

# In Pursuit of Freedom from COVID-19 Awareness in India: An Infodemiological Analysis

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Sir,

Infodemiology, an essential public health informatics tool, provides valuable insight into the nature of the diseases, helps in increasing situational awareness, and making suitable interventions by analyzing search behavior on the internet.<sup>1</sup> The relative internet search volumes (RSVs) analysis provides information about public attention. Google Trends™ has been successfully used for real-time analyses for transmissibility, severity, and natural history of the severe acute respiratory syndrome (SARS), influenza pandemic, and Ebola. It is found to be beneficial for tracking symptoms very rapidly in the population and better understanding of key epidemiological parameters.<sup>2,3</sup>

The 2019 novel coronavirus (COVID-19) pandemic, caused by severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2) is the burning issue of recent times. As of now in India, it has caused 473,105 cases with a fatality rate of 3.1% (June 25, 2020).

An unusual increase in the public interest about 11.5 days before the peak of newly infected cases in the USA and Europe, 7 days before in Brazil and Australia,<sup>3</sup> and 3 days before in Taiwan<sup>4</sup> have been reported. Similarly, in France dermatological symptoms related to coronavirus infection have been looked for before any official press release by scientific societies.<sup>5</sup> However, there is no similar assessment in India for COVID-19 in this regard.

We searched Google Trends for Indian data over the last 4 months since the inception of nationwide lockdown from March 24, 2020, to evaluate the association between internet searches about COVID-19 and the daily rise of new cases in India.

We found that the average search volumes of all items (Figs. 1A and B) were low until early March. However, interest in the search terms has shown picks at the beginning of lockdown. There was a surge in the public interest about probable symptoms (Figs. 1B) about 1 to 3 days before the sharp increase in new cases in the last week of March (Figs. 1C).

The RSV of "fever" ( $r = 0.368$ ), "sore throat" ( $r = 0.589$ ), and "pneumonia" ( $r = 0.591$ ) positively correlates with the rise in new cases.

The Indian internet populace's renewed interest in prevention since the last week of April, resulting in a sharp decrease in a daily increase in the percentage of new patients (Figs. 1C). The RSV of "hand sanitizer" ( $r = -0.4199$ ), "facemask" ( $r = -0.4199$ ), and "social distancing" ( $r = -0.4765$ ) negatively correlates with the daily increase in the percentage of new cases. We need to capitalize on

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the renewed interest to create greater public consciousness about this dreaded situation.

There is a widespread interest regarding hydroxychloroquine ( $r = 0.2877$ ) and vitamin C ( $r = 0.1855$ ) and other trial treatments (Table 1) are noted.

However, the negative correlation treatment modalities like convalescent plasma therapy ( $r = -0.1967$ ), remdesivir ( $r = -0.2687$ ), favipiravir ( $r = -0.0369$ ), dexamethasone ( $r = -0.1468$ ), and Zinc ( $r = -0.5956$ ) may be an early indication of their effectiveness.

Coincidentally in the last week of June with early promising results of chemotherapeutic agents and revocation of the strict lockdown, the interest in preventing measures is declining at an alarming rate. It indicates the overall duration of public attention is short.

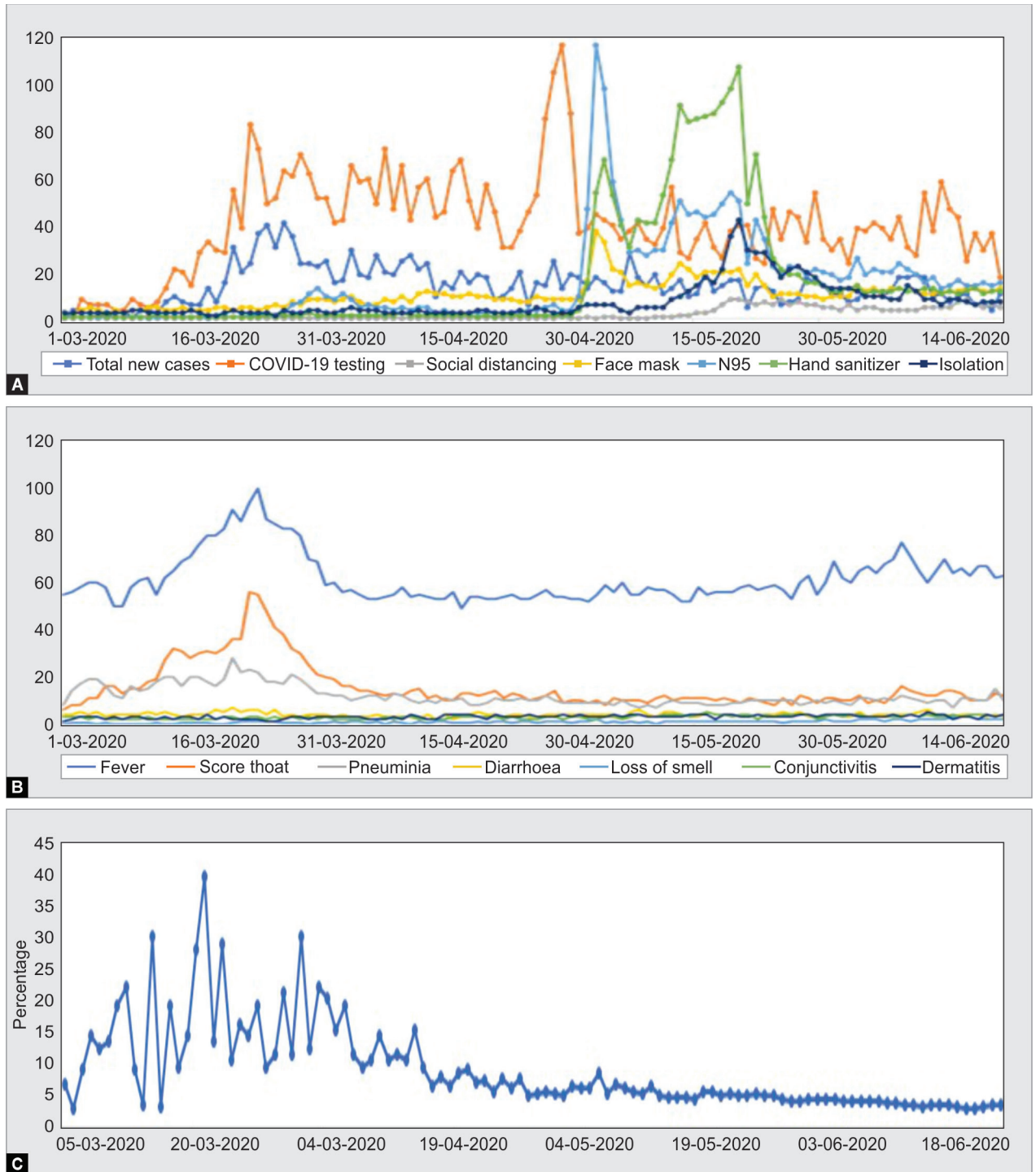
However, in the absence of a standardized procedure for data collection, the selection of spelling and terminology may affect the result of studies based on Google Trends™.

Appropriate risk communication has become the need of the hour for preventing "infodemics".<sup>6</sup> With cheaper and faster access and dissemination of information, the internet has become a double-edged tool. Hence, the use of the internet and social media in generating interest and creating public awareness in the importance of prevention, early detection, and timely management of this life-threatening condition should be strengthened.

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**Fig. 1A to C:** Trends of relative internet search volumes of COVID-19 related terms (A), various COVID-19 symptoms (B), and trends of daily increase in the percentage of new cases (C) in India

**Table 1:** Indian average monthly RSVs of COVID-19 trial medications in comparison to the world

Search topics	January		February		March		April		May		June	
	India	Global	India	Global	India	Global	India	Global	India	Global	India	Global
Hydroxychloroquine	0.5	0.5	0.5	0.6	8.2	15.7	21.2	22.1	2.7	10.7	2.7	4.3
Vitamin C	4.1	13	5	15.2	11.5	34.9	7.7	24.5	9.4	18.9	12.3	18.5
Zinc	4.2	11.6	4.8	12.5	4.8	20.4	5.4	20.5	7.5	16.8	8.2	16.15
Remdesivir	0.1	0.2	0.5	1.7	0.7	5.9	3.1	15.7	3.9	12.9	3.3	3.5
Favipiravir	0	0.1	0.1	0.4	0.9	4.3	0.7	1.2	0.8	0.7	2.4	1.7
Ivermectin	0.7	0.7	0.6	0.8	0.6	0.7	4.9	5.9	2.5	1.4	2.2	1.3
Doxycycline	1.1	3.7	1	3.6	1.1	3.6	1	3.4	1.8	3.1	1.1	3.3
Dexamethasone	0.9	1.8	1	1.9	0.9	1.7	1	1.6	0.9	1.3	13	12.9
Lopinavir/ritonavir	0	0.1	0	0.1	0	0.2	0.1	0.1	0	0.1	0.1	0.1
Plasma	3.3	15	3.7	15.2	3.6	14.6	22.6	21.1	8.6	17.3	6.6	15.8

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