BRIEF RESEARCH COMMUNICATION

Celebrity drug use reporting in Indian media and its impact on drug-related online search behavior: An infodemiology study

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ABSTRACT

Aim: We aimed to examine and interpret the changes in internet search volumes for keywords representing different drug use-related themes before and after the drug use started being discussed in the Indian news media during recent celebrity drug trials.
Materials and Methods: Data were extracted using Google Trends framework in health-related research. Search keywords were prepared under four broad themes: General interest in cannabis use, drug use being a criminal/unlawful act, help seeking for cannabis use, and help-seeking for drug-related problems. The mean relative search volume was analyzed and compared pre- and post-media discussion about celebrity drug use using SPSS V23.0.
Results: A significant increase was noted in online search interest for keywords related to themes of general interest in cannabis use and drug use being a criminal/unlawful act once the media discussion on the celebrity drug use started. However, no corresponding increase was noted in online search interest for themes of help seeking for drug-related problems in general and cannabis use in particular.
Conclusion: Media discussions on celebrity drug use may impact the online search behavior of the general public adversely. There is an need to develop and adhere to drug use reporting guidelines by media professionals.

Key words: Cannabis, illicit drug use, infodemiology, marijuana, media

INTRODUCTION

Multiple factors influence the attitude and behavior of general public toward illicit drug use. According to the cultivation theory, the more a viewer is exposed to the media, the more he/she is likely to accept the media's view as an accurate depiction.[1] Thus, mass media reporting has an important role in shaping attitudes and behaviors toward drugs, alcohol, and tobacco consumption.[2]

The Indian public is witnessing a dramatic and overzealous reporting of famous celebrity suicide and the drug use angle (primarily cannabis use) that emerged during the

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Submitted: 24-Nov-2020, **Revised:** 02-Mar-2021,
Accepted: 04-May-2021, **Published:** 07-Aug-2021

Access this article online	
Website: www.indianjpsychiatry.org	Quick Response Code
DOI: 10.4103/indianjpsychiatry.indianjpsychiatry_1329_20	

How to cite this article: Singh S, Bhatia G, Sharma P, Parmar A. Celebrity drug use reporting in Indian media and its impact on drug-related online search behavior: An infodemiology study. Indian J Psychiatry 2021;63:391-4.

investigation for the past few months.[3] The news channels, in their depiction, have linked drug use to moral depravity and crime. Little is known about the ramifications of such a portrayal of illicit drug use, especially by celebrities, on the viewers' minds, attitudes, and behaviors, particularly in India.[4,5] Illicit drug use reporting may have a deterrent effect on youth by possibly increasing the perceptions of drug use as risky. On the other hand, the relentless reporting of drug use by celebrities may present the youth with a trendy and innocuous perception of drug use, considering the iconic role model status celebrities enjoy among the masses. A few Indian studies have analyzed alcohol and tobacco depictions in Indian movies and their effects on young viewers.[6,7]

Infodemiology is 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." Using web searches' analysis is a novel method used by policymakers to monitor illicit drug use and influence drug policies in countries such as the USA and Russia.[8,9] On the other hand, such studies have been used to understand the impact of lockdown due to the COVID-19 pandemic on India's alcohol-related searches. Another infodemiology study from India reported a higher peak search interest for suicide seeking than help seeking for suicidal tendencies after a recent celebrity suicide.[10,11] Thus, the impact of media and other events on people's attitudes and behavior, to some extent, can be gauged by the overall search interest over the internet.

The available literature supports the use of Google Trends as a reliable and valid method for monitoring web-based activity of the population and makes accurate predictions about the current and future public behaviors.[12] A few recent studies have also used Google Trends data to assess the impact of the COVID-19 pandemic and subsequent lockdown on the mental health of the population at the level of entire county or state.[13,14] In addition, Google Trends analysis was also done to assess the impact on mental distress, social and economic stressors, and mental health treatment seeking by analyzing the changes in Internet search volume index for topics or keywords related to each of these themes, respectively.[15]

We hypothesized that those with access to Internet would have shown an increased online search interest in seeking information related to cannabis and other psychoactive substances following rampant media reporting of sensationalized celebrity drug use instances. Thus, in the present study, we monitored the changes in Internet search volumes for keywords representing a general interest in cannabis use, treatment seeking for cannabis use, drug use being a criminal/unlawful act, and help seeking for drug-related problems before and after drug use grabbed the spotlight in Indian media, aiming to provide indirect evidence for the impact of media reporting involving celebrity illicit drug use at India's population level.

MATERIALS AND METHODS

The Google Trends analysis was conducted to evaluate the online search interest of the population for keywords representing different themes related to drug use in general and cannabis in specific before and after the widespread media reporting on drug culture in the film industry, and Bollywood celebrities allegedly involved in drug-related offenses in India. Google Trends utilizes an algorithm to give normalized relative search volume (RSV) for the keyword(s) searched for a specified geographical region and time period. The RSV provides a measure of how frequently a given keyword was searched using the Google search engine, compared to the total number of Google searches conducted in the same geographical region over the selected time period. The RSV values could range from zero (representing very low search volumes) to 100 (peak search volume). The four Google Trends options of Region, Time, Category, and Search type were specified as India, June 1, 2020 to September 30, 2020, all categories, and web search, respectively.

The preliminary list of drug use-related search queries was prepared under four broad themes: (1) general interest in cannabis use; (2) treatment seeking for cannabis use; (3) drug use as a criminal/unlawful act, and (4) help seeking for drug use-related problems. This was refined before data extraction by consensus building between all authors (qualified psychiatrists with clinical and research experience in addiction psychiatry) based on the face validity of selected search queries. The "plus" (+) function from Google Trends was used to integrate the search volume (RSV) of all the chosen keywords representing a particular theme. The complete list of keywords used in this study, and other details about the methodology are described in Supplementary Table 1.

The daily RSV values for selected search keywords under the four broad themes were downloaded from 1st June till 30th September in separate .csv files using the above-described search strategy on 20th October 2020.

Ethics statement

The information used in this study was freely available in the public domain. No patient or participant was approached directly in this study. Thus, no written ethical permission was required.

Statistical analysis

The daily RSV values were downloaded separately from Google Trends and were entered into Microsoft Excel. A graph showing daily variations in RSV was made. The data

were transferred to SPSS 23.0 (New York, USA, IBM Corp.). Data were divided into two time periods: first was about 2 months before media coverage (June 1–July 31) and the second spanning 2 months after the coverage (August 1–September 30). The data were checked for distribution using the Kolmogorov-Smirnov and Shapiro-Wilk tests. Since the data were not normally distributed even after attempting logarithmic transformation, nonparametric inferential statistics were used. Mann–Whitney U-tests were then conducted to determine if the difference in RSVs for different keywords between the two time periods was significant. A two-tailed $P < 0.05$ was considered statistically significant.

RESULTS

The daily variations in the online search interest and peak search volumes (PSVs) for different drugs and cannabis use-related themes are depicted in Figure 1. The PSVs for keywords representing all drug-related themes except help seeking for drug use-related problems were in the month of September following the extensive media coverage of Bollywood celebrities allegedly involved in drug-related offenses. The PSV for keywords representing the theme of help seeking for drug use-related problems was on June 26, 2020, which coincides with the International Day against Drug Abuse and Illicit Trafficking.

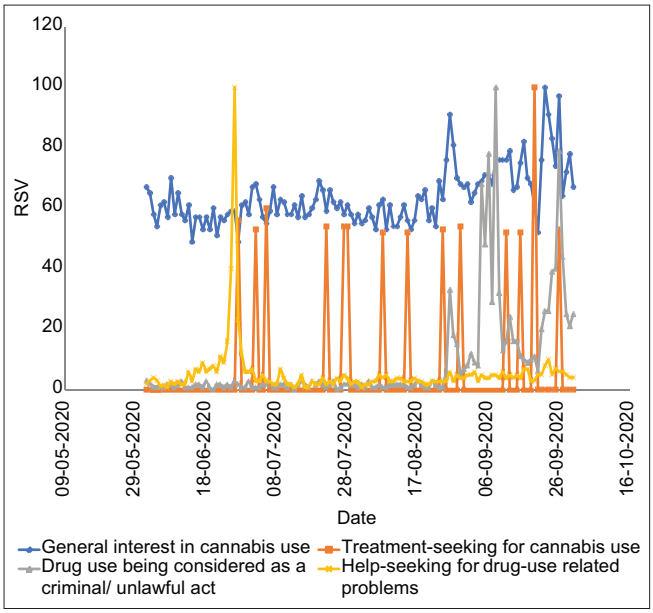

Figure 1: Graph depicting daily variations in online search interest for keywords representing different drug-related themes in India for 2 months before and after widespread media coverage of drug use in Bollywood (results are expressed as relative normalized search volume numbers)

The change in online search interest for different drug use-related themes is described in Table 1. There was a significant increase in RSV for keywords representing a general interest in cannabis use ($U = 1016.50$, $Z = -4.32$, $P < 0.001$) and drug use as a criminal/unlawful act ($U = 741.00$, $Z = -5.87$, $P < 0.001$). However, there was no significant change observed in RSV for keywords representing treatment seeking for cannabis use and help seeking for drug use-related problems.

DISCUSSION

This is the first infodemiology study from India looking at the impact of celebrity drug use media reporting on drug-related internet searches by general public. Our study reported that, with the widespread media coverage of alleged drug use by celebrities, an increase was seen in Internet searches related to cannabis use and drug use as a criminal/unlawful act. However, there was no corresponding increase in the searches related to help seeking for drug use in general or cannabis use in particular.

The results suggest that mass media coverage about drug use has a potential impact on the population's online search behaviors. Relatively greater impact on general cannabis use and crime-related aspects with no effect on help/treatment-related aspects may be explained by the fact that the media coverage focused primarily on the punitive aspects of drug use and Narcotics Drugs and Psychotropics Substances Act, 1985. This, in turn, may be explained by the involvement of primarily law enforcement experts with no or minimal participation of addiction professionals in the media discussions. The primary focus on legal aspects may be counterproductive in many ways. The fear of criminal sanctions may deter people who use drugs from disclosure and treatment seeking. This warrants concern, especially in India, where 88% treatment gap exists for drug use disorders.[16] Finally, media coverage also impacts the drug policies of

Table 1: Comparison of mean rank of relative search volume pre- and post-media coverage for different drug-related themes

Theme	Mean rank (before media coverage)	Mean rank (after media coverage)	Mann-Whitney *U* test
General interest in cannabis use	47.66	75.34	*U*=1016.50, *Z*=−4.32, *P*<0.001*
Treatment seeking for cannabis use	60.74	62.26	*U*=1814.00, *Z*=−0.43, *P*=0.66
Drug use being considered as a criminal/unlawful act	43.15	79.85	*U*=741.00, *Z*=−5.87, *P*<0.001*
Help seeking for drug-use related problems	57.59	65.41	*U*=1622.00, *Z*=−1.24, *P*=0.21

*Statistically significant at *P*<0.05. RSV - Relative search volume

a country. Thus, the portrayal of drug like cannabis being deadly may get integrated into key governmental policies. This may be counterproductive to recent discussions on more liberal drug policies in India.[17]

Unlike the WHO's media suicide reporting guidelines, which were subsequently adopted by the Press Council of India, there are no national guidelines for reporting drug abuse by media professionals. Our study suggests the need to develop such media reporting guidelines for drug abuse and related crimes. Countries such as Australia have their reporting guideline[18,19] which suggests (1) avoiding exaggeration or glamourization of drug use and associated problems; (2) abstaining from using pejorative terms; (3) developing clear concepts of drug use disorders; (4) seeking opinions of experts in the field, and (5) sending the key message of "treat, not punish." These aspects should be incorporated into the media coverage of drug use. The media should also provide helpful information such as the provision of treatment in drug-related laws and displaying drug helpline numbers.

The results should be interpreted keeping certain limitations in mind. The search terms were not comprehensive, keeping in mind the limits of Google Trends. Google was the only search engine considered. Only English language search keywords were used, and specific vernacular terms could not be incorporated.

CONCLUSION

The study provides a preliminary assessment of media reporting of drug use involving celebrities on Internet search behavior by general public. A corresponding increase in online search interest for general interest in cannabis use and crime-related aspects, but not on help/treatment-seeking was noted. Keeping in mind the effect of drug use reporting on viewers' behavior, there is a need to develop and follow drug use media reporting guidelines in the Indian context.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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Supplementary Table 1: Checklist for documentation of methodology for a Google Trends-based study

Section/topic	Checklist item	Details for present study
Search variables		
Access date	Provide the date(s) when Google Trends was accessed and when the data were downloaded	On July 31, 2020, we searched and downloaded data using Google Trends
Time period	Identify all the time periods that were searched for in Google trends, providing up to the month and day in detail	We searched within the "India" region using the "customized time range" option in Google Trends. The search period was set from June 01, 2020 to September 30, 2020
Query category	Identify which query category was used for search; if not using a query category, designate that "all query categories were used," which is the default setting	The default option of "all categories" was used as drug use related searches can span across multiple different categories
Search input		
Full search input	Provide the full search input(s) that were queried for in Google Trends, along with the appropriate documentation of search syntax. Ensure that the provision of the search input is clear, using brackets or other delineators to separate the search input from the body text	Keywords representing the four drug related themes General interest in cannabis use: Cannabis+marijuana+weed+ganja+hash+joint+bhang+bong+hashish+charas+thc Treatment-seeking for cannabis use: Cannabis treatment+cannabis deaddiction+marijuana treatment+marijuana deaddiction Drug use being considered a criminal/unlawful act: NDPS+NCB+narcotics control bureau+narcotic drugs and psychotropic substances act Help-seeking for drug-use related problems: Drug dependence+drug deaddiction+drug abuse+harmful drug use+drug detox+drug rehab
Combination	If more than one search term was used, document whether those terms were used in combination with a plus sign (+), or if terms were excluded with a minus sign (−). If terms were not used in combination, state so clearly	Plus sign (+) function was used to integrate RSV for different category of keywords
Quotation marks	If there was more than one word in any search term (e.g., "lipid guideline") document whether those words were queried with quotation marks or not	No quotation marks were used to keep the search broad and not restricted
Rationale for search strategy		
For search input	Provide the reasoning behind the choice of search input	The keywords were finalized by expert consensus approach based on the face validity of selected keywords for different drug use related themes
For settings chosen	Provide the reasoning for the settings/search variables chosen to specify the search.	The Google Trends analysis was conducted for about 2 months before media coverage (June 01-July 31), and 2 months after the starting of extensive media coverage of drug use in Bollywood (August 01-September 30) in the geographical region of India. This was done to evaluate the changes in online search interest for different drug-related themes in general and cannabis use-related themes in specific at the population level as a result of the widespread media coverage and sensationalizing of alleged drug use by Bollywood celebrities in India

This checklist is taken from the study: Nuti SV, Wayda B, Ranasinghe I, Wang S, Dreyer RP, Chen SI, *et al*. The use of Google trends in health care research: A systematic review. PLoS One 2014;9:e109583. RSV - Relative search volume; NDPS - Narcotic drugs and psychotropic substances; NCB - Narcotics control bureau