples increased during alcohol sales bans, due to them being used to brew alcohol at home.[20] When we asked participants where they purchased their alcohol, during the alcohol sales restrictions compared to the previous year, we found that illegal/unlicenced on-site sources and friends as a source both increased from the previous year. Online alcohol purchasing decreased by 2 percentage points from 2019, and even though marketing of online alcohol delivery agencies went up by 20 percentage points from 2019 to 2020, the majority of participants reported that online purchasing of alcohol was more difficult than buying groceries online. A total of 62% of participants said it took up to 2 days

Table 3: Comparison between 2019 pre-COVID and 2020 during COVID, of frequency of drinking, HED, online alcohol delivery times, age verification upon alcohol delivery and prevalence of digital marketing of online alcohol delivery advertisements noticed by participants

Variables	2019 *n*(%)	2020 *n*(%)
How often did you have a drink containing alcohol?[a]		
≥1 times per day	308(30.6)	225(24.4)
1–6 times a week	544(54.0)	440(47.8)
1–4 times per month	102(10.1)	120(13.0)
Less than once a month	25(2.5)	52(5.6)
1–3 times per year	17(1.7)	17(1.8)
Didn't drink	11(1.1)	67(7.3)
How often did you have 6 or more drinks of alcohol on a single occasion?		
Daily	95(10.4)	87(11.5)
Weekly	250(37.8)	189(24.9)
Monthly	146(16.0)	91(12.0)
Less than monthly	181(19.8)	121(16.0)
Never	240(17.4)	270(35.6)
Classified as HED[b]		
Yes	491(53.8)	367(48.4)
No	421(46.2)	391(51.6)
How long on average did it take for your alcohol to be delivered?		
Less than 15 minutes	10(5.3)	1(0.7)
15 minutes to an hour	24(12.8)	8(5.2)
1 hour to 24 hours	18(9.6)	22(14.4)
Between 1 to 2 days	56(29.8)	27(17.6)
More than 2 days	80(42.6)	95(62.1)
If you are under 25, have you been asked to show age ID when online alcohol has been delivered?		
Often	6(23.1)	3(17.6)
Sometimes	3(11.5)	0
Never	17(65.4)	14(82.4)
How many ads for online alcohol delivery did you notice?		
A lot of ads per day	17(13.6)	43(33.1)
Some ads per day	28(22.4)	24(18.5)
A few ads per day	46(36.8)	41(31.5)
No ads	34(27.2)	22(16.9)

[a]A drink is defined as a half-pint (340 mL) of beer containing 5% alcohol, or a shot (30 mL) of spirits containing 40% alcohol, or a small glass (120 mL) of wine containing 12% alcohol.

[b]HED, heavy episodic drinker. Based on the question "How often did you have 6 or more drinks of alcohol on a single occasion during 2019/the COVID-19 pandemic restrictions?" Those who answered anything more regular than monthly (including monthly) were classified HED while those who answered anything less frequently than monthly were classified as moderate drinkers.

for alcohol to be delivered in 2020, which was similar to New Zealand.[10] A third of alcohol consumers reported buying more alcohol online when their alcohol was finished, presumably when alcohol sales restrictions were lifted. Even though there were other countries that also had alcohol sales bans during COVID-19, there were no other research papers that we could find that reported on where people illegally bought alcohol, or how many of them did so. A study from Thailand indicated that 5.8% of people saw illegal alcohol sales being conducted, while 15.7% of people drank socially during the 3-week (10 April – 1 May 2020) alcohol sales ban.[21]

The legal age for purchasing and drinking alcohol in South Africa is 18 years, and age has to be verified by alcohol trading companies, including

Table 4: Multiple logistic regression with illegal purchasing as the dependent variable

Variables	AOR	95%CI	*p*-value
Age			
18–34	(ref)		
35–44	0.86	0.51–1.43	0.553
45–54	1.13	0.68–1.87	0.642
55–64	0.72	0.45–1.15	0.173
≥65	0.35	0.21–0.60	**0.000**
Sex			
Male	(ref)		
Female	0.72	0.53–0.98	**0.039**
Province			
Eastern Cape	(ref)		
Free State	2.26	0.93–5.46	0.071
Gauteng	1.60	0.94–2.74	0.084
KwaZulu-Natal	1.07	0.58–1.96	0.828
Mpumalanga	2.07	0.87–4.92	0.100
Limpopo	0.99	0.40–2.45	0.988
Northern Cape	4.97	0.98–25.21	0.053
North West	1.03	0.39–2.73	0.945
Western Cape	2.02	1.14–3.59	**0.017**
Are you retired?			
Yes	(ref)		
No	2.22	1.57–3.14	**0.000**
Frequency of drinking			
≥1 times per day	(ref)		
1–6 times a week	0.96	0.68–1.35	0.800
1–4 times per month	0.45	0.28–0.70	**0.001**
Less than once a month	0.26	0.14–0.49	**0.000**
1–3 times per year	0.11	0.03–0.38	**0.001**
Heavy episodic drinking frequency of drinking occasions			
Daily	(ref)		
Weekly	0.99	0.52–1.88	0.978
Monthly	0.42	0.21–0.83	**0.012**
Less than monthly	0.39	0.21–0.74	**0.004**
Purchasing more alcohol than usual during the restrictions			
Yes	(ref)		
No	0.57	0.44–0.73	**<0.001**
Less money to purchase alcohol			
Yes	(ref)		
No	0.52	0.40–0.66	**<0.001**
No longer purchasing alcohol			
Yes	(ref)		
No	6.65	4.82–9.18	**<0.001**

Variables	AOR	95%CI	*p*-value
Ease of buying alcohol online compared to groceries online			
Easier	(ref)		
No difference	0.36	0.19–0.68	**0.002**
More difficult	0.71	0.38–1.32	0.277

AOR, adjusted odds ratio

for online alcohol sales, either upon ordering or delivery.[22] Our research found that age verification became even more careless in 2020 than it was in 2019, with 82% of participants under the age of 25 stating that their age was never verified when purchasing alcohol online. The lack of age verification was higher in South Africa than in other countries such as New Zealand, where it was found that 58% of people under the age of 25 reported that their age was not verified[10], 45% in the United States of America[23] and 36% in Australia[24]. There was no research on age verification through illegal alcohol sale avenues during the sales ban in South Africa. However, we can assume that it would have been even worse than what was found for legal online alcohol delivery applications.[4,25]

It has been well documented that early initiation of alcohol use is associated with risky or harmful alcohol use as an adult.[26] Added to this is the fact that online alcohol delivery increases the ease with which alcohol can be obtained, and the fact that an increase in alcohol outlet density and an increase in digital marketing of alcohol lead to an increase in alcohol use at a young age, which may lead to more alcohol-related harms within the household.[6,7,27-30] According to the international policy review done by Colbert et al.[29], steps should be put in place to strengthen online alcohol sales regulations.

Our findings demonstrate that the perception that it was easier to buy alcohol than groceries online, was associated with significantly increased odds of purchasing illegal alcohol. We could speculate that this finding is due to the perception that alcohol was easily accessible, even during alcohol sales bans, when legal and official online sales and deliveries were cancelled. However, illegal sales that were taking place via WhatsApp, Facebook, and other social messaging platforms, were probably continuing. By enforcing more robust regulations and fines on digital alcohol sales platforms, illegal alcohol sales may be reduced, and with it the perception of ease of online alcohol sales.[9, 31]

Nearly half of HEDs reported buying more alcohol than usual during the alcohol sales restrictions, while moderate drinkers were purchasing less alcohol than usual and even stopped buying alcohol. There was a reduction in HED classification of 5.4 percentage points between 2019 and 2020, with the largest reduction being shown in daily and weekly frequency of alcohol consumption. This finding highlights the fact that alcohol consumption behaviours reduced during the alcohol sales restrictions. However, those who wanted to buy alcohol managed to do so even though it was illegal. To reduce alcohol consumption, without having to implement alcohol sales bans, researchers have found that a minimum unit price of alcohol products of as low as ZAR10 (USD0.6) has the potential to save lives by reducing alcohol intake and harms associated with it.[32]

In the current study, we found that people who consumed alcohol daily or weekly, and had HED episodes daily or weekly, were around 60% more likely to buy alcohol illegally than those who consumed alcohol less frequently. This knowledge can be used to tailor interventions aimed at reducing illegal alcohol purchases, reducing consumption by those who are heavy drinkers, and ensuring online sales of alcohol are not allowed during times when physical outlets are closed.

A limitation of the current research is that our survey was placed on only one online digital platform, which excluded people from participating if they did not have Internet access, or were not on that social networking platform. There was a high response rate from older age groups and predominantly white population groups living in Gauteng and the Western Cape of South Africa, which limits the generalisability of the findings. Another limitation is that people may not have recalled exactly what they observed or did the year before when asked to compare 2019 to 2020.

Conclusion

We found that alcohol sales bans increased alcohol purchasing by HEDs, even though they had less money to buy alcohol. However, overall, the alcohol sales ban led to a reduction in alcohol intake compared to the previous year. Illegal alcohol sales were not taking place through licenced online/home delivery applications, but rather through unlicenced/illegal outlets and friends. Retrospective research may shed light on where and how these illegal alcohol sales took place and to understand the phenomenon better. A third of alcohol consumers reported that they bought alcohol online to continue drinking when their alcohol ran out, indicating a need for online interventions that prevent high-intensity drinking.

To reduce heavy drinking, a multitude of interventions is needed simultaneously, including minimum unit pricing, stricter online regulations, especially preventing access and marketing of alcohol to minors, a ban on the marketing of alcohol overall, and a reduction in outlet density. The low levels of age verification for online alcohol sales indicate that immediate programmatic and enforcement of regulations, such as the inclusion and verification of an identification number when purchasing alcohol online, is needed in South Africa.

Whilst this study has yielded interesting results, it cannot be generalised to the entire population, but rather only to those who had Internet access and responded to an online survey.

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Competing interests

We have no competing interests to declare.

Authors' contributions

M.T.: Formal analysis; investigation; data curation; writing – original draft preparation; writing – review and editing; visualisation. R.S.: Writing – review and editing. M.L.: Conceptualisation; methodology; formal analysis; investigation; data curation; writing – original draft preparation; funding acquisition. C.P.: Conceptualisation; methodology; writing – review and editing; funding acquisition. P.P.W.: Conceptualisation; methodology; funding acquisition. N.H.: Conceptualisation; methodology; software; validation; investigation; resources; writing – original draft preparation; writing – review and editing; supervision; project administration; funding acquisition.

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