Journal of Clinical and Basic Research
Online ISSN: 2538-3736

Research article

Searching For Vitamin C, Vitamin D and COVID-19: a Google Trends Study

Samira Eshginia[1], Leila Khalili[2], Masoumeh Khalili[3]*

1. Metabolic Disorder Research Center, Golestan University of Medical Sciences, Gorgan, Iran
2. Department of Material Science and Engineering, North Carolina State University, Raleigh, NC 27695
3. Neuroscience Research Center, Golestan University of Medical Sciences, Gorgan, Iran

***Correspondence:** Masoumeh Khalili, Neurosciences Research Center, Golestan University of Medical Sciences, Gorgan, Iran
Email: mkhalili_phs@goums.ac.ir

Received April 1, 2021 **Accepted** April 27, 2021

ABSTRACT

Background and objectives: COVID-19 outbreak is characterized as a pandemic. Owing to the effect of this disease on people's lives, news about the methods of preventing and treating this disease is released every day. There have been some clinical data suggesting that vitamins C and D can be useful in treating patients with COVID-19 disease. In this study, we aimed to examine vitamin C and D searching trends in 10 countries and worldwide about the COVID-19 news based on the data on Google Trends.

Methods: We surveyed the searches about vitamins C and D using some keywords on Google Trends from December 15, 2019 to April 29, 2020.

Results: The number of searches increased after the release of news about the effect of vitamins C and D on COVID-19.

Conclusion: The results suggest that as the news about the role of vitamins on infection prevention and treatment spreads, people become more interested in expanding their nutritional knowledge.

Keywords: COVID-19; Coronavirus; Vitamin C; Vitamin D; Google Trends

DOI: 10.29252/Jcbr.5.2.5

This work is licensed under a Creative Commons Attribution 4.0 License.
© The authors

[DOI: 10.52547/jcbr.5.2.5]

INTRODUCTION

A new coronavirus (CoV) infection epidemic began in Wuhan, China, in December 2019 and recognized as COVID-19 by the World Health Organization in February 2020 (1). The number of COVID-19 cases outside China started to increase rapidly. The virus has spread to at least 219 countries. By May 1st 2020, there have been more than 3,180,000 confirmed cases and 224,300 confirmed deaths, and the numbers are increasing every day (2).

Diet and nutrition affect the immune system competence and determine the risk and severity of infections. The macro/micro-nutrients in diet generally promote healthy immune responses. Micronutrients, including beta-carotene, vitamins C, E and D, magnesium and zinc have antioxidant and anti-inflammatory properties, which modulate the immune functions (3, 4). Since there is no registered treatment available for this new virus as of today, there is an urgent need to find an alternative solution to prevent and control this disease. As the COVID-19 spreads around the world, the general population seeks information on methods of protecting themselves. This relevance could be reflected on Google searches (5). Previous studies showed a relationship between web searches and regional influenza incidence (6). In recent publications, Google search trends were also used to predict the national COVID-19 outbreak in Taiwan (5), China (7) and Iran (8). These studies hypothesized that the search behaviors on health literacy might reflect the rate of disease spread among different countries. More specifically, Lin et al. aimed to examine whether Google searches for “wash hands” and “face masks” would prevent the increase in number of confirmed cases of COVID-19 among 21 countries (5). This approach enables the use of search queries to detect nutrition literacy and interest to improve public health. Therefore, we aimed to examine vitamins C and D searching trend in 10 countries and worldwide in accordance to the COVID-19 news.

MATERIALS AND METHODS

Based on the data extracted from Worldometer up to May 3, 2020, we chose 10 countries with the highest COVID-19 incidence rates (9). These countries included the USA, Spain, Italy, UK, France, Germany, Russia, Turkey, Brazil and Iran. Then, we searched Google Trends (https://trends.google.com) for the keywords "Vitamin C COVID-19", " Vitamin D COVID-19", "Vitamin C Coronavirus", "Vitamin D Coronavirus", "Vitamin C Supplement Coronavirus", “Vitamin D Supplement Coronavirus", “Vitamin C Supplement COVID-19", and “Vitamin D Supplement COVID-19" dated from December 15, 2019 to April 29, 2020. Moreover, we used Google Translate (https://translate.google.com/) to translate these keywords to every country’s national language (Supplementary Table 1) and searched Google Trends for the translated keywords as well. We deleted the keywords that had not been searched on Google Trends (Supplementary Table 2). For reference, the mean value of daily searches were also reported. The search periods were divided into two groups (group 1: 15/12/2019 until 20/2/2020, the first outbreak of COVID-19 and group 2: 21/2/2020 until 29/4/2020, COVID-19 pandemic). The means were compared and analyzed by t-test. A p-value of less than 0.001 was considered to be statistically significant.

RESULTS

The results show that Google searches for “vitamin C” and “Covid19” were zero from Google Trend value between December 15, 2019 and February 20, 2020. However, after spread of the news about the relationship of vitamin C and COVID-19, the corresponding value increased significantly (Figure 1). For instance, from February 21 to April 29, this value increased to a

[DOI: 10.52547/jcbr.5.2.5]

maximum of 20.80 and 58.27 from Google Trend value for 10 countries and the world, respectively (O<0.0001). Same trend was seen for the keyword searches of "Vitamin D" and "COVID-19".

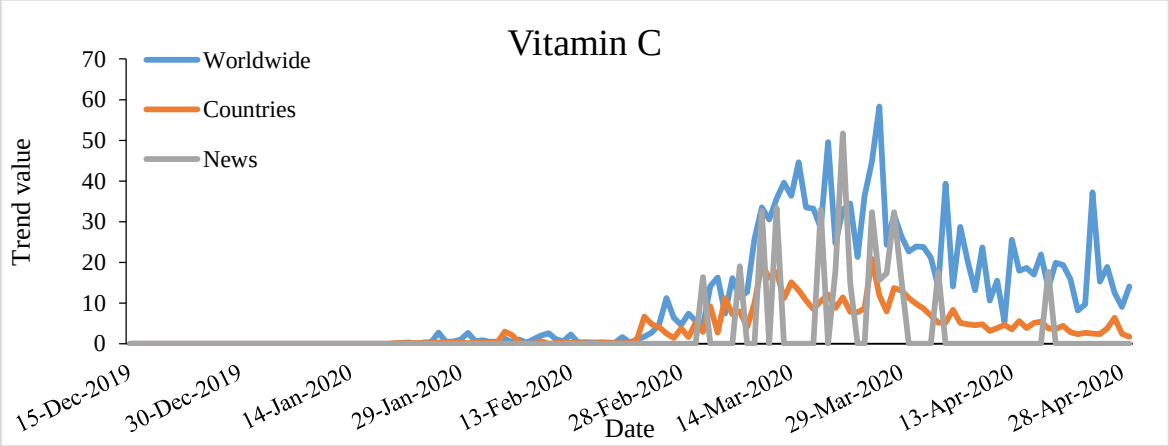

Figure 1. The daily mean of searching about vitamin C (according to the keywords) on Google Trends from December 15, 2019 to April 29, 2020

From December 15th to February 20th, there was no search from Google Trend value; however, after spread of the news about the importance of vitamin D on preventing and treating COVID-19 (Figure 2), the number of searches increased to a maximum of 9.83 and 47.09 from Google Trend value in the 10 surveyed countries and the world, respectively.

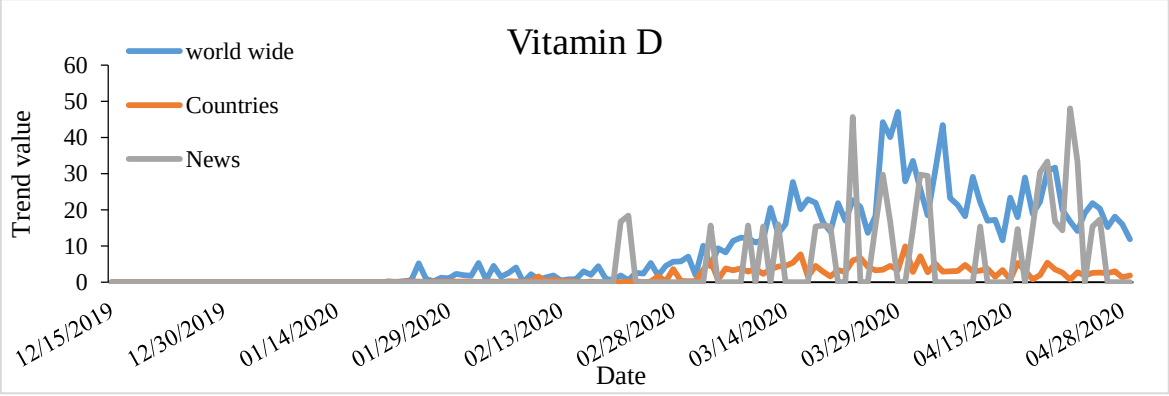

Figure 2. The daily mean of searching about vitamin D (according to the keywords) on Google Trends from December 15, 2019 to April 29, 2020

[DOI: 10.52547/jcbr.5.2.5]

Figures 3 and 4 show the search results of vitamin C, D and COVID-19. The search results of vitamin C was increased from February 23 to April 29, 2020. Searches about vitamin D and COVID-19 increased dramatically from February 10 to April 29, 2020. People in the USA and the UK searched more for these keywords compared to people in other countries.

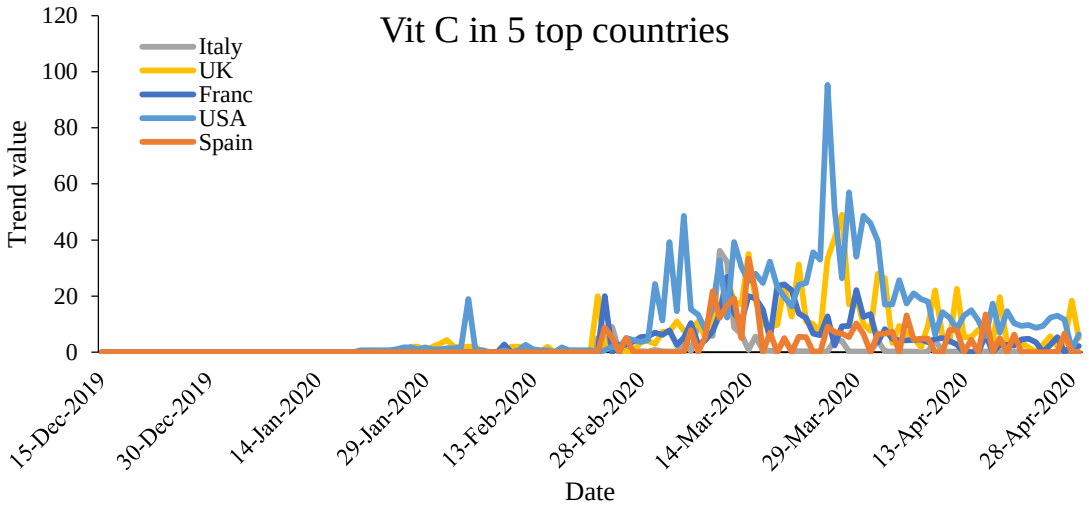

Figure 3. The daily mean of searching about vitamin C (according to the keywords) on Google Trends from December 15, 2019 to April 29, 2020in five countries (USA, UK, France, Italy, and Spain)

[DOI: 10.52547/jcbr.5.2.5]

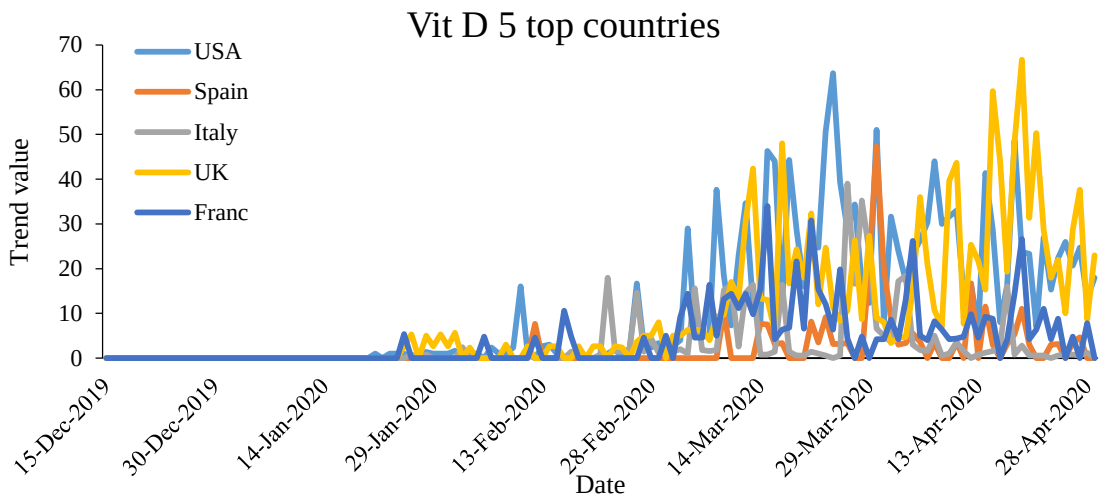

Figure 4. The daily mean of searching about vitamin D (according to the keywords) on Google Trends from December 15, 2019 to April 29, 2020 in five countries (USA, UK, France, Italy, and Spain)

DISCUSSION

After the spread of COVID-19, various potential prevention and treatment methods became available on the media, and people started using search engines to gain knowledge about the infection. Based on a previous study, after the spread of COVID-19, searches for "mask face" and "wash hand" increased (5). Considering the effect of nutrition and vitamins in preventing and treating viral respiratory infections (3, 4), we expected that Google searches for nutritional information increase as the news about the effect of vitamin C and D on COVID-19 were released. Our findings indicate that after the release of the news about the relationship of vitamins C and D and COVID-19, Google searches about these two supplements increased worldwide. These results indicate that people are more willing to use search engines to confirm the news and obtain more information about their health.

CONCLUSION

The results suggest that as the news about the role of vitamins on infection prevention and treatment spreads, people become more interested in expanding their nutritional knowledge.

ACKNOWLEDGMENTS

None.

DECLARATIONS

Funding

Not applicable.

Ethics approvals and consent to participate

Not applicable.

Conflict of interest

The author declares that there is no conflict of interest regarding publication of this rticle .

[DOI: 10.52547/jcbr.5.2.5]

REFERENCES

1. Benvenuto D, Giovanetti M, Salemi M, Prosperi M, De Flora C, Junior Alcantara LC, et al. The global spread of 2019-nCoV: a molecular evolutionary analysis. Pathogens and Global Health. 2020;114(2):64-7.
[View at Publisher] [DOI] [PubMed] [Google Scholar]

2.https://www.who.int/emergencies/diseases/novel-coronavirus-2019 -.

3. Calder PC, Carr AC, Gombart AF, Eggersdorfer M. Optimal nutritional status for a well-functioning immune system is an important factor to protect against viral infections. Nutrients. 2020;12(4):1181.
[View at Publisher] [DOI] [PubMed] [Google Scholar]

4. Zhang L, Liu Y. Potential interventions for novel coronavirus in China: a systemic review. J Med Virol. 2020.
[View at Publisher] [DOI] [PubMed] [Google Scholar]

5. Lin Y-H, Liu C-H, Chiu Y-C. Google searches for the keywords of "wash hands" predict the speed of national spread of COVID-19 outbreak among 21 countries. Brain, Behav, Immun. 2020.
[View at Publisher] [DOI] [PubMed] [Google Scholar]

6. Ginsberg J, Mohebbi MH, Patel RS, Brammer L, Smolinski MS, Brilliant L. Detecting influenza epidemics using search engine query data. Nature. 2009;457(7232):1012-4.
[View at Publisher] [DOI] [PubMed] [Google Scholar]

7. Li C, Chen LJ, Chen X, Zhang M, Pang CP, Chen H. Retrospective analysis of the possibility of predicting the COVID-19 outbreak from Internet searches and social media data, China, 2020. Eurosurveillance. 2020;25(10):2000199.
[View at Publisher] [DOI] [PubMed] [Google Scholar]

8. Ayyoubzadeh S, Zahedi H, Ahmadi M. Predicting COVID-19 incidence using Google Trends and data mining techniques: A pilot study in Iran. JMIR Public Health and Surveillance. 2020. [View at Publisher] [PubMed] [Google Scholar]

9.https://www.worldometers.info/coronavirus/?utm_campaign=instagramcoach1?

[DOI: 10.52547/jcbr.5.2.5]

Supplementary tables

Table 1. The keywords used in searches for vitamins C and D and COVID-19

1	News	Vitamin C Covid-19, Vitamin D Covid-19, Vitamin C Coronavirus, Vitamin D Coronavirus, Vitamin C Supplement Coronavirus, Vitamin D Supplement Coronavirus, Vitamin C Supplement Covid-19, Vitamin D Supplement Covid-19
2	Worldwide	Vitamin C Covid-19, Vitamin D Covid-19, Vitamin C Coronavirus, Vitamin D Coronavirus, Vitamin C Supplement Coronavirus, Vitamin D Supplement Coronavirus, Vitamin C Supplement Covid-19, Vitamin D Supplement Covid-19
3	USA	Vitamin C Covid-19, Vitamin D Covid-19, Vitamin C Coronavirus, Vitamin D Coronavirus, Vitamin C Supplement Coronavirus, Vitamin D Supplement Coronavirus, Vitamin C Supplement Covid-19, Vitamin D Supplement Covid-19
4	Spain	Vitamina C Covid-19, Vitamina D Covid-19, Coronavirus de vitamina C, Coronavirus de vitamina D, Suplemento de vitamina C Coronavirus, Suplemento de vitamina D Coronavirus, Suplemento de vitamina C Covid-19, Suplemento de vitamina D Covid-19
5	Italy	Vitamina C Covid-19, Vitamina D Covid-19, Vitamina C Coronavirus, Vitamina D Coronavirus, Supplemento di vitamina C Coronavirus, Supplemento di vitamina D Coronavirus, Vitamina C Supplemento Covid-19, Supplemento di vitamina D Covid-19
6	UK	Vitamin C Covid-19, Vitamin D Covid-19, Vitamin C Coronavirus or Vitamin D Coronavirus, Vitamin C Supplement Coronavirus, Vitamin D Supplement Coronavirus, Vitamin C Supplement Covid-19, Vitamin D Supplement Covid-19
7	France	Vitamine C Covid-19, Vitamine D Covid-19, Vitamine C Coronavirus, Vitamine D Coronavirus, Vitamine C Supplément Coronavirus, Vitamine D Supplément Coronavirus, Vitamine C Supplément Covid-19, Vitamine D Supplément Covid-19
8	Germany	Vitamin C Covid-19, Vitamin D Covid-19, Vitamin C Coronavirus, Vitamin D Coronavirus, Vitamin C Ergänzung Coronavirus, Vitamin D Ergänzung Coronavirus, Vitamin C Ergänzung Covid-19, Vitamin D Ergänzung Covid-19
9	Russia	Витамин C Covid-19, Витамин D Covid-19, Витамин C Коронавирус, Витамин D Коронавирус, Витамин C Дополнение Коронавирус, Витамин D Дополнение Коронавирус, Витамин C Дополнение Covid-19, Витамин D Дополнение Covid-19
10	Turkey	C Vitamini Covid-19, D Vitamini Covid-19, C Vitamini Coronavirüs, D Vitamini Coronavirüs, C Vitamini Takviyesi Coronavirüs, D Vitamini Takviyesi Coronavirüs, C Vitamini Takviyesi Covid-19, D Vitamini Takviyesi Covid-19
11	Brazil	Vitamina C Covid-19, Vitamina D Covid-19, Vitamina C Coronavírus, Vitamina D Coronavírus, Vitamina C Suplemento Coronavírus, Vitamina D Suplemento Coronavírus, Suplemento de Vitamina C Covid-19 , Vitamina D Suplemento de Covid-19
12	Iran	ویتامین ث کووید-۱۹، ویتامین د کووید-۱۹، ویتامین ث ویروس کرونا، ویتامین د ویروس کرونا، مکمل ویتامین ث ویروس کرونا، مکمل ویتامین د ویروس کرونا، مکمل ویتامین ث کووید-۱۹، مکمل ویتامین د کووید-۱۹

[DOI: 10.52547/jcbr.5.2.5]

Table 2. The keywords that have not been searched on Google Trends

1	Vitamin C Supplement Covid-19	22	Suplemento de vitamina D Coronavirus
2	Supplemento di vitamina C Coronavirus	23	Suplemento de vitamina D Covid-19
3	Vitamina C Supplemento Covid-19	24	Supplemento di vitamina D Coronavirus
4	Vitamine C Supplément Coronavirus	25	Vitamina D Supplemento Covid-19
5	Vitamine C Supplément Covid-19	26	Vitamine D Supplément Coronavirus
6	Vitamin C Ergänzung Coronavirus	27	Vitamine D Supplément Covid-19
7	Vitamin C Ergänzung Covid-19	28	Vitamin D Ergänzung Coronavirus
8	Витамин C Covid-19	29	Vitamin D Ergänzung Covid-19
9	Витамин C Дополнение Коронавирус	30	Витамин D Covid-19
10	Витамин C Дополнение Covid-19	31	Витамин D Дополнение Коронавирус
11	C Vitamini Covid-19	32	Витамин D Дополнение Covid-19
12	C Vitamini Coronavirüs	33	D Vitamini Covid-19
13	C Vitamini Takviyesi Coronavirüs	34	D Vitamini Coronavirüs
14	C Vitamini Takviyesi Covid-19	35	D Vitamini Takviyesi Coronavirüs
15	Vitamina C Suplemento Coronavírus	36	D Vitamini Takviyesi Covid-19
16	Suplemento de Vitamina C Covid-19	37	Vitamina D Suplemento Coronavírus
17	ویتامین ث کووید-۱۹	38	Suplemento de Vitamina D Covid-19
18	ویتامین ث ویروس کرونا	39	ویتامین د کووید-۱۹
19	مکمل ویتامین ث ویرووس کرونا	40	ویتامین د ویروس کرونا
20	مکمل ویتامین ث کووید-۱۹	41	مکمل ویتامین د ویرووس کرونا
21	Vitamin D Supplement Covid-19	42	مکمل ویتامین ث کووید-۱۹

How to Cite: Eshginia S, Khalili L, Khalili M. Searching For Vitamin C, Vitamin D and COVID-19. Journal of Clinical and Basic Research. 2021; 5 (2) :5-12

[DOI: 10.52547/jcbr.5.2.5]