Internet searches for measures to address COVID-19 in Brazil: a description of searches in the first 100 days of 2020

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Abstract

Objective: to describe profiles of interest of web search queries related to the COVID-19 epidemic in Brazil. **Methods:** this was a quantitative and exploratory study using Google Health Trends. We analyzed daily data of interest, defined as search probability (Pr), in 23 terms in searches performed by users connected in Brazil from January 1 to April 9, 2020. **Results:** the peak in interest (Pr=0.0651) on the theme of coronavirus occurred on March 21. Interest in use of face masks (Pr=0.0041), social distancing (Pr=0.0043) and hand hygiene with alcohol gel (Pr=0.0037) was greater than interest in respiratory etiquette (Pr=0.0010) and hand hygiene with soap and water (Pr=0.0005). **Conclusion:** the difference in interest in issues related to combating COVID-19 was substantial and can guide new strategies for disseminating health information.

Keywords: Coronavirus Infections; Communication; Epidemiology, Descriptive.

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Introduction

COVID-19 is a communicable disease caused by a recently discovered coronavirus (SARS-CoV-2). The virus and the disease were unknown until the outbreak in Wuhan, China, in December 2019.[1] The first confirmed case in Brazil was detected in São Paulo on February 26th,[2] and by April 8th 2020, 15,927 cases and 800 deaths had been confirmed nationwide.[3] The World Health Organization (WHO) has considered COVID-19 to be a public health emergency of international concern since January 30th 2020.

> *The profile of queries on internet search engines is a good proxy of a population's interest, concerns and intentions regarding a given issue.*

Medication for effective treatment of the disease and vaccines to prevent SARS-CoV-2 infection are not available thus far. As such, social distancing, respiratory etiquette and hand sanitizing are recommended as measures to combat the pandemic.[2] Among these measures, it is social distancing that has had the greatest impact on the everyday lives of Brazilian people. The Federal District implemented this strategy on March 11th,[2] followed by São Paulo, Brazil's most populous state, which adopted social distancing on March 21st.[4] Other states also adhered to social distancing, but on March 24th 2020, the President of the Republic used a national TV network to call for a "return to normality", going against global recommendations for fighting the epidemic.[5]

The profile of queries on internet search engines is a good proxy of a population's interest, concerns and intentions regarding a given issue. Although it does not represent the opinion of the person doing the search query, it points to their tendency, since while it is not possible to know the reason for a given search query, it is possible to know its contents.[6] This is a tool that is gaining force in monitoring health conditions[7,8] and behaviors related to them.[9]

The strategies for containing COVID-19 propagation are, for the most part, behavioral and impact the population's sociability and subsistence. It must be added that these measures have updated and renewed political and social polarization among the population. Within this context, knowing what the Brazilian population's doubts are about this subject can offer public policymakers possibilities for enhancing people's adherence to measures to contain the pandemic.

The objective of this study was to describe profiles of interest of web search queries related to the Covid-19 epidemic in Brazil.

Method

This was a quantitative and exploratory study describing Google searches for terms related to the Covid-19 pandemic and containment measures established by the Ministry of Health.

By 2018, 70% of Brazilians were accessing the internet, which is equivalent to approximately 127 million people. In the country's Southeast region, 75% of its inhabitants had access to the internet, while 64% had access in the Northeast region. In the other regions, 70% had access to the internet.[10]

We analyzed 23 terms related to COVID-19 using Google Health Trends (GHT), an interface for accessing data on internet searches. GHT is free and requires access by means of an application programming interface (API; available at: https://sites.google.com/a/google.com/health-trends-api-getting-started-guide/).

The GHT API provides data on internet searches since 2004, at various levels of spatial and temporal aggregation. Searches are retrieved from Google's general dataset in the form of a proportion, dividing the number of searches for a specific term in a given time interval by the total number of searches for terms in the same period. The result is multiplied by a predefined constant to facilitate its visualization. Its results therefore express the probability (Pr) of searches for a given term, referred to as *interest* in this article, standardized for the interval between 0 and 1.

Daily data were retrieved on searches made by users connected in Brazil between January 1st and April 9th 2020. The Pr of each term was aggregated according to defined categories. Overall interest in the subject was represented by the terms "coronavirus", "corona", "covid" and "sars". Interest in respiratory etiquette was represented by: 'cough', 'to cough', 'sneeze', 'to sneeze', 'handshake', 'to shake hands', 'hug', 'to hug'. For face mask use: 'mask', 'N95', 'duckbill'. For social distancing: 'quarantine', 'social isolation', 'social distancing'. For hand sanitizing with alcohol gel: 'alcohol gel', 'alcohol-based gel'. For hand sanitization with soap and water: 'soap', 'toilet soap', 'hand washing'.

When choosing the terms, non-technical terms were selected, which, although imprecise, are probably the closest to the everyday language of the Brazilian population in general.

The GHT API uses the Python programming language, while data organization and graph preparation was done using the R programming language.

Results

Between January 1st and April 9th 2020, there was an increase in interest about the theme of coronavirus and about themes associated with behavioral measures to contain it.

Figure1 shows the P trend between some of the epidemic's landmarks in Brazil. The peak in interest (P=0.0651) in the theme occurred on March 21st, when São Paulo published its decree on social distancing.

Of note is the low interest (lowest P=0.0008) in the theme in the period between the epidemic being considered a public health emergency and the first confirmed case in Brazil. Consistent and sustained growth of interest in the theme can only be seen with effect from the application of social distancing measures (P=0.0273) and the first death in Brazil (P= 0.0577).

In Figure 2 it can be seen that the population's interest in seeking information about pandemic containment measures showed substantial growth with effect from the first social distancing measures. Interest in the subject of face mask use (P=00041), social distancing (P=0.0043) and sanitizing hands with alcohol gel (P=0.0037) was greater than interest in the subject of respiratory etiquette (P=0.0010) and sanitizing hands with soap and water (P=0.0005).

Discussion

The periods of increased interest in COVID-19 occurred after the main epidemiological landmarks of the disease in Brazil were publicized by the media. Moreover, the results suggest possible information gaps about some of the main forms of prevention.

The internet search profile found during the current COVID-19 epidemic was similar to that seen during the Zika epidemic in 2015, when there was a predominance of reactive rather than proactive searches for prevention strategies.[11]

Fake news, unclear communication and divergences between the President of the Republic and the State Governors and the Minister of Health about how to deal
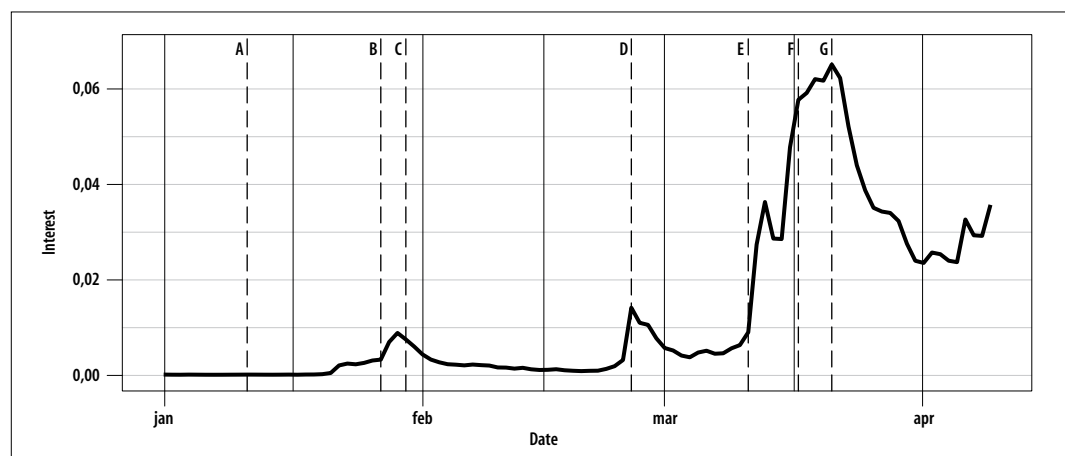

Figure 1 – Trend of probability of internet search interest in the theme of Covid-19 in Brazil, according to Google Health Trends, from January 1st to April 9th 2020

Legend:

A: 11/01 – 1st death registered in China.

B: 27/01 – 1st suspected case in Brazil (in the state of Minas Gerais).

C: 30/01 – World Health Organization (WHO) declares public health emergency.

D: 26/02 – 1st case confirmed in Brazil.

E: 11/03 – 1st decree on social distancing in Brazil (Federal District).

F: 17/03 – 1st death registered in Brazil (in São Paulo).

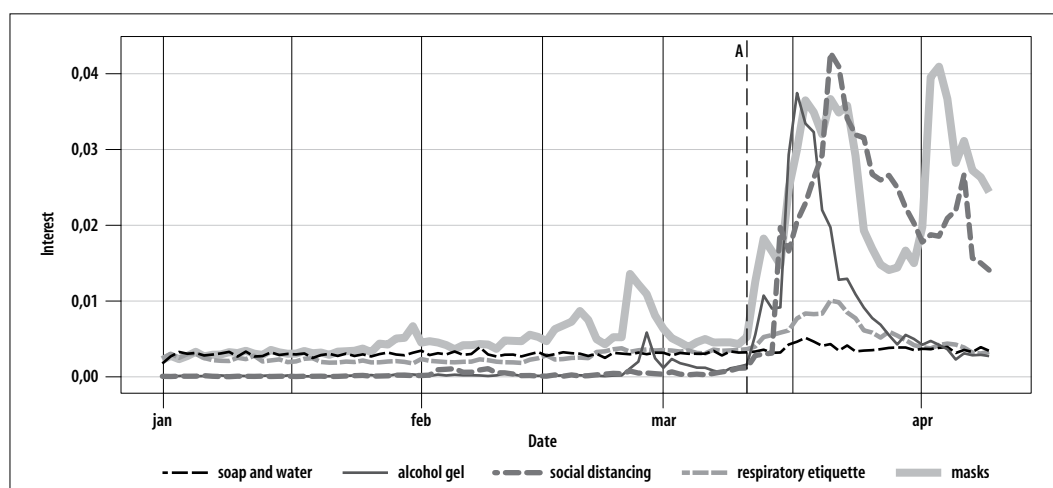G: 21/03 – The State of São Paulo announces decree on social distancing.

Figure 2 – Trend of probability of internet search interest in themes related to COVID-19 prevention in Brazil, according to Google Health Trends, from January 1ˢᵗ to April 9ᵗʰ 2020

Legend:

A: 11/03 – 1ˢᵗ decree on social distancing in Brazil (Federal District).

with the epidemic[5] may have contributed to reducing the population's interest in the disease up until the end of March, as well as to the sudden and heterogeneous growth in interest in themes related to its prevention following the adoption of social distancing measures.

In addition, lack of clearness in information provided by health authorities about social distancing, including absence of uniformity as to what care should be taken, can contribute to worsening the psychological impacts of quarantine.[12]

Substantial and sustained growth in interest in the pandemic in Brazil occurred with effect from the first social distancing measures. It is therefore not surprising that the theme of most interest is social distancing, given its implications beyond the field of health, including its impacts on the income of informal workers and workers in precarious job situations and the need for emergency government programs targeting these segments.[13]

The theme of face masks was the second most searched subject, principally after the Health Ministry recommendation regarding use of face masks by the population in general, including suggesting homemade masks and encouraging the population to share the results of this experience on social networks.[14]

Substantial interest in hand sanitization using alcohol gel and low interest in hand sanitization using soap and water is relevant for questioning whether communication between health authorities and the population has been effective. It is possible that there

is an information gap about an effective and low-cost behavior for containing the pandemic.

The main limitation of this study is that is based on the probability of searching for terms, without it being possible to establish the reasons that led to the searches. Social distancing, for instance, was the most outstanding theme among the containment measures, but this study is not capable of defining whether the population does or does not support and adhere to this measure. As such, further research is needed. An example could be research into the contents of posts on social networks.

The conclusion is therefore reached that there was a difference in interest in themes related to combating COVID-19, and this can guide new strategies for disseminating health information. Public health authorities can use internet search monitoring as a proxy for health information dissemination.[9,11]

Authors' contributions

Garcia-Filho C contributed to the study concept and design, data collection and data analysis. Garcia-Filho C, Vieira LJES and Silva RM contributed to data analysis and interpretation, drafting and critically reviewing the contents of the manuscript. All the authors have approved the final version of the manuscript and are responsible for all aspects thereof, including the guarantee of its accuracy and integrity.

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