Brief Communication

Evaluation of COVID-19 Trend in Iran; Population Response to the Recent Pandemic Overtime

Abstract

Relative internet search volumes (RSV) is now being consider as a measurement of awareness for most of the trending topics. During the recent coronavirus disease (COVID-19) outbreak, many researchers used the RSVs to interpret the population responses to the pandemic in various ways. By using the RSVs searched by Persian language people, we demonstrated that the Iranian people increased their knowledge and awareness of COVID-19 during the early phases of the disease before the first peak. However, their relative searches about the COVID-19 and its clinical symptoms decreased gradually despite of the gradual rise of the confirmed cases. Their less tendency to seek information about the COVID-19 could be one of the possible explanation for the increasing number of confirmed cases even several days after easing the disease related lockdown.

Keywords: *Awareness, COVID-19, internet*

Introduction

The recent coronavirus pandemic (COVID-19) has raised global awareness in many ways and became a common concern for every nation.[1] COVID-19 outbreak highlighted the effect of computer science in management of infectious disease outbreak 2. Relative internet search volumes (RSV) in every country can be used for the determination of public interest in specific health concerns,.[2] During the recent Coronavirus pandemic, global public interest on COVID-19 began to rise in late January 2020.[2] The worldwide Google Trends ™ (GT) demonstrated a peak in mid-March, as the number of confirmed cases began to rise in Europe.[2] A correlation between RSV and COVID-19 confirmed cases observed in many European countries.[2] Moreover, in the United States, Yuan *et al*. demonstrated that COVID-19 related search terms correlate with COVID-19 new cases.[3] The usefulness of GT in the recent COVID-19 is not restricted to prospective relations between RSV and case numbers. The Walker *et al.* study is an example of using GT for detecting novel symptoms during the current outbreak.[4] They reported a strong correlation between smell related information and COVID-19 in many countries, including Iran.[4] Even more, specific RSVs can predict the

COVID-19 behaviors in every population. The second wave COVID-19 was predicted by the use of GT as performed by Strzelecki *et al*.[5] According to the mentioned potentials of RSVs, we decided to evaluate the trends of COVID-19 and its most common clinical manifestations' RSVs in Persian speaking subjects during the recent COVID-19 pandemic.

Methods

To visualize our findings, we retrieved the four most common manifestations of COVID-19 RSVs, including fever, cough, sore throat, and dyspnea from GT. In addition, we retrieved the RSVs for the term of COVID-19 "coronavirus". All these terms retrieved only in Persian language and during the specific period from 20/2/2020 to 30/5/2020. The number of confirmed cases during this period retrieved from the national committee on COVID-19 epidemiology and Iranian CDC - Ministry of health and medical education.[6] The data normalized and all the RSVs visualized on a single graph [Figure 1].

Results

Although the term "coronavirus" searched from earlier than 20/2/2020; however, the peak of RSVs for coronavirus occurred just as the first case confirmed in Iran.

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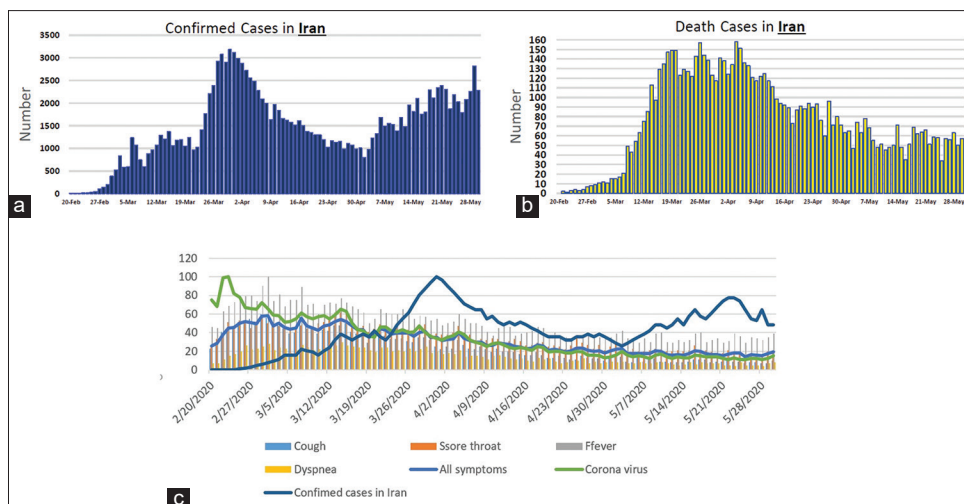*E-mail: bidkhori@acecr.ac.ir*

Figure 1: (a and b) The number of confirmed cases and mortality report adopted the national committee on COVID-19 epidemiology and Iranian CDC - Ministry of health and medical education.[6] (c) The graph shows the relative internet search volumes for the four specific symptoms, normalized volume of all symptoms, the coronavirus term and normalized volume of the confirmed cases of COVID-19 in Iran

Since then, RSVs for common clinical manifestations of COVID-19 raised, and the peak of confirmed cases happen in early April 2020. The period between the peak of confirmed cases and the peak of both RSV for coronavirus and the COVID-19 symptoms were 38 and 30 days, respectively. Prior to the second peak, there is no peak for the COVID-19 symptoms nor are the coronavirus term and the RSVs regarding the studied terms gradually decreasing as the confirmed cases are still increasing.

Discussion

The recent COVID-19 successfully managed in many countries including Iran; however, the potential development of next disease wave addressed in the literature.[7] According to the Persian language RSVs in recent months, we demonstrated that COVID-19 related RSVs could only correlate with the first peak of confirmed cases. Although the interpretation of RSV has many limitations; however, we can address some possible explanations for such behavior. The first possible explanation could be the raised awareness of people after announcement of the first COVID-19 patients in Iran and before the first peak. We may conclude that the people learned the COVID-19 symptoms and have knowledge of the infection. Therefore, they are less likely to search for the COVID-19 and its symptoms since then. The second possible explanation could be the less symptomatic illness as the RSVs for the main clinical symptoms of COVID-19 is dropping while the second peak happened and number of confirmed cases is still raising. It is noteworthy to mention that the second raise is consistent with slow ease of lockdown in Iran and widespread of using antibody tests for COVID-19 in diagnostic laboratories, which both could end up in increased number of confirmed cases. As there is not scientific explanation for weakening of

the virus over time, we may not conclude that decreasing the RSVs for the COVID-19 symptoms could be due to the milder presentation of the disease. However, the confirmation of such milder presentations need further research in near future. The last explanation may be due to the psychological impact of COVID-19 in the early phases of the disease. By confirmation of the first cases in Iran, people may pay more attention to their clinical symptoms, and as they increased their knowledge and awareness, the rate of somatization and fear of infection gradually decreasing overtime. Moreover, the important role of social media during COVID-19 outbreak should also be considered. Social media plays a crucial role in introducing the epidemiology and the status of the outbreak to general population. The information provided by social media may not be effective enough in educating general population and even could be misleading.[8] Regardless of the reason behind this trend, it seems that Iranian population is not seeking for information about the COVID-19 as same as the early stages of the disease and this possible fact alongside of increasing number of patients could be an alarm sign for further education interventions in order to prevent possible waves in future.[7]

Conclusions

Our finding demonstrated that Iranian people increased their knowledge and awareness of COVID-19 during the early phases of the disease before the first peak. However, as the second wave of confirmed cases occurred and the number of confirmed cases is increasing, their information seeking about the COVID-19 topic and symptoms is decreasing. Their less tendency to seek information about the disease could be one of the possible explanation for the increasing number of confirmed cases even several days after easing the disease-related lockdown.

Author's contribution

RJE contributed in conception and design, drafting the work. MS and ASN contributed in acquisition, analysis, or interpretation of data. HRB contributed in revising the work and Final approval of the version to be published. All the authors fulfil the ICMJE criteria of authorship and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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Conflicts of interest

There are no conflicts of interest.

References

1. Rezaei-Kalat A, Javanbakht A, Esfehani RJ, Bordbar MR. A Computerized Platform for Screening and Management of Psychological Characteristics of Healthcare Providers during Novel Coronavirus Infection. Iranian Journal of Medical Sciences. 2021;46:402.

2. Jafarzadeh-Esfehani R, Fard MM, Hatam-Ghale FH, Kalat AR, Fathi A, Shariati M, *et al*. Telemedicine and computer-based technologies during coronavirus disease infection; a chance to educate and diagnose. Archives of Iranian Medicine 2019;23:561-3.

3. Yuan X, Xu J, Hussain S, Wang H, Gao N, Zhang L. Trends and prediction in daily new cases and deaths of COVID-19 in the United States: An internet search-interest based model. Explor Res Hypothesis Med 2020;5:1-6.

4. Walker A, Hopkins C, Surda P. The use of google trends to investigate the loss of smell related searches during COVID-19 outbreak. Int Forum Allergy Rhinol 2020;10:839-47.

5. Strzelecki A. The second worldwide wave of interest in coronavirus since the COVID-19 outbreaks in South Korea, Italy and Iran: A Google Trends study. Brain Behav Immun 2020;88:950-1.

6. CDC NCoC-EaI. Analysis of epidemic trend by provinces of Iran (till May29) Iran: Ministry of Health and Medical Education, IR Iran; 2020. Available from: http://corona.behdasht.gov.ir/files/site1/files/IRAN_COVID19_Factsheet_N.43_-30May_En.pdf. [Last cited on 2020 Jun 05].

7. Yasri S, Wiwanitkit V. Common place for COVID-19 local spreading: Observation from Thailand. Int J Prev Med 2020;1:11-45.

8. Allington D, Duffy B, Wessely S, Dhavan N, Rubin J. Health-protective behaviour, social media usage and conspiracy belief during the COVID-19 public health emergency. Psychol Med 2020:1-7. doi: 10.1017/S003329172000224X.