BRIEF REPORT

The impact of nationwide alcohol ban during the COVID-19 lockdown on alcohol use-related internet searches and behaviour in India: An infodemiology study

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Abstract

Introduction and Aims. *To control the spread of COVID-19, India imposed a nationwide lockdown in phases including lockdown 1.0 (25 March–14 April) and 2.0 (15 April–3 May). Among other restrictions, it involved a complete ban of alcohol sales. We aimed to examine and interpret the changes in online search interest for keywords representing different alcohol-related themes during the lockdown period in India.* **Design and Methods.** *Data were extracted using the framework described for using Google Trends in health-related research. The list of alcohol-related search queries was prepared for four broad themes: types of alcoholic beverages consumed; means of accessing alcohol; problems experienced due to break in alcohol supply; and help-seeking for alcohol use disorders. The mean relative search volumes across three time periods (pre-lockdown; lockdown 1.0; lockdown 2.0) were compared using* SPSS *version 23.0.* **Results.** *A significant increase in online search interest for keywords related to the procurement of alcohol was observed in lockdown 1.0 but not during lockdown 2.0, compared with pre-lockdown. A significant increase in online search interest for alcohol withdrawal was observed during lockdown 1.0 compared to the pre-lockdown period. A significant increase in online search interest for keywords representing benzodiazepines was observed in lockdown 2.0.* **Discussion and Conclusions.** *Indian internet users exhibited significantly increased online interest for alcohol-related searches during lockdown. It seems that the challenges associated with offering interventions for alcohol use-related problems are likely to continue once the lockdown is lifted and people have the option to access alcohol and treatment services freely.* [Singh S, Sharma P, Balhara YPS. The impact of nationwide alcohol ban during the COVID-19 lockdown on alcohol use-related internet searches and behaviour in India: An infodemiology study. *Drug Alcohol Rev* 2021;40:196–200]

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Introduction

The nationwide lockdown as a result of COVID-19 pandemic led to a complete ban on the sale of alcohol for 41 consecutive days for the first time in the history of independent India [1]. Initially, the lockdown was imposed for a duration of 3 weeks from 25 March to 14 April 2020 (lockdown 1.0), which involved the shutdown of all non-essential services and strict implementation of stay-at-home instructions. Subsequently, the lockdown was extended for another 19 days from 15 April to 3 May 2020 (lockdown 2.0) with conditional relaxations. Both phases of lockdown (1.0 and 2.0) involved nationwide restrictions on the movement of people and shutdown of non-essential business activities and services.

The restrictions created a unique situation with more than 1.3 billion people isolated in their homes. The restrictions also presented challenges for researching their impacts because household or community surveys

were no longer possible. However, the lockdown saw a significant increase in the use of various internet sources for seeking information on a wide range of topics [2].

This means that research on internet-based search behaviours can provide insight into the impact of the ban on alcohol sales. Infodemiology has been defined as 'the science of distribution and determinants of information in an electronic medium, specifically the internet, or in a population, with the ultimate aim to inform public health and public policy' [4]. Infodemiological study methods have been widely utilised by researchers to examine COVID-19 related phenomena [5].

Monitoring online interest for alcohol use-related search queries can be useful for understanding the impact of break in the alcohol supply chain and difficulties in accessing healthcare facilities during the lockdown. Google is the most popular online search engine in India [6]. Google Trends is an analytical tool available for tracking online search interests of the population. The literature supports the use of Google Trends as a reliable and valid method for monitoring web-based activity of the population, and making accurate predictions, nowcasting and forecasting related to public behaviours [7]. The use of Google Trends for tracking alcohol use-related behaviours at the population level has been validated previously [8].

We expected that those with access to internet would have searched online to seek answers for their alcohol-related queries. Thus, this study aimed to examine and interpret the change in online search interest for keywords representing different alcohol-related themes during the lockdown period in India.

Methods

Data extraction

Data were extracted using the framework described for using Google Trends in health-related infodemiology and infoveillance research [4]. The Google Trends utilises an algorithm to give normalised relative search volume (RSV) for the keyword(s) searched for in a specified geographical region and time period. RSV values range from zero (representing very low search volumes) to 100 (peak search volume for that query). A list of alcohol-related search queries was prepared under four broad themes: types of alcoholic beverages consumed; means of accessing alcohol; problems experienced due to break in alcohol supply; and help-seeking for alcohol use disorders. The daily RSV values for selected search queries were downloaded for the period from 1 February until 27 April 2020. Furthermore, by using the Google Trends 'rising related queries' option, other related terms that were searched with the search

query entered by the same people during the selected period were also downloaded (see Appendix S1, Supporting Information for further details).

Analysis

Data were analysed using Microsoft Excel and Statistical Package for the Social Sciences software (SPSS, Version 23.0. New York, IBM Corp.). The data were divided into three timeframes representing pre-lockdown (4–24 March), lockdown 1.0 (25 March–14 April) and lockdown 2.0 (15–27 April) periods. The data were checked for distribution by Q–Q plots, and logarithmic transformation was conducted for skewed data. The mean RSV across three time periods were compared using the one-way analysis of variance. If the variable did not follow normal distribution even after the logarithmic transformation, the non-parametric Kruskal–Wallis test was applied instead of one-way analysis of variance. A two-tailed P-value of <0.05 was considered significant for all tests.

Results

The daily variations in the online search interest for different alcohol-related search queries explored during the pre-lockdown, lockdown 1.0 and 2.0 periods (see Table S1) are depicted along with peak search volumes in Figure 1. The Google search interest for most of the popular keywords representing alcohol-seeking behaviours peaked in the first week of the lockdown 1.0 period. The online search interest of the two most popular keywords representing problems experienced due to break in alcohol supply peaked on the fourth day of lockdown 1.0. The online search interest for the two most popular keywords representing help-seeking behaviours for alcohol use disorders peaked in the lockdown 2.0 period.

The change in mean RSV values for selected keywords under four different alcohol-related themes across the three selected timeframes are described in Table 1. A significant increase was observed in the online search interest for keywords representing distilled spirits in both lockdown 1.0 and 2.0, as compared to pre-lockdown. In contrast, a significant decrease was observed in the online search interest for the keyword beer in lockdown 1.0 and 2.0 compared to pre-lockdown. Furthermore, a significant increase was observed in online search interest for keywords related to the procurement of alcohol in lockdown 1.0. A significant increase was observed in online search interest for the keyword alcohol withdrawal during lockdown 1.0, followed by a significant decrease in lockdown 2.0 when
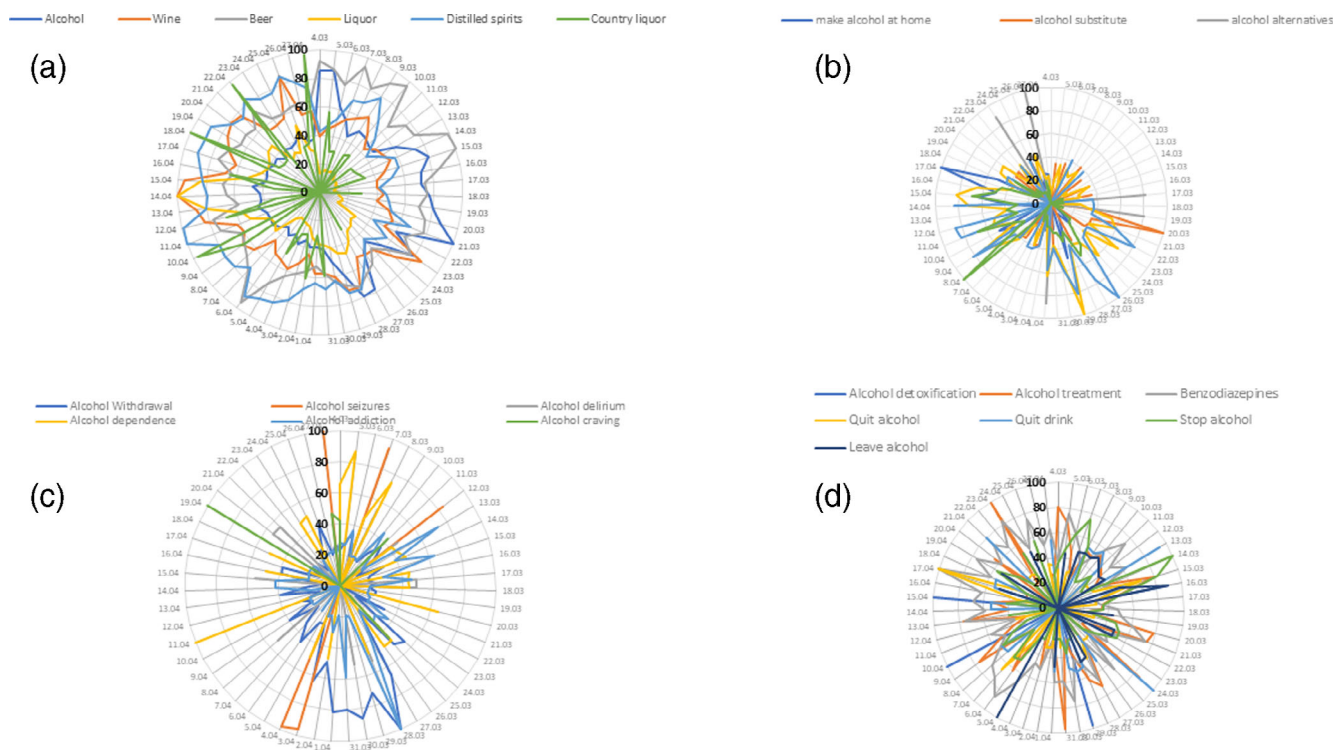
Figure 1. 1*Radar plots showing change in the daily relative search volume for different keywords searched over the Google online search engine from 4 March to 27 April 2020. (a) Keywords related types of alcoholic beverages consumed; (b) Keywords related to means of accessing alcohol; (c) Keywords related to problems experienced due to break in alcohol supply chain; (d) Keywords related to help-seeking for alcohol use disorders.*

compared with lockdown 1.0. Simultaneously, a significant increase was observed in the online search interest for keywords representing benzodiazepines in lockdown 2.0, when compared with pre-lockdown.

Table S1 and Table S2 provides a list of the top five rising related queries for different alcohol-related keywords during the selected search period on Google Trends (i.e. past 90 days).

Discussion

The present study aimed to understand the impact of the nationwide alcohol sales ban during COVID-19 lockdown on the online search interest for alcohol-related queries among internet users in India. This provides an indirect assessment regarding the nature of concerns of people due to the break in the supply

Table 1. *Comparison of mean relative search volume for popular keywords searched during pre-lockdown, lockdown 1.0 and lockdown 2.0 period*

	(0) Pre-lockdown		(1) Lockdown 1.0		(2) Lockdown 2.0			Post-hoc test (P-value)		
Keyword	Mean	SD	Mean	SD	Mean	SD	ANOVA (F; P-value)	0 vs. 1	0 vs. 2	1 vs. 2
Beer	80.86	10.92	66.00	9.78	66.00	4.49	16.38; <0.00*	<0.001*,c	<0.001*,c	0.99c
Distilled spirits	54.29	10.42	75.29	13.48	82.08	5.73	31.85; <0.00*	<0.00*,b	<0.00*,b	0.25b
Alcohol shop[a]	29.14	17.19	46.05	19.82	39.77	19.52	4.56; 0.01*	0.0*,b	0.19b	0.99b
Buy alcohol online[a]	21.00	24.66	49.05	31.33	13.08	20.42	6.46; 0.003*	0.02*,c	0.60c	0.006*,c
Alcohol withdrawal[a]	23.57	11.22	46.43	26.10	10.36	2.87	6.53; 0.003*	0.003*,b	0.99b	0.04*,b
Alcohol addiction[a]	31.10	15.31	24.90	22.41	19.69	10.44	2.66; 0.07	0.10c	0.14c	0.99c
Benzodiazepines	50.71	14.22	57.48	15.51	67.92	13.37	5.61; 0.006*	0.41b	0.005*,b	0.14b
Alcohol treatment[d]	50.10	20.55	43.00	24.69c	30.85	27.87	4.48; 0.10	NS	NS	NS

*P-value < 0.05. [a]Analysis was carried out after logarithmic transformation of the values. [b]Bonferroni test for pairwise comparison. [c]Games–Howell test for pairwise comparison. [d]Kruskal–Wallis test was run. ANOVA, one-way analysis of variance; NS, not significant.

chain, and offers insights from changes observed in online alcohol- and help-seeking behaviours among this population during the lockdown period.

A significant and sustained increase was observed in the online search interest for keywords representing distilled spirits in lockdown 1.0 and 2.0, as compared to pre-lockdown. Distilled spirits represent the most-commonly consumed alcoholic beverage in India [9]. However, online search interest for the keyword beer was significantly lower during lockdown 1.0 and 2.0 compared to pre-lockdown. The rising-related queries actually identified a 'breakout', as defined by Google Trends (more than 5000% increase in recent search volume), associated with the keyword beer that included queries such as 'corona beer company' and 'corona beer image'. Thus, the increased online search interest for beer during the pre-lockdown period could be explained due to the Corona brand of beer partly sharing name with the novel coronavirus causing the COVID-19 pandemic. Breakouts were also noted in relation to rising queries associated with distilled spirits, including 'how to make whisky at home', 'whisky home delivery', 'crazy romeo whisky price', among other related search queries. This suggested an increased interest in searching for possible avenues of accessing alcohol during the lockdown. Interestingly, there have been media reports on people reverse engineering hand sanitizers to make alcohol for themselves in response to a lack of access to alcoholic beverages [10]. Also, news reports about online platforms providing information such as telephone numbers, or links to join secret social groups involved in the illegal supply of alcohol at home during the lockdown, have surfaced from different parts of the country [11].

A significant increase was also observed in online search interest for keywords related to the procurement of alcohol in lockdown 1.0. Access to alcohol was abruptly disrupted across the country without any prior notice at the beginning of lockdown 1.0, which could explain the increased interest in online search queries like 'alcohol shops' and 'buy alcohol online' during lockdown 1.0 as compared to pre-lockdown. This also suggested that people might have resorted to alternative sources of procuring alcohol during the lockdown. The prohibition-like situation is conducive to creation of a grey market for alcohol, with access to alcohol in unsealed packaging already being reported during the current lockdown in India [3]. There are published reports on quality concerns for the alcohol sold in unsealed packaging from India during the lockdown [12]. Unrecorded alcohol (includes homemade, counterfeit, contraband and surrogate alcohol) consumption varies across different regions within India, ranging from 40% to 77% of total alcohol consumption [13]. The impacts of these markets and links to the lockdowns need further examination.

A significant increase was observed in the online search interest for 'alcohol withdrawal' during lockdown 1.0 as compared to pre-lockdown. This could reflect the possibility that persons with alcohol use disorder may have experienced alcohol withdrawal due to a lack of alcohol. The online search interest for alcohol withdrawal decreased significantly during the extended lockdown 2.0 as compared to the initial lockdown 1.0. This is in keeping with the usual duration of alcohol withdrawal that would be expected to subside over the 21 days of the first lockdown period [14].

A significant increase was observed in the online search interest for the keywords representing benzodiazepines in lockdown 2.0 but not lockdown 1.0. People who regularly use alcohol can experience protracted withdrawal symptoms and sleep disturbances for an extended period [15]. This might explain the online interest in benzodiazepines related search during the lockdown 2.0. Another possible explanation for the continued interest in benzodiazepines during lockdown 2.0 is the possibility of some of the regular users of alcohol substituting alcohol with benzodiazepines. A study from India reported that a significant proportion of persons receiving treatment for alcohol dependence used benzodiazepines in dependent or harmful patterns [16].

Interestingly, only a non-significant trend for increased online searches related to alcohol treatment keywords was observed in lockdowns 1.0 and 2.0. This observation possibly reflects the limited interest in seeking treatment services for alcohol use disorders among those who accessed the internet during this lockdown period. This is similar to the pattern of help-seeking observed in the past following the prohibition of alcohol in the state of Bihar in India. There was limited interest in seeking treatment services, with around 30% of respondents continuing to consume alcohol even after more than 2 months into prohibition [17]. Alternatively, this pattern of online search interest might be partly explained by the inability of people to leave their households for seeking treatment during the lockdown period.

These findings should be interpreted keeping in mind the limitations of the present study, such as only the Google-search based internet traffic was assessed. While we planned to include vernacular search terms commonly used for alcohol in different Indian languages, we could not explore non-English language search due to logistical factors. Furthermore, despite increased internet penetration in India, access to the internet in certain regions of the country is limited [18]. We could not capture the search interest of those without access to the internet.

Despite of the above-described limitations, the present study provides a systematic assessment of the impact of nationwide lockdown due to COVID-19 on alcohol users at the population level. This is of relevance due to limited applicability of the traditional research methodologies in the current times of lockdown and other restrictions imposed to curb the spread of COVID-19. Indian people with access to the internet used search terms related to different ways of procuring alcohol even during the lockdown, and a significant proportion of them used search terms related to alcohol withdrawal symptoms during the break in the alcohol supply. Furthermore, there was limited searching for help-seeking for alcohol dependence beyond search interest in benzodiazepines. Interestingly, on the first day of lifting restrictions on the sale of alcohol (after a 41-day prohibition), many states across the country witnessed record highs for single-day sales of alcohol [19]. This underscores the need for revisiting the rules and regulations for the sale of alcohol during the lockdown period in response to the COVID-19 pandemic. Relevant stakeholders should consider a comprehensive policy and plan for availability of alcohol and services for management of alcohol dependence during lockdowns related to COVID-19.

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Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's website:

Appendix S1. Detailed data extraction methodology followed using the Google Trends.
Table S1. Popularity of different keywords searched over the Google online search engine for the period 4 March to 27 April 2020 for India.
Table S2. Rising related queries on Google Trends for different popular keywords searched for the period 4 March to 27 April 2020.