

Research Paper

Impacts of changes in alcohol consumption patterns during the first 2020 COVID-19 restrictions for people with and without mental health and neurodevelopmental conditions: A cross sectional study in 13 countries



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ABSTRACT

Background: The initial period of COVID-19-related restrictions affected substance use in some population groups. We explored how changes in alcohol use at the beginning of the pandemic impacted the health and wellbeing of people with and without mental health and neurodevelopmental conditions (MHDCs).

Methods: Data came from the Global Drug Survey Special Edition on COVID-19 conducted in May–June 2020. Measured were; changes in drinking compared to February 2020 (pre-COVID-19 restrictions), reasons for changes, and impact on physical health, mental health, relationships, finances, work/study, and enjoyment. This study included 38,141 respondents (median age = 32 IQR 25–45; 51.9% cis man; 47.8% cis woman; 1.2% trans/non-binary; 30.2% with MHDCs e.g. depression 20.0%, anxiety 16.3%, ADHD 3.8%, PTSD 3.3%).

Results: A third (35.3%) of respondents with MHDCs and 17.8% without MHDCs indicated that increased drinking affected their mental health negatively ($p < .001$); 44.2% of respondents with MHDCs compared to 32.6% without MHDCs said it affected their physical health negatively ($p < .001$). Reduced drinking was associated with better mental health among a fifth (21.1%) of respondents with MHDCs and 14.4% without MHDCs ($p < .001$). Age, relationship status, living arrangements, employment, coping and distress were significant predictors of increases in drinking.

Conclusion: Among people with MHDCs, reduced alcohol consumption was associated with better mental health, while the negative effects of increased drinking were more pronounced when compared to people without MHDCs. When supporting people in reducing alcohol consumption during uncertain times, people with MHDCs may need additional support, alongside those experiencing greater levels of distress.

Introduction

The COVID-19 pandemic forced people around the world to dramatically change their lifestyles by staying at home and remaining physically distant from people who were not in the same household. During the initial restrictions, pubs, bars and clubs were closed in many countries, such as the UK and Australia for example, but not elsewhere,

such as Uruguay. However, in some places where these premises remained closed, regulations allowed alcohol sales for consumption from off licensed premises and these outlets were designated as essential services (Chick, 2020; Hobin & Smith, 2020). Subsequently, in many Western countries, supermarket and online alcohol sales increased and were associated with health problems (Chick, 2020; Huckle et al., 2020; Pollard et al., 2020). The World Health Organization recommended that people avoid alcohol altogether during the pandemic, due to negative effects on the immune system, physical and mental health, and wellbeing (WHO, 2020). However, a number of surveys launched in the aftermath of the lockdowns suggested that while most people did not change

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or reduce their drinking, some people increased the amount and/or frequency of alcohol consumed (Jackson et al., 2021; Manthey et al., 2021).

Alcohol has a long established relationship with stress and coping (Keyes et al., 2011) and past studies have found an increase in alcohol consumption in some population groups following large scale crises such as '9/11' (Cerdeira et al., 2008) and severe economic downturns, like the Global Financial Crisis (de Goeij et al., 2015; Dom et al., 2016). Similarly, hospital workers under mandatory quarantine during the 2003 severe acute respiratory syndrome (SARS) outbreak in China exhibited more symptoms of alcohol use disorder than those who were not quarantined (Wu et al., 2008). Thus, in the early days of pandemic-related stay-at-home orders around the world, researchers were keen to gather data on changes in substance use patterns and health to inform support measures.

Different studies have found contrasting patterns of changes in alcohol consumption following COVID-19 restrictions. In Germany, 37.7% of respondents reported no change in their drinking, 34.7% of respondents had increased their alcohol consumption, whereas 19.4% were drinking less than before the restrictions (Koopmann et al., 2020). A study in the United States found that 34.9% had not changed their drinking, 32.2% were drinking more, and 10.2% were drinking less (Weerakoon et al., 2020). In Poland, however, a study found that 70% had not changed their drinking behaviour while 16% decreased consumption, and 14% drank more (Chodkiewicz et al., 2020). Alongside exploring changing patterns of consumption, it is also important to consider reasons for those changes.

The focus of this paper is on mental health and neurodevelopmental conditions. It is well established that there is a link between alcohol and depressive symptoms (Boden & Fergusson, 2011), anxiety disorders (Kushner et al., 1990), post-traumatic stress disorder (Gaher et al., 2014), obsessive compulsive disorder (Dimitriou et al., 1993) and bipolar disorder (Farren et al., 2012). Thus, there is cause for concern that existing mental health conditions, as well as stress brought on by the pandemic, may be important influences on changes in drinking behaviours and outcomes. For example, those with greater depressive symptoms in a Canadian study drank more to cope with the pandemic (Wardell et al., 2020), and existing stress and depression predicted greater increases in drinking in an Australian study (Neill et al., 2020). Depressive symptoms and loneliness were common in the early stage of the pandemic (O'Connor et al., 2020), and depression and reduced psychological wellbeing were associated with increased drinking in some studies (Oldham et al., 2021; Weerakoon et al., 2020). Importantly, respondents to a Uruguayan survey who had increased consumption of their preferred psychoactive substance during the early stages of the pandemic reported greater psychological distress (Ruiz et al., 2021).

Alongside mental health conditions, we sought to explore the impact of changing alcohol consumption during COVID-19 restrictions on people with neurodevelopmental conditions. There is a lack of evidence describing alcohol consumption in people with neurodevelopmental conditions such as autistic adults (Adhia et al., 2020), who may face unique challenges in dealing with COVID-19 restrictions as they are less likely to have access to coping strategies, such as social resources (Ressel et al., 2020). Highlighting the lack of evidence, Adhia et al. (2020) identified that only one data set out of 19 potential US sources included information about autism and alcohol use. Attention Deficit Hyperactivity Disorder (ADHD) is also associated with alcohol consumption and dependence (Capusan et al., 2016; Mochrie et al., 2020). Mochrie et al. (2020) for example, surveyed 1,748 US college students and found that those with ADHD were more likely to drink more frequently, engage in binge drinking, and had higher depression scores than those without ADHD. It is also likely that people with ADHD may face unique challenges complying with changes in restrictions associated with COVID-19 (Merzon et al., 2020), which may lead to greater instances of drinking to cope.

Such findings highlight the need to understand the impact of changes in drinking on health and wellbeing, particularly for people with existing mental health conditions who might be at greater risk of adverse consequences from drinking.

In this paper we build on the existing evidence about alcohol consumption during the initial restrictions of the COVID-19 pandemic by exploring respondents' changes in drinking behaviour and the impact of the restrictions relative to drinking behaviour for respondents with and without mental health and neurodevelopmental conditions (MHDCs). Based on previous findings, we expect that those with MHDCs may be more likely to increase their alcohol consumption and may possibly experience more detrimental impacts from doing so than those without MHDCs. We also explore whether having MHDCs predict an increase in alcohol consumption when adjusting for other factors such as age, gender, current levels of distress, relationship and living arrangements.

Methods

Survey

The Global Drug Survey (GDS) is an annual, anonymous, online survey collecting data on drug use trends and patterns, with the aim of making drug use safer, regardless of the legal status of the drug. Surveys are usually launched in November each year, with data released the following May. GDS data have been previously used to explore alcohol-related behaviours in relation to intoxication (Davies et al., 2020), help seeking (Davies et al., 2019) and pre-loading (Ferris et al., 2019; Labhart et al., 2017). The GDS Special Edition on COVID-19 (GDS COVID-19) was developed in April 2020 after governments around the world asked citizens to stay at home and avoid meeting with people outside of their households. The focus of the GDS COVID-19 Special Edition was to understand the impact of the pandemic on peoples' lives, with a focus on the use of alcohol and other drugs, mental health and relationships prior to and during the initial lockdown. GDS recruits people via media partners worldwide such as The Guardian and Vice (UK), Zeit Online (Germany) and Stuff.nz (New Zealand). This means that the GDS sample is not representative of the wider population in these countries, and GDS participants tend to be younger, and more experienced with illicit drugs. However, previous research has demonstrated that compared to general population surveys in Australia, Switzerland and the U.S, the GDS recruits people with similar demographic characteristics as those who use cannabis and alcohol in their specific country (Barratt et al., 2017). The GDS COVID-19 Special Edition received ethical approval from the University College London (11671/001).

Participants

The sample for this study is restricted to those who reported drinking alcohol in the last 30 days, who provided answers to questions about their mental health/neurodevelopmental conditions, and from countries with >250 respondents.

Measures

Full details of all measures can be seen in Supplementary Table 1, and are summarised here.

Alcohol

Last year and last 30-day use was recorded. Three measures assessed alcohol consumption in the last 30 days and three measures assessed changes in alcohol consumption compared to February 2020 (prior to COVID-19 restrictions). This approach was in line with other studies conducted during the same time period (Grossman et al., 2020; Pollard et al., 2020). The items mirror the first three items within the Alcohol Use Disorders Identification Test (AUDIT; Babor et al., 2001) and thus of interest were the frequency of consumption in days, number

of standard drinks consumed on a typical day, and frequency of consuming more than five drinks on a single occasion. Response options were for the items assessing changes were; increased a lot, increased a little, stayed the same, decreased a little, decreased a lot (and don't know). Respondents were also asked whether, compared to February 2020 (no COVID-19 restrictions in place), they had started drinking earlier in the day (yes/no) and whether they would like to drink less in the next 30 days (yes/no).

Respondents who answered 'increased a lot' or 'increased a little' to any of the three alcohol change measures were asked to indicate reasons for changes from a list of 13 items, e.g. 'I have more time to drink' and 'I am more bored'. Respondents who answered 'decreased a little' or 'decreased a lot' to any of the three alcohol change measures were asked to indicate reasons for changes from a list of 13 items, e.g. 'I have less access to the settings where I usually drink' and 'I have less contact with people who I usually drink with'.

To assess the impact of changes in alcohol consumption, those who indicated that their drinking had increased or decreased on any of the measures were asked if the changes had any impact on their: mental health, physical health, relationships, finances, work/study performance, pleasure/enjoyment related to their drinking. The response options for both the changes in drinking scale and the impact of changes scale were developed based on previous GDS research about drinking contexts and motivations for reducing drinking. The scales were rapidly developed due to time pressures, and were piloted and adjusted to incorporate a wide range of valid responses for changes and impacts.

Mental health and neurodevelopmental conditions

Respondents were asked if they had ever received a diagnosis of the following mental health or neurodevelopmental conditions (MHDCs): depression; anxiety, panic attacks or phobias; bipolar disorder; obsessive-compulsive disorder; post-traumatic stress disorder (PTSD); ADHD/ADD; Autism, Asperger's, or Autism Spectrum Disorder (ASD); Psychotic illness/Schizophrenia; other; or none of the above. To assess current levels of mental distress, the six item Kessler scale (K6) of non-specific psychological distress was utilised (Kessler et al., 2002). This scale includes items to assess feelings of distress in the last 30 days, for example 'during the past 30 days, about how often did you feel nervous?' Response options were: all of the time, most of the time, some of the time, a little of the time, none of the time. Respondents were also asked how they had been coping with changes related to the COVID-19 pandemic (coping really well, coping with some things and not others, not coping well at all).

Sociodemographic measures included: age; gender; country of residence; relationship status; whether the respondent lived with a child, other adults or lived alone; employment status; and whether their income had changed since the restrictions (no change, earn more, earn less). Cis or trans gender was determined through concordance or discordance between current gender identity and sex assigned at birth (see Supplementary Table 1).

Analysis

Data were analysed using descriptive statistics to explore country differences in socio-demographic characteristics. Descriptive statistics were also used to explore differences between respondents with different MHDCs in terms of their drinking behaviours in the last 30 days before taking the survey. Appropriate summary statistics include mean and standard deviation for all symmetric (non-skewed) distributed measures and median, 25th and 75th quartiles for skewed distributions. A categorical variable was created combining those who reported ever having one or more of the MHDCs into one group and those without into another for some of the analyses. Categorical outcome measures were described using both numbers and proportions (percentage). Chi-Square tests were used to compare participants with MHDCs against those with none in

terms of their changes in drinking and their reasons for changes in their drinking, and the impacts of these changes.

Finally, three multi-level, multivariable binary logistic regression was used to explore predictors of increases in drinking in terms of frequency of consumption, number of drinks and binge drinking. The outcome variables combined respondents who indicated they 'increased a lot' or 'increased a little' in one category and compared them to respondents who indicated the other response options (stayed the same, decreased a little, decreased a lot, don't know). This analysis involved clustering for country of residence, which was entered as a random factor to account for confounders relating to country that were not incorporated into the model, such as drinking culture (Labhart et al., 2017). Age, gender, MHDCs, coping, relationship status (not in a relationship, in a relationship with one other person, in a relationship with two other people), whether respondents lived alone or not, and with a child or not, employment and income (employed with no change in income, not employed, earning more, earning less) coping, and Kessler 6 were entered as fixed factors in all models. Analyses were conducted in SPSS 26 (IBM).

Results

In total, 40,044 GDS COVID-19 respondents who reported drinking alcohol in the last 30 days answered questions about whether or not they had been diagnosed with MHDCs. After excluding countries with $n < 250$ the final sample was reduced to 38,141 respondents. As seen in Table 1, this included respondents from 13 countries; a large proportion (47.9%) were from Germany, in line with other waves of GDS (Davies et al., 2021). Just over half (51.0%) of the sample were cis men, 66.2% were in a relationship with one partner, 27.1% lived with at least one child, 54.9 were in full time employment, 22.9% were earning less compared to before the pandemic and 2.8% were not coping with the changes related to the COVID-19 pandemic. The average K6 score was 6.8 (SD=4.9). Respondents from Brazil ($M=11.2$, $SD=5.4$) had the highest average K6 score, and those from New Zealand the lowest ($M=5.4$, $SD=4.6$). Of the study sample; 30.2% reported diagnosis of a MHDCS (20.0% depression, 16.3% anxiety, 3.8% ADHD; see Supplementary Table 2).

Patterns of drinking during the last 30 days are presented in Supplementary Table 2, comparing respondents who disclosed specific MHDCs and those who disclosed none. In subsequent analyses, those who disclosed any MHDCs are compared with those who did not. Table 2 indicates that there was a significant association between changes in frequency of drinking, changes in number of standard drinks, and changes in binge drinking between those with and without MHDCs. Consistently, those with MHDCs were more likely to report increased drinking. Respondents with MHDCs were significantly more likely to say that they were drinking earlier in the day, and that they would like to drink less in the next 30 days.

Reasons for increases in drinking and reasons for decreases in drinking are shown in Figs. 1 and 2, comparing the percentage of those with and without MHDCs who selected each of the reasons, and displaying the sample total. The percentage of respondents who selected each response, and the Chi Square test results are shown in Supplementary Table 2. The main reasons for increased drinking were having more time (42.0%) and feeling bored more often (39.8%), as well as spending more time with their partner or household (37.6%). A greater proportion of those with MHDCs said they were more bored, stressed, lonely, and depressed (47.4%) compared to those without (35.9%). More respondents without MHDCs said that the increase in drinking was no big deal (40.8%) compared to those with MHDCs (30.7%). Only 'having more time', 'having stocked up' and 'other' were not significantly different between those with and without MHDCs.

The main reasons for decreased drinking were having less access to settings where drinking usually occurred (69.0%) and less contact with people they usually drink with (66.3%) and 43.6% reported that they

Table 1
Socio demographic characteristics of the sample.

country	N (%)	Age Mdn (P25-P75)	cis manN %	cis woman N%	trans /non-binary N %	In a relationship N %	live alone N %	live with child N %	full time emp N %	earn less N %	Kessler 6 Mean (SD)	Not coping N %	MHDCS Yes N %
Total	38141	33 (25-45)	19444 (51.0)	18223 (47.8)	474 (1.2)	25589 (67.1)	7330 (19.2)	10318 (27.1)	20941 (54.9)	6565 (22.9)	6.8 (4.9)	1079 (2.8)	11507 (30.2)
Australia	1075 (2.8)	28 (21-39)	483 (44.9)	571 (53.1)	21 (2.0)	618 (59.0)	121 (11.3)	249 (26.1)	450 (42.1)	238 (30.4)	7.9 (5.3)	43 (4.0)	531 (49.4)
Austria	757 (2.0)	31 (24-39)	391 (51.7)	356 (47.0)	10 (1.3)	491 (65.1)	179 (23.6)	137 (23.7)	340 (45.2)	167 (32.8)	6.8 (4.6)	15 (2.0)	195 (25.8)
Brazil	2128 (5.6)	29 (24-36)	1070 (50.3)	1039 (48.8)	19 (0.9)	1273 (61.0)	264 (12.4)	484 (26.0)	1029 (48.8)	460 (33.6)	11.2 (5.4)	157 (7.4)	1091 (51.3)
Denmark	303 (0.8)	23 (20-28)	182 (60.1)	117 (38.6)	4 (1.3)	156 (52.0)	106 (35.0)	58 (29.7)	100 (33.2)	46 (23.8)	7.1 (5)	9 (3.0)	102 (33.7)
France	3595 (9.4)	30 (25-39)	2082 (57.9)	1461 (40.6)	52 (1.4)	2223 (62.0)	904 (25.1)	857 (31.9)	2028 (56.7)	613 (24.7)	6.7 (5.1)	97 (2.7)	1237 (34.4)
Germany	18266 (47.9)	34 (26-47)	9134 (50.0)	8894 (48.7)	238 (1.3)	12760 (70.6)	3758 (20.6)	5121 (35.3)	9963 (55.0)	2849 (20.3)	6.4 (4.6)	407 (2.2)	4107 (22.5)
Greece	267 (0.7)	21 (18-27)	138 (51.7)	126 (47.2)	3 (1.1)	109 (40.8)	34 (12.7)	65 (27.9)	61 (23.0)	41 (43.2)	8.7 (4.9)	9 (3.4)	86 (32.2)
Ireland	3119 (8.2)	41 (34-50)	1451 (46.5)	1655 (53.1)	13 (0.4)	2289 (74.2)	387 (12.4)	1365 (50.0)	2037 (66.5)	510 (22.3)	6.0 (4.7)	83 (2.7)	1026 (32.9)
Netherlands	2095 (5.5)	24 (22-28)	823 (39.3)	1253 (59.8)	19 (0.9)	1115 (53.9)	488 (23.3)	160 (10.0)	837 (40.1)	354 (22.6)	7.4 (4.9)	72 (3.4)	809 (38.6)
New Zealand	2143 (5.6)	44 (33-55)	1025 (47.8)	1098 (51.2)	20 (0.9)	1563 (53.9)	271 (12.6)	835 (44.6)	1420 (67.1)	551 (31.9)	5.4 (4.6)	45 (2.1)	877 (40.9)
Switzerland	2385 (6.3)	33 (27-41)	1548 (64.9)	813 (34.1)	24 (1.0)	1665 (70.2)	524 (22.0)	563 (30.3)	1443 (60.9)	301 (14.9)	5.7 (4.3)	33 (1.4)	446 (18.7)
United Kingdom	1553 (4.1)	32 (25-43)	891 (57.4)	634 (40.8)	28 (1.8)	1025 (66.4)	228 (14.7)	325 (24.6)	1008 (65.2)	366 (30.0)	8.1 (5.2)	86 (5.5)	725 (46.7)
United States	455 (1.2)	32 (24-45)	226 (49.7)	206 (45.3)	23 (5.1)	302 (66.7)	66 (14.5)	99 (25.5)	225 (49.6)	69 (23.2)	9.0 (5.2)	23 (5.1)	275 (60.4)
N	N=38141	N=38141	N=38141	N=38141	N=38141	N=37772	N=38141	N=30779	N=37819	N=28613	N=36270	N=38043	N=38141

Note: Total Ns vary for some items due to survey branching (e.g. those who were not employed were not asked about changes in income) as well as missing data (e.g. no response provided to one of the K6 questions or other items not completed).

did not like drinking at home or when not out with friends. Differences between those with and without MHDCs were less evident, although a greater proportion of those with MHDCs reported that they did not feel like drinking in a pandemic (35.5%), compared to those without MHDCs (27.5%). Around a fifth of the respondents said the decrease was no big deal. There were significant differences between those with and without MHDCs for all options other than 'having less contact with people', 'less time now I am at home', 'using the time to get healthy', and 'spending more time with partner family'.

The impacts of changes in drinking are shown in Table 3. There were significant associations observed for all items. However, effect sizes were biggest for the mental health item for both increases ($V=.210$) and decreases in drinking ($V=.140$). Respondents with MHDCs who had increased their drinking were more likely to say their mental health had got worse than those without MHDCs. Conversely, those with MHDCs who had decreased their drinking were more likely to say their mental health had got better than those without MHDCs. Respondents with MHDCs who had increased their drinking were more likely to say that their work or study performance had suffered, and that their finances had suffered compared to those without MHDCs.

Models in Table 4 compared the likelihood of increasing drinking on all three measures, compared to the combined grouping of staying the same or decreasing (i.e., reference category). These results are also illustrated in Fig. 3. Age was a significant factor in all models with older age being associated with increases in frequency ($OR = 1.11$; 95%CI= 1.09-1.12), number of drinks ($OR = 1.12$; 95%CI= 1.11-1.14) and binge drinking $OR = 1.11$; 95%CI=1.09-1.12) compared to February before the restrictions. This relationship is illustrated further in Supplementary Figs. 1-3. The figures illustrate the age at which increases in drinking associated with age change to decreases in drinking (frequency =39, amount of drinks = 45, binge drinking = 44). Thus, as age increases, until around 40-45 years, there is an increase in reporting increases for each outcome, and after this point, the likelihood of reporting any of the outcomes decreases.

Gender was significant for number of drinks and binge drinking, with cis women less likely to have increased these behaviours compared to cis men (number of drinks $OR = 0.84$; 95%CI= 0.80-0.88; binge drinking $OR = 0.66$ 95%CI=0.62-0.69). MHDCs status was only significant for binge drinking; those with MHDCs more likely to have increased their binge drinking compared to those without ($OR = 1.16$; 95%CI= 1.09-1.23). Respondents who were in relationships were more likely to have increased their drinking behaviours on all three measures. Living arrangements had a different pattern of results depending on the type of drinking behaviour. Respondents who lived with a child were more likely to have increased the frequency of their drinking compared to those living alone ($OR = 1.11$; 95%CI= 1.03-1.19). Those living with other adults were less likely to increase the number of drinks. Those living with a child or other adults were also less likely to have increased binge drinking. Earning less money than before the pandemic, and not coping well was also associated with increases in all three drinking behaviours. K6 score was also a significant factor in all three models, with a higher score being associated with increases in frequency ($OR = 1.05$; 95%CI= 1.04-1.05), number of drinks ($OR = 1.07$; 95%CI= 1.06-1.07), and binge drinking occasions ($OR = 1.07$; 95%CI= 1.06-1.07), when compared to February before the restrictions.

Discussion

This paper explored changes in alcohol consumption, and impacts of any changes, during the first period of COVID-19-related restrictions in 2020 for people with and without MHDCs. It also explored whether MHDCs predicted increases in alcohol consumption adjusting for other variables. A third of the sample reported having ever received a diagnosis of one or multiple MHDCs and overall levels of current distress were not at clinical levels. Respondents with MHDCs were more likely to report increases in their drinking behaviours and were significantly more

Table 2

Bivariate associations between changes in drinking frequency, amount, binge drinking, composite measure of changes in drinking, and drinking earlier for those with a MHDCS and those without a MHDCS.

	All	Any MHDCs	No MHDCS	Chi square, p, effect size
Compared to February – before COVID-19 restrictions has the:				
number of days you drink alcohol in a typical week changed?	N=37,972	N=11,455	N=26,527	$\chi^2 = 449.67$, $p < .001$
Decreased a lot	3737 (9.8)	1235 (10.8)	2502 (9.4)	V=.109
Decreased a little	4918 (13.0)	1308 (11.4)	3610 (13.6)	
Same	11511 (30.3)	2904 (25.4)	8607 (32.4)	
Increased a little	12352 (32.5)	3798 (33.2)	8554 (32.2)	
Increased a lot	5129 (13.5)	2080 (18.2)	3049 (11.5)	
don't know	325 (0.9)	120 (1.0)	205 (0.8)	
number of standard drinks containing alcohol that you have on a typical day changed?	N=38,016	N=11,480	N=26,634	$\chi^2 = 508.78$, $p < .001$
Decreased a lot	3292 (8.7)	1103 (9.6)	2189 (8.2)	V=.116
Decreased a little	4830 (12.7)	1349 (11.8)	3481 (13.1)	
Same	16420 (43.2)	4213 (36.7)	12207 (46.0)	
Increased a little	9442 (24.8)	3115 (27.1)	6327 (23.8)	
Increased a lot	3638 (9.6)	1562 (13.6)	2076 (7.8)	
don't know	394 (1.0)	138 (1.2)	256 (1.0)	
number of times you had five or more drinks on a single occasion changed?	N=37,924	N=11,455	N=26,469	$\chi^2 = 548.55$, $p < .001$
Decreased a lot	5795 (15.3)	1743 (15.2)	4052 (15.3)	V=.120
Decreased a little	4970 (13.1)	1350 (11.8)	3620 (13.7)	
Same	18091 (47.7)	4815 (42.0)	13276 (50.2)	
Increased a little	5721 (15.1)	2075 (18.1)	3646 (13.8)	
Increased a lot	2690 (7.1)	1224 (10.7)	1466 (5.5)	
don't know	657 (1.7)	248 (2.2)	409 (1.5)	
Drinking earlier in the day compared to Feb	N=38,033	N=11,473	N=26,560	$\chi^2 = 415.464$, $p < .001$
No	27090 (71.2)	7346 (64.0)	19744 (74.3)	V=.105
Yes	10943 (28.8)	4127 (36.0)	6816 (25.7)	
Would like to drink less in next 30 days	N=38,035	N=11,507	N=26,634	$\chi^2 = 261.40$, $p < .001$
No	22255 (58.5)	6004 (52.3)	16251 (61.2)	V=.083
Yes	15780 (41.5)	5476 (47.7)	10304 (38.8)	

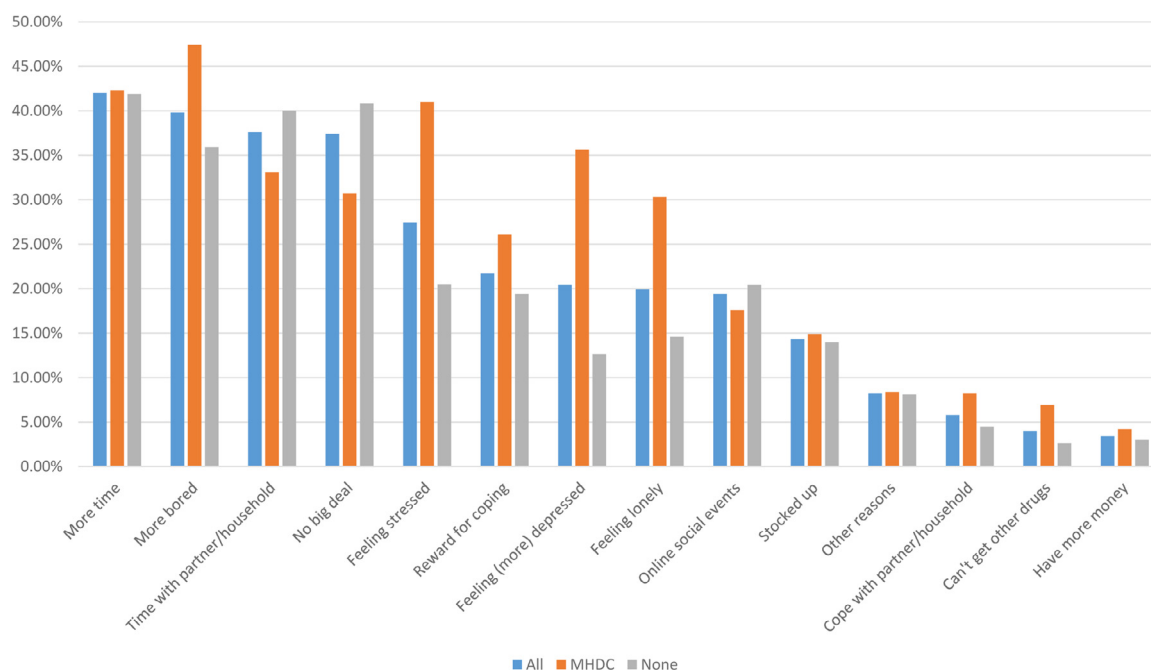


Fig. 1. Reasons for increased alcohol consumption during initial COVID-19 restrictions in May- June 2020 compared to February 2020 for those with and without MHDCs.

likely to say that they were drinking earlier in the day, and that they would like to drink less in the next 30 days. Those with MHDCs reported that they were drinking more due to feelings of boredom, stress, loneliness and depression. However, levels of current distress were a better predictor of increases in drinking than disclosed MHDCs.

Age, relationship status, living arrangements, earning less money, and not coping were also associated with increases in alcohol consumption. These may be considered further risk factors that need to be taken

into account for people with MHDCs. For example, romantic partners are an important influence on drinking behaviours (Bartel et al., 2017), and people with MHDCs may need more support from partners to avoid increasing consumption. Other research from the same time period as the current study also shows that having child under the age of 18 living at home predicted greater coping motives for drinking (Wardell et al., 2020), possibly as a result of school closures and the pressure to manage work and home schooling in some countries. People with MHDCs

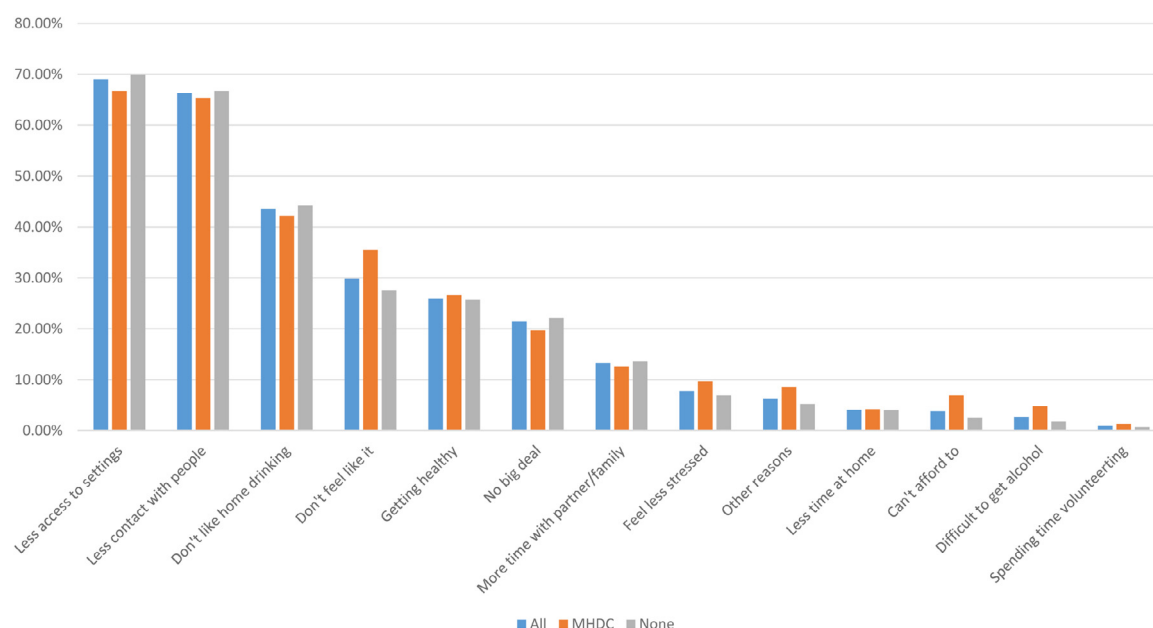


Fig. 2. Reasons for **decreased** alcohol consumption during initial COVID-19 restrictions in May- June 2020 compared to February 2020 for those with and without MHDCs.

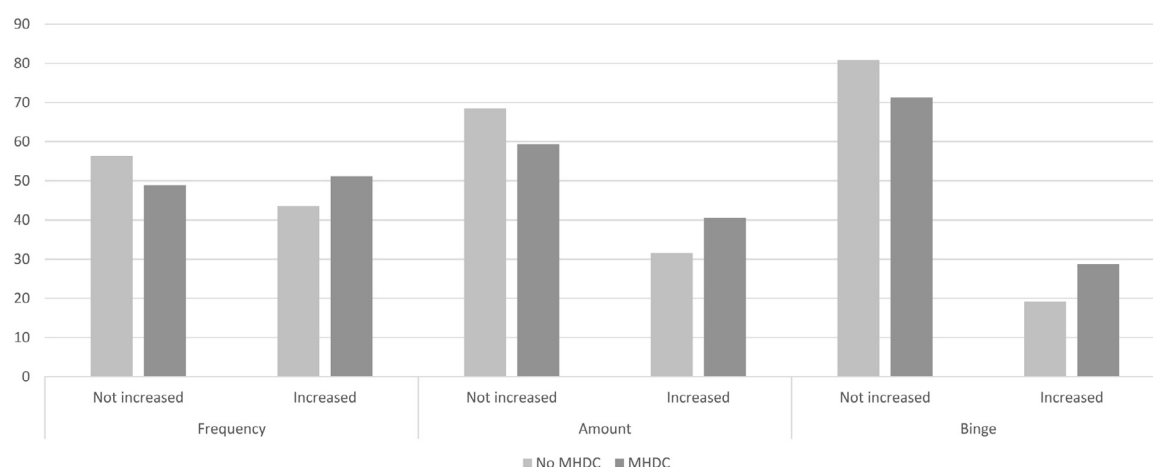


Fig. 3. Increases in alcohol consumption during initial COVID-19 restrictions in May- June 2020 compared to February 2020 for those with and without MHDCs.

facing such challenges may need targeted support to engage in healthier coping strategies.

The current level of distress may be a better predictor in this sample, as we only asked respondents about lifetime prevalence of MHDCs and they may have received adequate treatment to allow them to overcome, or live with, their condition. The average K6 score did not indicate psychological distress in the sample (Kessler et al., 2002), but country differences in K6 scores may represent differences in how safe or anxious respondents from different countries felt, as demonstrated in other large scale studies (Lieberoth et al., 2021). Those in Brazil scored more highly on distress and New Zealand respondents had the lowest score. This could be explained by different governmental approaches to the pandemic, as well as socio-economic disparities. Those in New Zealand were also older than the average age of the sample, who may be in more secure housing or employment.

Our findings concur with other research that has shown that the mental health impacts of the pandemic were felt more by those with existing mental health issues (O'Connor et al., 2020). Previous research has also found anxiety disorders were specifically linked to increased drinking during the COVID-19 restrictions (Garnett et al., 2021). However,

it is important to note the bi-directional relationship between drinking and mental health, for example a number of studies have found that increases in drinking were associated with poorer mental health and psychological wellbeing (Alcohol Change UK, 2020; Jacob et al., 2021; Oldham et al., 2021). This is particularly important in light of the finding that current levels of distress were a better predictor of increased consumption than having MHDCs. Humans are social creatures, thus periods of isolation, such as those experienced during the COVID-19 restrictions may be psychologically harmful regardless of mental health status (Usher et al., 2020). Although this may be an important concern for those MHDCs, people experiencing financial stresses, poor housing and other deprivation factors are also at risk of increased substance use.

It is also important to highlight that around a third of respondents to our survey did not change their drinking behaviours, and a significant number were consuming less alcohol than before the period of restrictions began. While media attention has focussed on reporting increases in drinking, studies have consistently showed that a large majority of people did not perceive changes to their drinking as a result of the pandemic restrictions (Chodkiewicz et al., 2020; Koopmann et al., 2020; Weerakoon et al., 2020). Media reporting should focus on this lack of

Table 3

Impacts of any increase or decrease in drinking for those with a MHDCS and those without a MHDCS.

	Impact of increase	All	MHDCS	None	Chi Square, p, V
Mental health N=13098	Worse	24.2%	35.30%	17.8%	578.18, <.001 V=.210
	Stayed the same	66.8%	54.2%	74.0%	
	Better	6.9%	8.1%	6.1%	
	Not applicable	2.2%	2.4%	2.1%	
Physical health N=13096	Worse	36.8%	44.2%	32.6%	188.08, <.001 V=.120
	Stayed the same	56.4%	49.8%	60.1%	
	Better	5.1%	4.0%	5.7%	
	Not applicable	1.7%	2.0%	1.5%	
Relationships N=12985	Worse	10.3%	13.9%	8.3%	166.16, <.001 V=.113
	Stayed the same	75.2%	70.3%	78.1%	
	Better	9.8%	9.4%	10.0%	
	Not applicable	4.6%	6.4%	3.7%	
Finances N=12947	Worse	15.4%	20.7%	12.5%	180.39, p<.001 V=.118
	Stayed the same	74.50%	69.20%	77.5%	
	Better	6.70%	6.00%	7.2%	
	Not applicable	3.30%	4.20%	2.8%	
Work/study performance N=12948	Worse	19.6%	23.9%	17.2%	192.61, <.001 V=.122
	Stayed the same	67.2%	60.2%	71.1%	
	Better	3.7%	3.4%	3.9%	
	Not applicable	9.5%	12.5%	7.8%	
Pleasure/enjoyment related to your drinking N=13032	Worse	18.3%	24.30%	14.90%	232.64, <.001 V=.134
	Stayed the same	58.4%	50.7%	62.8%	
	Better	20.9%	22.2%	20.3%	
	Not applicable	2.3%	2.8%	2.1%	
	Impact of decrease	All	MHDCS	None	Chi Square, p, V
Mental health N=10466	Worse	8.1%	11.90%	6.60%	205.70, p<.001 V=.140
	Stayed the same	72.1%	62.4%	76.0%	
	Better	16.3%	21.1%	14.4%	
	Not applicable	3.5%	4.6%	3.0%	
Physical health N=10445	Worse	4.9%	6.8%	4.2%	64.31, p<.001 V=.078
	Stayed the same	59.7%	55.6%	61.3%	
	Better	33.1%	34.2%	32.6%	
	Not applicable	2.30%	3.40%	1.9%	
Relationships N=10373	Worse	8.0%	10.2%	8.0%	75.73, <.001 V=.085
	Stayed the same	76.0%	70.2%	78.2%	
	Better	9.3%	11.8%	8.3%	
	Not applicable	6.2%	7.8%	5.5%	
Finances N=10372	Worse	4.6%	6.1%	4.1%	87.483, <.001 V=.092
	Stayed the same	56.6%	50.7%	59.0%	
	Better	35.2%	37.9%	34.0%	
	Not applicable	3.6%	5.3%	2.9%	
Work/study performance N=10375	Worse	7.3%	8.2%	6.9%	104.76, <.001 V=.100
	Stayed the same	73.6%	67.6%	76.0%	
	Better	10.8%	12.1%	10.3%	
	Not applicable	8.3%	12.1%	6.7%	
Pleasure/enjoyment related to your drinking N=10432	Worse	28.3%	32.3%	26.7%	79.30, <.001 V=.087
	Stayed the same	56.6%	49.8%	59.3%	
	Better	10.2%	12.0%	9.4%	
	Not applicable	4.9%	5.8%	4.5%	

change, and on decreases in drinking in order to convey accurate social norms about alcohol consumption and encourage those who do need help to reduce their drinking to seek it.

A quarter of respondents reported reducing their alcohol consumption. The benefits of reducing drinking seemed to be felt more positively by those with MHDCs, but were prevalent across the sample. Physical health and finances were rated as better by a larger proportion of the respondents, and there appeared to be a bigger beneficial impact of drinking less on mental health of those with MHDCs. Drinking less did seem to negatively impact the pleasure and enjoyment related to drinking. However, as many people decreased consumption and most people that GDS reaches usually drink in social settings, this is likely due to having less social contact.

Increases in drinking impacted on physical health the most, followed by mental health. There were much larger differences between those with and without MHDCs in terms of impacts of increases compared to decreases in drinking. Around a fifth of respondents reported negative effects on their work/study performance. Interestingly a fifth also reported their pleasure had increased as well. This could reflect an in-

creased engagement with online social activities, or lack of worry about hangovers or social embarrassment. Linked to this a large proportion of people who increased their drinking reported it was no big deal. More respondents with MHDCs said they were drinking earlier in the day than those without, and more reported wanting to drink less in the following 30 days.

Limitations

Alongside the findings, there are a number of limitations that should be considered, including the self-report and cross-sectional nature of our study. We have included mental health and neurodevelopmental conditions together, and asked about lifetime diagnosis rather than current conditions. In line with other GDS studies, (Davies et al., 2017; Winstock et al., 2020), German respondents dominated the sample. Interestingly, respondents from German speaking countries reported lower rates of MHDCs and US, Brazil and UK the highest, which could also point towards recruitment bias, but may reflect lower rates of stigma. GDS is generally a young sample and young people reported more lone-

Table 4

Three multi-level multivariable binomial logistic regression models predicting increases in frequency of consumption, usual number of drinks, and binge drinking, with country included as a random effect.

	Alcohol measure		
	Frequency of consumption AOR (95% CI) p	Usual number of drinks AOR (95% CI) p	Binge drinking AOR (95% CI) p
Age	1.11 (1.09-1.12)	1.12 (1.11-1.14)**	1.11 (1.09-1.12)**
Age ⁵	1.65 (1.56-1.74) **	1.78 (1.68-1.89) **	1.68 (1.56-1.80) **
Gender – Cis man (ref)			
Gender – Cis woman	0.96 (0.92-1.01)	0.84 (0.80-0.88)**	0.66 (0.62-0.69)**
Gender trans and non-binary	1.10 (0.90-1.34)	0.83 (0.68-1.03)	0.87 (0.69-1.09)
No MHDCS (ref)			
MHDCS	1.02 (0.97-1.08)	1.05 (0.99-1.11)	1.16 (1.09-1.23)**
Not in a relationship (ref)			
In a relationship	1.23 (1.17-1.30)**	1.18 (1.11-1.24)**	1.10 (1.04-1.18)*
Live alone (ref)			
Live with adult(s) only	0.94 (0.89-1.00)	0.95 (0.80-0.91)**	0.82 (0.76-0.89)**
Live with child	1.11 (1.03-1.19)*	1.00 (0.93-1.08)	0.87 (0.80-0.94)*
Employed no change in earnings (ref)			
Not employed	0.91 (0.86-0.97)*	0.94 (0.88-1.00)*	1.06 (0.99-1.14)
Earn more now	0.95 (0.84-1.07)	0.98 (0.86-1.11)	0.97 (0.83-1.12)
Earn less now	1.06 (1.00-1.13)*	1.11 (1.05-1.18) *	1.24 (1.15-1.32)**
Coping really well (ref)			
Coping with some things not others	1.38 (1.32-1.45)**	1.35 (1.28-1.42)**	1.25 (1.72-1.32)**
Not coping well at all	1.47 (1.27-1.70)**	1.49 (1.29-1.72)**	1.71 (1.47-1.99)**
K6 score	1.05 (1.04-1.05)**	1.07 (1.06-1.07)**	1.07 (1.06-1.07)**
Intercept	3.16	2.86	2.18
REvar (SE)	0.09 (0.04)	0.10 (0.4)	0.09 (0.04)
ICC	0.03	0.04	0.04

Notes: Table presents odds ratios, confidence intervals and significance of the showing variables associated with increases frequency, number of drinks and binge drinking.

* $p < .05$

** $p < .001$

liness and more depression in a US-based study (Lee et al., 2020), which may indicate that our sample has a higher likelihood of experiencing distress than the general population. Our finding that those with MHDCs were drinking earlier in the day warrants further attention, because we did not find out about the specific timing of this behaviour. In terms of measures, we did not use validated scales to obtain information about reasons for changes in drinking, or the impacts of changes. In order to develop the questionnaire promptly in response to the pandemic restrictions, we needed to develop unique measures under time pressure. This meant we were unable to access existing standardised measures (these did not yet exist). Despite time pressures we incorporated piloting and adjusted our measures accordingly to include a wide range of valid responses for increasing or decreasing drinking and we believe they have face validity. While the K6 is a validated scale, it has a focus on symptoms of anxiety and depression, which may not fully reflect other mental health conditions. Importantly, it is focused on internalizing symptoms and therefore may not fully capture the distress felt by people with neurodevelopmental conditions. Such symptoms are also generally more prevalent in women than in men, which is a further consideration when interpreting the findings.

Conclusions

Our study showed a nuanced picture of changes in drinking behaviours in the early stages of the COVID-19 pandemic restrictions. It is also important to note that many people reduced their drinking or reported no changes to their behaviour. Such messages are important to highlight within the news media, which tended to focus on the smaller proportion who were drinking more. Alongside this, many of those who were drinking more did not experience negative consequences, and may have been able to connect with others while drinking during 'Zoom Quizzes' or 'Happy Hours' (Pakdaman & Clapp, 2021; Palamar & Acosta, 2021), reducing some of the isolating effects of the restrictions.

However the study also has important implications for service provision and policy. Firstly, targeted support for people with MHDCs is needed, that identifies the risk factors, such as age, being in a relationship, and employment changes that may lead to people feeling less able to cope with what is happening. Such support could be delivered remotely, with traditional and social media used to raise awareness of how to access it. The fact that alcohol sales were considered essential in many jurisdictions reinforces the message that alcohol is an vital part of everyday life (Hobin & Smith, 2020). This is, perhaps, an indicator of lack of healthcare provision, or stigma associated with accessing support. However, during challenging times, such as the COVID-19 pandemic, this data has shown that alcohol consumption can worsen mental health and wellbeing, and while this may be a particular concern for people with MHDCs, those experiencing greater levels of distress may be at greater risk.

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Ethics approval

The GDS COVID-19 Special Edition received ethical approval from the University College London (11671/001).

Declarations of Interest

None.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.drugpo.2021.103563](https://doi.org/10.1016/j.drugpo.2021.103563).

References

- Adhia, A., Bair-Merritt, M., Broder-Fingert, S., Nunez Pepen, R. A., Suarez-Rocha, A. C., & Rothman, E. F. (2020). The critical lack of data on alcohol and marijuana use by adolescents on the autism spectrum. *Autism in Adulthood*, 2(4), 282–288.
- Alcohol Change UK. (2020). *Drinking during lockdown: Headline findings*. <https://alcoholchange.org.uk/blog/2020/covid19-drinking-during-lockdown-headline-findings>.
- Babor, T., Higgins-Biddle, J. C., Saunders, J. B., & Monteiro, M. G. (2001). *The alcohol use disorders identification test, guidelines for use in primary care* (2nd ed.). Geneva: World Health Organization.
- Barratt, M. J., Ferris, J. A., Zahnow, R., Palamar, J. J., Maier, L. J., & Winstock, A. R. (2017). Moving on from representativeness: testing the utility of the Global Drug Survey. *Substance Abuse: Research and Treatment*. 10.1177/1178221817716391.
- Bartel, S. J., Sherry, S. B., Molnar, D. S., Mushquash, A. R., Leonard, K. E., Flett, G. L., & Stewart, S. H. (2017). Do romantic partners influence each other's heavy episodic drinking? Support for the partner influence hypothesis in a three-year longitudinal study. *Addictive Behaviors*, 69, 55–58. 10.1016/j.addbeh.2017.01.020.
- Boden, J. M., & Fergusson, D. M. (2011). Alcohol and depression. *Addiction*, 106(5), 906–914. 10.1111/j.1360-0443.2010.03351.x.
- Capusan, A. J., Bendtsen, P., Marteinsdottir, I., & Larsson, H. (2016). Comorbidity of adult ADHD and its subtypes with substance use disorder in a large population-based epidemiological study. *Journal of Attention Disorders*, 23(12), 1416–1426. 10.1177/1087054715626511.
- Cerda, M., Vlahov, D., Tracy, M., & Galea, S. (2008). Alcohol use trajectories among adults in an urban area after a disaster: evidence from a population-based cohort study. *Addiction*, 103(8), 1296–1307. 10.1111/j.1360-0443.2008.02247.x.
- Chick, J. (2020). Alcohol and COVID-19. *Alcohol and Alcoholism*, 55(4), 341–342. 10.1093/alcalc/aga039.
- Chodkiewicz, J., Talarowska, M., Miniszewska, J., Nawrocka, N., & Bilinski, P. (2020). Alcohol consumption reported during the COVID-19 pandemic: The initial stage. *International Journal of Environmental Research and Public Health*, 17(13). 10.3390/ijerph17134677.
- Davies, E. L., Conroy, D., Winstock, A. R., & Ferris, J. A. (2017). Motivations for reducing alcohol consumption: An international survey exploring experiences that may lead to a change in drinking habits. *Addictive Behaviors*, 75, 40–46. 10.1016/j.addbeh.2017.06.019.
- Davies, E. L., Cooke, R., Maier, L. J., Winstock, A. R., & Ferris, J. A. (2020). Drinking to excess and the tipping point: An international study of alcohol intoxication in 61,000 people. *International Journal of Drug Policy*, 83, Article 102867. 10.1016/j.drugpo.2020.102867.
- Davies, E. L., Maier, L. J., Winstock, A. R., & Ferris, J. A. (2019). Intention to reduce drinking alcohol and preferred sources of support for help: An international cross sectional study. *Journal of Substance Abuse Treatment*. 10.1016/j.jsat.2019.01.011.
- Davies, E. L., Puljevic, C., Connolly, D., Zhuparris, A., Ferris, J. A., & Winstock, A. R. (2021). Chapter 2- The world's favorite drug: What we have learned about alcohol from over 500,000 respondents to the Global Drug Survey. In D. Frings, & I. P. Albery (Eds.), *The Handbook of Alcohol Use* (pp. 17–47). Academic Press. 10.1016/B978-0-12-816720-5.00022-0.
- de Goeij, M. C. M., Suhrcke, M., Toffolutti, V., van de Mheen, D., Schoenmakers, T. M., & Kunst, A. E. (2015). How economic crises affect alcohol consumption and alcohol-related health problems: A realist systematic review. *Social Science & Medicine*, 131, 131–146. 10.1016/j.socscimed.2015.02.025.
- Dimitriou, E. C., Lavrentiadis, G., & Dimitriou, C. E. (1993). Obsessive-compulsive disorder and alcohol abuse. *The European Journal of Psychiatry*, 7(4), 244–248.
- Dom, G., Samochowiec, J., Evans-Lacko, S., Wahlbeck, K., Van Hal, G., & McDaid, D. (2016). The impact of the 2008 economic crisis on substance use patterns in the countries of the European Union. *International Journal of Environmental Research and Public Health*, 13(1), 122. 10.3390/ijerph13010122.
- Farren, C. K., Hill, K. P., & Weiss, R. D. (2012). Bipolar disorder and alcohol use disorder: A review. *Current Psychiatry Reports*, 14(6), 659–666. 10.1007/s11920-012-0320-9.
- Ferris, J. A., Puljevic, C., Labhart, F., Winstock, A., & Kuntsche, E. (2019). The role of sex and age on pre-drinking: An exploratory international comparison of 27 countries. *Alcohol and Alcoholism*, 54(4), 378–385. 10.1093/alcalc/azg040.
- Gaher, R. M., Simons, J. S., Hahn, A. M., Hofman, N. L., Hansen, J., & Buchkoski, J. (2014). An experience sampling study of PTSD and alcohol-related problems. *Psychology of Addictive Behaviors*, 28(4), 1013–1025. 10.1037/a0037257.
- Garnett, C., Jackson, S., Oldham, M., Brown, J., Steptoe, A., & Fancourt, D. (2021). Factors associated with drinking behaviour during COVID-19 social distancing and lockdown among adults in the UK. *Drug and Alcohol Dependence*, 219, Article 108461. 10.1016/j.drugalcdep.2020.108461.
- Grossman, E. R., Benjamin-Neelon, S. E., & Sonnenschein, S. (2020). Alcohol consumption during the COVID-19 pandemic: A cross-sectional survey of US adults. *International Journal of Environmental Research and Public Health*, 17(24), 9189. 10.3390/ijerph17249189.
- Hobin, E., & Smith, B. (2020). Is another public health crisis brewing beneath the COVID-19 pandemic? *Canadian Journal of Public Health*, 111(3), 392–396. 10.17269/s41997-020-00360-z.
- Huckle, T., Parker, K., Romeo, J. S., & Casswell, S. (2020). Online alcohol delivery is associated with heavier drinking during the first New Zealand COVID-19 pandemic restrictions. *Drug and Alcohol Review* n/a(n/a). 10.1111/dar.13222.
- Jackson, S. E., Garnett, C., Shahab, L., Oldham, M., & Brown, J. (2021). Association of the COVID-19 lockdown with smoking, drinking and attempts to quit in England: an analysis of 2019–20 data. *Addiction*, 116(5), 1233–1244. 10.1111/add.15295.
- Jacob, L., Smith, L., Armstrong, N. C., Yakkundi, A., Barnett, Y., Butler, L., McDermott, D. T., Koyanagi, A., Shin, J. I., Meyer, J., Firth, J., Rimes, O., López-Sánchez, G. F., & Tully, M. A. (2021). Alcohol use and mental health during COVID-19 lockdown: A cross-sectional study in a sample of UK adults. *Drug and Alcohol Dependence*, 219, Article 108488. 10.1016/j.drugalcdep.2020.108488.
- Kessler, R. C., Andrews, G., Colpe, L. J., Hiripi, E., Mroczek, D. K., Normand, S. L., ... Zaslavsky, A. M. (2002). Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychological Medicine*, 32(6), 959–976. 10.1017/s0033291702006074.
- Keyes, K. M., Hatzenbuehler, M. L., & Hasin, D. S. (2011). Stressful life experiences, alcohol consumption, and alcohol use disorders: The epidemiologic evidence for four main types of stressors. *Psychopharmacology (Berl)*, 218(1), 1–17. 10.1007/s00213-011-2236-1.
- Koopmann, A., Georgiadou, E., Kiefer, F., & Hillemacher, T. (2020). Did the general population in Germany drink more alcohol during the COVID-19 pandemic lockdown? *Alcohol and Alcoholism*, 55(6), 698–699. 10.1093/alcalc/aga058.
- Kushner, M. G., Sher, K. J., & Beitman, B. D. (1990). *The relation between alcohol problems and the anxiety disorders*. American Psychiatric Assn. 10.1176/ajp.147.6.685.
- Labhart, F., Ferris, J. A., Winstock, A., & Kuntsche, E. (2017). The country-level effects of drinking, heavy drinking and drink prices on pre-drinking: An international comparison of 25 countries. *Drug and Alcohol Review*, 36(6), 742–750. 10.1111/dar.12525.
- Lee, C. M., Cadigan, J. M., & Rhew, I. C. (2020). Increases in loneliness among young adults during the COVID-19 pandemic and association with increases in mental health problems. *Journal of Adolescent Health*, 67(5), 714–717. 10.1016/j.jadohealth.2020.08.009.
- Lieberoth, A., Lin, S.-Y., Stöckli, S., Han, H., Kowal, M., Gelpi, R., ... Milfont, T. L. (2021). Stress and worry in the 2020 coronavirus pandemic: Relationships to trust and compliance with preventive measures across 48 countries in the COVIDSTRESS global survey. *Royal Society Open Science*, 8(2), Article 200589. 10.1098/rsos.200589.
- Manthey, J., Kilian, C., Carr, S., Bartak, M., Bloomfield, K., Braddick, F., ... Rehm, J. (2021). Use of alcohol, tobacco, cannabis, and other substances during the first wave of the SARS-CoV-2 pandemic in Europe: A survey on 36,000 European substance users. *Substance Abuse Treatment, Prevention, and Policy*, 16(1), 36. 10.1186/s13011-021-00373-y.
- Merzon, E., Manor, I., Rotem, A., Schneider, T., Vinker, S., Golan Cohen, A., Laudan, A., Weizman, A., & Green, I. (2020). ADHD as a risk factor for infection with Covid-19. *Journal of Attention Disorders* 1087054720943271. 10.1177/1087054720943271.
- Mochrie, K. D., Whited, M. C., Cellucci, T., Freeman, T., & Corson, A. T. (2020). ADHD, depression, and substance abuse risk among beginning college students. *Journal of American College Health*, 68(1), 6–10. 10.1080/07448481.2018.1515754.
- Neill, E., Meyer, D., Toh, W. L., van Rhee, T. E., Phillipou, A., Tan, E. J., & Rossell, S. L. (2020). Alcohol use in Australia during the early days of the COVID-19 pandemic: Initial results from the COLLATE project. *Psychiatry and Clinical Neuroscience*, 74(10), 542–549. 10.1111/pcn.13099.
- O'Connor, R. C., Wetherall, K., Cleare, S., McClelland, H., Melson, A. J., Niedzwiedz, C. L., ... Robb, K. A. (2020). Mental health and well-being during the COVID-19 pandemic: Longitudinal analyses of adults in the UK COVID-19 Mental Health & Wellbeing study. *The British Journal of Psychiatry*, 1–8. 10.1192/bjp.2020.212.
- Oldham, M., Garnett, C., Brown, J., Kale, D., Shahab, L., & Herbec, A. (2021). Characterising the patterns of and factors associated with increased alcohol consumption since COVID-19 in a UK sample. *Drug and Alcohol Review* n/a(n/a). 10.1111/dar.13256.
- Pakdaman, S., & Clapp, J. D. (2021). Zoom (Virtual) happy hours and drinking during COVID-19 in the US: An exploratory qualitative study. *Health Behavior and Policy Review*, 8(1), 3–12. 10.14485/HBPR.8.1.1.
- Palamar, J. J., & Acosta, P. (2021). Virtual raves and happy hours during COVID-19: New drug use contexts for electronic dance music partygoers. *International Journal of Drug Policy*, 93 102904. 10.1016/j.drugpo.2020.102904.
- Pollard, M. S., Tucker, J. S., & Green, H. D., Jr. (2020). Changes in adult alcohol use and consequences during the COVID-19 pandemic in the US. *JAMA Network Open*, 3(9), Article e2022942. 10.1001/jamanetworkopen.2020.22942.
- Ressel, M., Thompson, B., Poulin, M.-H., Normand, C. L., Fisher, M. H., Couture, G., & Iarocci, G. (2020). Systematic review of risk and protective factors associated with substance use and abuse in individuals with autism spectrum disorders. *Autism*, 24(4), 899–918. 10.1177/1362361320910963.
- Ruiz, P., Semblat, F., & Pautassi, R. M. (2021). The change in psychoactive substance consumption in relation to psychological stress during the COVID-19 pandemic in Uruguay. *Sultan Qaboos University Medical Journal [SQUMJ]*, 1(1). <https://doi.org/10.18295/squmj.5.2021.106>.
- Usher, K., Bhullar, N., & Jackson, D. (2020). Life in the pandemic: Social isolation and mental health. *Journal of Clinical Nursing*, 29(15–16), 2756–2757. 10.1111/jocn.15290.
- Wardell, J. D., Kempe, T., Rapinda, K. K., Single, A., Bilevicius, E., Frohlich, J. R., Hendershot, C. S., & Keough, M. T. (2020). Drinking to cope during COVID-19 pandemic: The role of external and internal factors in coping motive pathways to alcohol use, solitary drinking, and alcohol problems. *Alcoholism: Clinical and Experimental Research*, 44(10), 2073–2083. 10.1111/acer.14425.
- Weerakoon, S. M., Jetelina, K. K., & Knell, G. (2020). Longer time spent at home during COVID-19 pandemic is associated with binge drinking among US adults. *The American Journal of Drug and Alcohol Abuse*, 1–9. 10.1080/00952990.2020.1832508.
- WHO. (2020). *Alcohol and COVID-19: What you need to know*. http://www.euro.who.int/_data/assets/pdf_file/0010/437608/Alcohol-and-COVID-19-what-you-need-to-know.pdf.
- Winstock, A. R., Holmes, J., Ferris, J. A., & Davies, E. L. (2020). Perceptions of alcohol health warning labels in a large international cross sectional survey of people who drink alcohol. *Alcohol and Alcoholism*. 10.1093/alcalc/azg099.
- Wu, P., Liu, X., Fang, Y., Fan, B., Fuller, C. J., Guan, Z., ... Litvak, I. J. (2008). Alcohol abuse/dependence symptoms among hospital employees exposed to a SARS outbreak. *Alcohol and Alcoholism*, 43(6), 706–712. 10.1093/alcalc/agn073.