



# Effects of the COVID-19 pandemic and lockdown on alcohol use disorders and complications

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## Purpose of review

To understand the effect of COVID-19 pandemic and lockdown on persons with alcohol use disorders.

## Recent findings

From a total of 455 titles on COVID-19 and alcohol, 227 abstracts were screened, and 95 articles were reviewed (on November 25<sup>th</sup>, 2020). The immediate effect was an increase in alcohol related emergencies including alcohol withdrawal, related suicides, and methanol toxicity. Although there are mixed findings with respect to changes in the quantity of drinking, there are reports of binge/heavy drinking during the lockdown as well as relapse postlockdown. Psychological, social, biological, economic and policy-related factors appear to influence the changes in drinking. Although preliminary data suggest no change in alcohol use among persons with comorbid mental illness, findings in this population are presently limited. Among patients with alcohol related liver disease, outcomes appear worse and caution is warranted with the use of medications. Alcohol also appears to increase the risk of COVID-19 infection and complicates its course.

Although some nations banned alcohol sales completely during lockdown, others declared it as an essential commodity, resulting in different problems across countries. Alcohol use has added to the burden of the problem particularly among vulnerable groups like the adolescents, elderly, patients with cancer, as well as health professionals. Services for patients with alcohol use disorders have been affected.

## Summary

The COVID-19 pandemic has had considerable impact on alcohol use, with an increase in alcohol related emergencies, changes in alcohol use patterns, increased risk of contracting COVID-19, effect on alcohol policies and sales, and an effect on vulnerable groups. It is essential to understand and respond to the current situation, intervene early, and prevent further repercussions of the pandemic.

Video abstract link: <https://drive.google.com/file/d/1IJWtIs6e554PryKWhdma4VB-mjSZq1C/view?usp=sharing>.

## Keywords

alcohol, alcohol policy, COVID-19, drinking, lockdown

## INTRODUCTION

The SARS outbreak in 2003 led to an increase in alcohol use disorders [1]. The COVID-19 pandemic has also seen serious repercussions for vulnerable groups with substance use disorders (SUD), including alcohol [2]. The pandemic has resulted in changes in patterns of drinking, an increase in alcohol withdrawal, disruption in access to care, and increase in illicit alcohol availability [3]. It has also resulted in the disruption of a range of services, including emergency, treatment, and relapse prevention and liaison services for this population [4,5<sup>\*\*\*</sup>].

Although the long-term impacts of this pandemic are unknown, predictions have suggested a reduction in alcohol consumption as an immediate

effect, but an increase in consumption in the medium and long-term [6]. This raises the need to appropriately address SUD problems contextually in different phases of the pandemic [7]. Special

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## KEY POINTS

- The COVID-19 pandemic resulted in increase in alcohol related emergencies and changes in alcohol use patterns.
- Among patients with alcohol related liver disease, outcomes appear worse and caution is warranted with respect to the use of medications.
- Alcohol use increases the risk of contracting COVID-19.
- Alcohol policies and sales during pandemic have varied across countries.
- Alcohol use has added an additional burden in vulnerable populations.

attention needs to be focused on preventive aspects of alcohol related harms [8].

The purpose of this review is to understand the acute effects on persons with AUD during the COVID-19 virus outbreak. It focuses on 1. Alcohol related emergencies 2. Changes in alcohol use patterns 3. Alcohol use and co-morbid mental health problems 4. Effect on co-morbid medical illness 5. Alcohol and risk for COVID-19 infection 6. Effect on addiction treatment services 7. Effect on alcohol policy, sales, and on-line trends 8. Special populations

## TEXT REVIEW

A total of 455 titles were obtained using a PUBMED search (keywords related to COVID-19 and alcohol), among which 227 abstracts were screened, and 95 articles reviewed (on 25<sup>th</sup> November 2020).

### Alcohol-related emergencies

Lockdown and sudden alcohol ban in many countries saw a sudden surge in complicated alcohol withdrawal [5<sup>–</sup>,9]. There were also reports of alcohol withdrawal resulting in cases of suicides during the COVID-19 pandemic from India [10,11], raising potential dilemmas of forced abstinence [12]. There have also been instances of doctors prescribing alcohol for withdrawal management, which also raises ethical issues [13].

Another major concern, in the absence of licit alcohol, has been the consumption of methanol or of household products leading to methanol toxicity, as reported from Iran [14<sup>–</sup>]. Serious complications, including blindness, putamen necrosis, subcortical white matter haemorrhage and even death have been reported.

Immediately post lockdown, a significant increase in the number of alcohol intoxication cases presenting to the emergency department (11.3%) compared to lockdown (0.8%) and in the previous year (2.9%), were reported from Italy [15].

Studies from emergency departments in Ireland and United States (US) reported overall reductions in psychiatric and alcohol-related emergencies due to lockdown orders [16,17]. In a hospital-based study from the US, whereas there was significant reduction in motor vehicle accidents during the pandemic, alcohol-related motor vehicle accidents relatively increased [18,19].

Interestingly, alcohol bans in South Africa resulted in reduction of unnatural death by half, reduction in assaults, accidents, other injuries, sexual assaults [20<sup>–</sup>]. Disulfiram ethanol-reactions were observed in around 20% of the patients on disulfiram who used alcohol-based hand sanitisers [21].

### Key findings with regard to alcohol-related emergencies

Lockdown phase:

1. Increase in withdrawal-related emergencies
2. Increase in methanol toxicity
3. Reduction in overall psychiatric and alcohol-related emergencies
4. Disulfiram Ethanol Reactions (DER) were observed due to use of hand sanitiser

Post-lockdown phase:

1. Increase in alcohol intoxication-related emergencies

### Changes in alcohol use patterns

Most data available on changes in alcohol use patterns during lockdown are from web-based surveys. There is mixed evidence to the question of ‘whether alcohol use increased during lockdown?’

Overall, during the pandemic, there has been a surge in addiction related behaviours. Studies suggest an increase in alcohol, cannabis and tobacco use, screen time, behavioural addictions, higher salt and calorie intake [22–25]. As expected, there was also an increase in risky health behaviours like physical inactivity, sedentary lifestyle, but some evidence suggests that people adapted to the changes towards the end of lockdown [26].

A summary of studies from different countries (China, Finland, Belgium, Chile, US, Poland) reports increased alcohol consumption during lockdown compared to prelockdown [22,24,26–30]. Specifically, many studies report an increase in binge drinking, as well as solitary drinking [27,29,31,32<sup>\*</sup>,33,34]. Although some studies observed an increase in drinking among women [27,35], others did not observe gender differences in alcohol use patterns [36]. Some studies report relative increase in drinking among black and non-Hispanic population [27,37<sup>\*\*</sup>]. In a study from the UK on persons with registered alcohol use disorders prelockdown [38], there was greater relapse secondary to lockdown; past abstinence attempts were not protective, and people who relapsed had increased harmful drinking. Contact with health professionals reduced the risk of relapse.

A summary of factors associated with increased alcohol use include psychological distress related to COVID-19 [32<sup>\*</sup>,33,35,39], increased availability of free time [40], misinformation about alcohol, heavy drinking prepandemic, job loss, eating more, changes in sleep, higher anxiety and depression [41–44], living with children [45], reduced physical activity [46], loneliness, [47], cyberbullying, victimisation at work [33], lower social connectedness and having one child under the age of 18 years [48]. In a US-based online survey, increase in alcohol-related problems was independent of the amount of alcohol consumption [29].

Data from other countries suggests reductions in alcohol use during the pandemic. An online survey in nine European countries [49] reported reduced alcohol use and harmful drinking secondary to lockdown and restrictions on sales, especially among young women [50,51,52]. Among regular drinkers in France, alcohol consumption reduced during lockdown [53].

With regard to decreased alcohol consumption, higher social support [39], workers with higher conscientious domain of personality, those from educational, health, welfare sectors and those living with families reported lower alcohol consumption [54]. A monthly cross-sectional survey in England that compared smoking and drinking practices for a year before and after lockdown found that, following lockdown, attempts to quit among smokers increased and alcohol use among high-risk drinkers reduced [55].

A repeat nationwide survey from the Czech Republic showed no change in alcohol use in 2020, as compared to 2017 [34].

### Key findings with respect to changes in alcohol use patterns

Lockdown phase:

1. Mixed evidence of increase or decrease or no-change in alcohol consumption pattern
2. Specifically, increase in binge and solitary drinking
3. Increased relapses and reduced quit attempts
4. Psychological, social, biological, economic and policy-related factors influenced changes in drinking

### Alcohol use among persons with co-morbid mental health problems

COVID-19 and the related lockdown has affected the mental health of people, particularly vulnerable populations [56]. Attributed reasons include 1) financial troubles due to job losses 2) uncertainty about the control of pandemic by the health system and 3) fear of life post pandemic [57].

Increase in alcohol use during the pandemic has been associated with higher mental distress, [58,59] and higher likelihood of depressive symptoms [36,60]. There are reports of increase in domestic violence across different countries and this increase in risk is fueled by alcohol [61]. A twitter-based analysis suggests increased violence secondary to alcohol use during lockdown [62]. A text-mining analysis of twitter tweets from US, among alcohol users, observed difficulties in coping during pandemic [63].

Surveys from Australia have found no increase in the alcohol use in persons with preexisting mental illness [64<sup>\*</sup>].

Consultation-Liaison services across UK saw a sharp decline in alcohol-related and mental health referrals, during the lockdown, followed by a surge post lockdown for all disorders [65].

### Key findings with regard to comorbid mental health problems

Lockdown phase:

1. Increase in mental distress and depressive symptoms among alcohol users
2. Decrease in utilisation of consultation liaison services

Post Lockdown:

1. Increase in utilisation of consultation liaison services

## Effect on co-morbid medical illness

In patients with alcohol-related liver disease, increased alcohol consumption can increase new onset hepatic decompensation. During treatment, patients with alcoholic hepatitis treated with steroids treatment may have increased susceptibility to severe COVID-19 infection. Higher mortality has been observed in patients with alcohol-related liver disease and COVID-19 [66<sup>¶</sup>]. In an Indian study, patients with liver cirrhosis with COVID-19 infection had poor outcomes, with worse outcomes among those presenting with acute on chronic liver failure [67]. In this study, one-third of the patients had alcoholic cirrhosis. Furthermore, alcohol induced liver disease has been found to be an independent risk factor for death following COVID-19 [68].

Dietary habits also changed during COVID-19 and are related to changes in alcohol use [69]. A Lithuanian study found that increased alcohol consumption was associated with increased weight gain [70]. In a Japanese study, people who increased alcohol consumption and had a sedentary lifestyle secondary to tele-working, had a worsening of diabetes [71].

Sleep has been affected during COVID-19 lockdown in people using alcohol and tobacco [50]. New onset sleep problems were associated with heavier alcohol use [72]. Increased alcohol consumption was also associated with increased nightmares during the pandemic [73].

### Key findings with respect to effect on comorbid medical illness

1. Worse course in patients with alcohol-related liver disease
- Lockdown phase:
1. New onset sleep problems, weight gain and worsening of diabetes noted among alcohol users

## Alcohol and risk for COVID-19 infection

'Alcohol lung' among alcohol users increases the susceptibility and severity of COVID-19 [74] and using alcohol during COVID-19 infection has been described as a 'dangerous cocktail' [75,76].

In a hospital based observational study in Spain, among 2078 COVID-19 patients evaluated across 3 months, prevalence of SUDs was 1.3%, primarily among males (85%). Among the 1.3%, alcohol was the most commonly used substance in two-thirds [77].

## Does alcohol use increase the risk of COVID-19?

It is postulated that chronic alcohol use increases COVID-19 risk by reducing immunity, increasing inflammatory response, and associated liver disease [78]. Recent reviews suggest an increased risk of infection in people with all SUD [79].

A large retrospective analysis of electronic health record data from US, showed people with lifetime SUD diagnosis being at a higher risk for COVID-19 compared to non-SUD population [Adjusted Odds Ratio (AOR) = 1.45 (1.42–1.49)]. The risk is higher for people with opioid use disorder (AOR = 2.42 (2.24–2.60)) > cocaine use disorder (AOR = 1.57 (1.39–1.77)) > alcohol use disorder (AOR = 1.41 (1.22–1.50)) > tobacco use disorder (AOR = 1.33 (1.29–1.37)). Furthermore, patients with a recent diagnosis of SUD (AOR = 8.6 (8.4–8.9);  $P < 10^{-30}$ ) had a higher risk [37<sup>¶¶</sup>].

In a big data analysis using a machine learning approach from 154 countries and 50 US states which included 77 variables, alcohol use was associated with increased risk of COVID-19 (beta coefficient = 0.000452 for COVID cases; 0.01 for COVID deaths) [80<sup>¶¶</sup>]. In a multicountry study, higher per capita alcohol consumption in litres was associated with higher COVID-19 related mortality [81]. During the phased reopening, there was an increase in alcohol use as well as an associated increase in COVID-19 cases [82]. A Danish register-based study suggests that males are at higher risk of COVID-19, related to their comparatively excessive consumption of alcohol [83]. Anecdotal case reports suggest that patients with dual diagnosis have a higher risk of progression to severe forms of COVID-19 [84]. However, some studies did not find any association between alcohol use and COVID-19 risk or severity [85,86]. Contrarily, a Chinese case control study, observed that low dose of alcohol intake is associated with lower risk of COVID-19 morbidity [87].

Alcohol users may not adhere to social distancing norms, increasing their risk of COVID-19. Anecdotal reports from Thailand suggest outbreaks of COVID-19 among families attending alcohol parties [88]. Further, among young adults with hazardous drinking, adherence to public policies was low and declined over a period of time during the lockdown [89].

Alcohol users are also at a higher risk due to associated comorbidities like diabetes, cirrhosis of liver and chronic kidney disease [90].

Finally, among alcohol users diagnosed with COVID-19, treatment of patients with alcohol-related liver disease and heavy alcohol use warrants caution when medicines such as chloroquine or hydroxychloroquine, as combination can lead to hepatotoxicity [91]. Hence, screening patients with alcohol use is

important especially in areas with higher prevalence of alcohol use disorders or history of liver disease. Furthermore, use of medications like Non-Steroidal Anti-Inflammatory Drugs in patients with alcohol use disorder poses a risk of hepatotoxicity.

### Key findings with respect to alcohol and risk of COVID-19 infection

1. Multiple studies suggest alcohol increases the risk of COVID-19 infection.

Post-Lockdown:

1. Opening of alcohol outlets and increased alcohol use was associated with increased risk of COVID-19 infection.

### Effect on addiction treatment services

In England, the rates of smoking cessation and use of remote cessation support during lockdown were higher. Compared to prepandemic period, the use of evidence-based support to reduce the use of alcohol decreased among high-risk drinkers [55]. In India, in the early period of lockdown, less than 20% of registered patients with alcohol dependence were able to seek treatment. It was observed that there were difficulties to get help for withdrawal management and access to medication for preventing relapses (like disulfiram) [92<sup>a</sup>].

Admissions to rehabilitation centres have been severely impacted affected, as suggested from experience from India, where many were closed during lockdown and some who operated had an outbreak of COVID-19, due to difficulty in implementing stringent safety measures. Experience from US suggests similar difficulties in implementation of mitigation measures in recovery homes and making appropriate social adjustments [93].

### Key findings with respect to effect on addiction treatment services

Lockdown phase:

1. Increased treatment seeking for tobacco.
2. Reduced treatment seeking and difficulties in accessing help for alcohol.

### Effect on alcohol policy, sales, and on-line trends

There have been significant changes in alcohol policy globally in relation to the pandemic. Although

many countries banned alcohol, some declared alcohol as an 'essential' commodity [94]. Both policy positions posed public health concerns and legal problems with increased alcohol withdrawal, consumption of hand sanitisers, methanol poisoning due to use illicit liquor, diversion of alcohol used for medical purposes in banned countries. In countries where alcohol was considered as an essential commodity, this resulted in increased home-based alcohol consumption [95].

A proxy marker for changes in alcohol trends during lockdown is the google trend. A google trend analysis in India compared prelockdown, lockdown 1.0 and lockdown 2.0. Compared to prelockdown, there was a significant increase in online searches for distilled spirits (and not for beer), access to alcohol, alcohol withdrawal during lockdown 1.0 (21 days). However, during the second phase of lockdown 2.0, as compared to prelockdown, there was an increase in search of terms related to benzodiazepines [96<sup>a</sup>]. These findings indicate that the initial search was towards procuring alcohol and later to access treatment for alcohol-related extended withdrawals. Similar google trend analysis suggests post lockdown increase in search terms related to alcohol withdrawal and methods of procurement, reflecting changes in trends [97<sup>a</sup>].

Another epidemiological proxy marker is wastewater analysis. An Australian longitudinal study from April 2016 to April 2020 observed a significant reduction in ethyl sulfate (alcohol metabolite) in wastewater during lockdown and significant reduction in weekend to midweek ratio by 12% compared to previous years [98].

In US, online tweets related to alcohol blackouts significantly increased during the lockdown [99]. This raises concerns related to drinking and driving in the absence of dine-in alcohol locations.

In Iran, misinformation related to alcohol being a 'neutralizing agent' and consumption of illicit alcohol led to a 'syndemic of COVID-19 and methanol poisoning'. In the early part of pandemic, there were 5000 cases of methanol poisoning and 500 deaths [100]. Reports of consuming alcohol based sanitiser and leading to methanol toxicity were reported [101].

Alcohol policy is also reflected through media reporting. A qualitative study from India analysing 350 online newspaper articles during 1 month of lockdown reflected the lack of a comprehensive alcohol policy in India [102].

In the UK, alcohol purchase increased by 40% during lockdown across all strata [103]. A tendency to shift to high alcohol content beer was noted. However, this was levelled by a reduction in sales at bars and restaurants. The US reported increased

alcohol sale during the initial part of the lockdown [104]. There are documented instances of attempts by the alcohol industry to influence public policy by framing alcohol as an essential product and arguing that restrictions are complex and ineffective [105]. In Australia, industry resorted to social media advertising through new means like memes. It was observed that there were advertisements every 35 s, focusing on easy access, encouragement to buy more alcohol, to drink during COVID-19, drinking to cope and normalising alcohol [106].

Despite World Health Organization (WHO) warnings, a lot of misinformation regarding a protective role of alcohol and tobacco has been circulating in the social media [107]. A hospital-based study on patients tested for COVID-19 observed that chronic alcohol use does not protect against COVID-19 [108]. However, a study to evaluate the effect of this misinformation on alcohol use, found significant increase in both tobacco and alcohol use (OR 4.16, 95% CI 2.00–8.67) among current drinkers [109].

### Key findings with respect to effect on alcohol policy, sales, and on-line trends

Lockdown phase:

1. Some countries banned alcohol; others declared as essential (implicitly/explicitly)
2. Increased google trends for alcohol and related terms in India
3. Increased blackout tweets from US and alcohol purchases from UK
4. Reduced alcohol metabolites from wastewater surveys from Australia
5. Increased industry driven social media promotion of alcohol in Australia
6. Increased online misinformation on protective effects of alcohol

### Special populations

**Adolescents:** In Canada, an online survey among adolescents revealed increased alcohol and cannabis use during lockdown. Although most consumed alcohol alone, a quarter of patients were found to have taken alcohol face to face, putting them at risk for COVID-19. One-third of them consumed substances with their peers through online parties [110].

**Elderly:** Comorbid alcohol use puts the already vulnerable elderly population at even higher risk to COVID-19 [111]. The elderly are also at higher risk

for mental health problems, suicide and physical illnesses.

**Cancer:** In patients with diagnosed cancer, heavy drinking was found to be associated with higher levels of anxiety related to contracting infection [112].

**Healthcare workers:** Mental health of healthcare professionals has been found to be significantly affected across pandemics. A recent review suggests they are at risk to mental health issues in both short term and long term. Psychological distress, insomnia, substance use, depression, anxiety, burnout, anger, and features of Post-Traumatic Stress Disorder (PTSD) have been commonly observed among health professionals working with patients during epidemics/pandemics [113]. In a UK-based online survey among quarantined physicians, more than half of them significantly increased their alcohol use. Although males binged, female physicians drank more regularly [114]. Similar increase in alcohol use was observed among urologists from Brazil [115].

### Key findings with respect to special populations

Lockdown phase:

1. Increase in alcohol and cannabis use among adolescents.
2. Increase in binge drinking among male physicians and regular drinking among female physicians.

**Limitations of the studies:** Most of the studies are based on convenience samples and web-based surveys on social media platforms.

### CONCLUSION

In this review to understand the effects of alcohol during the COVID-19 pandemic, changes in the pattern of use of alcohol and resultant effects are evident. Immediate effects have been an increase in alcohol-related emergencies including alcohol withdrawal, withdrawal-related suicides, methanol toxicity and alcohol-related motor vehicle accidents.

Although the results on changes in alcohol use patterns during lockdown are mixed, there have been reports of binge/heavy drinking during lockdown and relapses postlockdown. Multiple psychological, social, biological, economic and policy-related factors influence changes in drinking. A study from Switzerland shows that on an average, a person would lose 0.205 Years of Lost Life (YLL)

due to psychological consequences of COVID-19, including alcohol use. This loss would be borne by 2.1% of the population who in turn would suffer an average of 9.79 YLL [116]. Hence, steps to optimise resources and to mitigate suffering in the most affected populations is necessary.

Among patients with alcohol-related liver disease, caution is warranted related to use of medications, and outcomes appear to be worse. It has also been observed that alcohol increased the risk of COVID-19 infection.

Services for patients with alcohol use disorders have been adversely affected across the globe. It is thus important to focus and train healthcare workers like nursing health professionals to deliver addiction related services [117]. Another important way to reduce the treatment gap is to harness technology [57]. One such example is e-consult for people with SUD during the pandemic and training support to healthcare workers in distant places to manage with SUD [118]. Telehealth, group meetings and online consultations can be some ways to handle the increased demand during and after pandemic [119].

Although some nations banned alcohol sales completely others declared it as an essential product, resulting in varied problems across countries, including unintended messaging that alcohol is 'essential' [120]. There is a need for a rethinking about policy changes like online alcohol delivery, which can be difficult to roll back [121]. Evidence based restriction of alcohol pricing, availability and marketing are required for the future [122]. Governments should refrain from abrupt and knee-jerk alcohol policy changes (either a sudden 'ban', 'online sale of alcohol', declaring alcohol as 'essential') and instead adopt evidence-based decision making. Adequate information to the public in the event of anticipated limitations of access and information on treatment services should be provided on priority. Further, governments should adopt adequate measures to protect vulnerable populations. Importantly, post-hoc research on impact of such decisions need to be undertaken.

Among vulnerable groups like health professionals, elderly, patients diagnosed with cancer, alcohol has added to the burden of the problem.

As there are some countries in the second wave at the time of this review, we need newer protocols and cohorts to study the long-term effects on mental health and addiction of different populations [123].

Finally, adapting to the current situation and preparedness to handle the repercussions due to pandemic is important. It is important to focus on the preventive dimension and early intervention. Survivor guilt, PTSD among survivors may put people at risk to addiction [124]. Evidence based policy changes,

improving access to treatment for alcohol use disorders, liaison services, evidence-based prevention, and prioritising care of vulnerable population are urgently required [125]. Preparedness plans to handle such emergencies in future are also required.

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## Conflicts of interest

There are no conflicts of interest.

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