RESEARCH LETTER

Potential use of Google Search Trend analysis for risk communication during the mpox (formerly monkeypox) outbreak in Iran

1 | INTRODUCTION

Mpox virus (formerly monkeypox), a double-stranded DNA virus from the genus *Orthopoxvirus*, causes a re-emerging zoonotic infection named severe mpox disease.[1,2] Moreover, this zoonotic infection has become endemic in sub-Saharan Africa, particularly in Central and West Africa. Since 2003, mpox-infected cases have been reported outside Africa.[1] As a result of the increased number of confirmed cases in 2022, the World Health Organization (WHO) declared mpox outbreak as a global health emergency on July 23.[2] In Iran, a 34-year-old woman living in Khuzestan province with skin lesions on her body was diagnosed as the first confirmed mpox case, and the Iran ministry of health reported this index case on August 16, 2022.[3] Direct or indirect contact with infected humans, suspected animals, or contaminated materials can cause transmission of the mpox virus to humans.[2,4] In mpox-infected patients, skin lesions, gastrointestinal signs, and respiratory symptoms are expected. Furthermore, septicemia, bronchopneumonia, encephalitis, and ocular lesions have been reported in severe cases.[1,5]

Using risk communication, information about incidents and health threats, such as disease outbreaks, is monitored and disseminated to the general public in responsible ways, as well as recommendations for reducing risks are instructed.[6,7] The accessibility and availability of technology increase the likelihood of spreading inaccurate information and rumors; therefore, evaluating the public concern, public behavioral changes, and community response to information by risk communication is required during disease outbreaks, especially in affected countries.[6,7]

Infodemiology, especially search interest analysis and web mining, has become an attractive research topic since 2020, especially during the coronavirus disease 2019 (COVID-19) pandemic. Likewise, many scientific investigations are based on Google data because over 90% of internet users choose Google as a search engine.[8–10] In addition, Google Trends (GTs) was launched to visualize and analyze the search interest of queries in various languages and regions. Moreover, search interest is demonstrated by the relative search volume (RSV) index with the range 0 (absence of popularity) to 100 (highest popularity) in GT.[8,11] The benefits of search trend analysis in medical research are surveillance and prediction of disease outbreaks.[10,11] Accordingly, researchers are interested in using GT data for monitoring how the different communities respond in finding data on disease outbreaks so that it can be potentially used as an early warning system and monitoring tool for public reactions, and then can be used to help the risk communication during health disasters and emergencies.[10,12]

Based on the mpox outbreak situation in the world, the importance of risk communication is evident, particularly in affected countries. Furthermore, researchers did not pay enough attention to applying public search interest analysis with GT for risk communication during outbreaks in Iran. Therefore, this analysis aims to explore the potential use of GT for monitoring community interest in the mpox outbreak in Iran.

2 | METHODS

During this analysis period, from July 1 to August 26, 2022, the WHO declared the mpox outbreak as a global health emergency on July 23,[2] and Iran's ministry of health reported the first confirmed mpox case on August 16.[3] Aside from this, the concern about disease outbreaks may have been reflected in different communities' search interests on Google.[10] Therefore, the topic "monkeypox" were searched in GT for gathering data from July 1 to August 26, 2022 in Iran. The advantage of topic search in GT is considering RSV of universal queries related to the topic of interest without language limitation.[8,10]

3 | RESULTS AND DISCUSSION

The RSV wave of the GT has been raised two times over the analysis duration (July 1 to August 26, 2022). Consequently, increased search interest implicitly displayed the community's concern about this zoonosis outbreak. The first sharp increase in
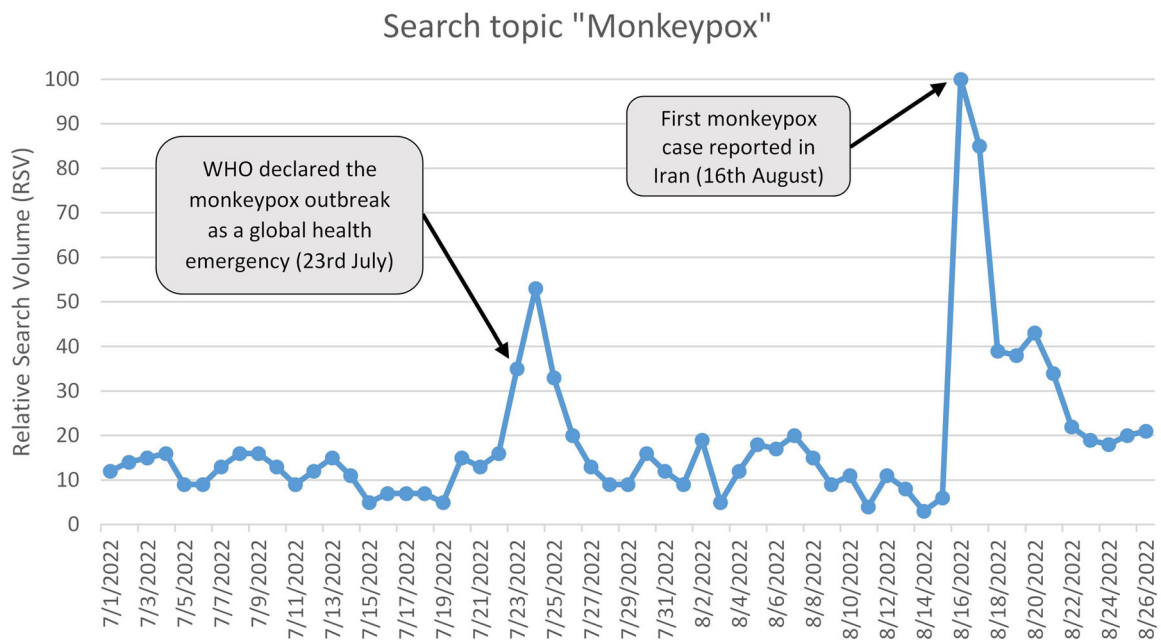
Search topic "Monkeypox"

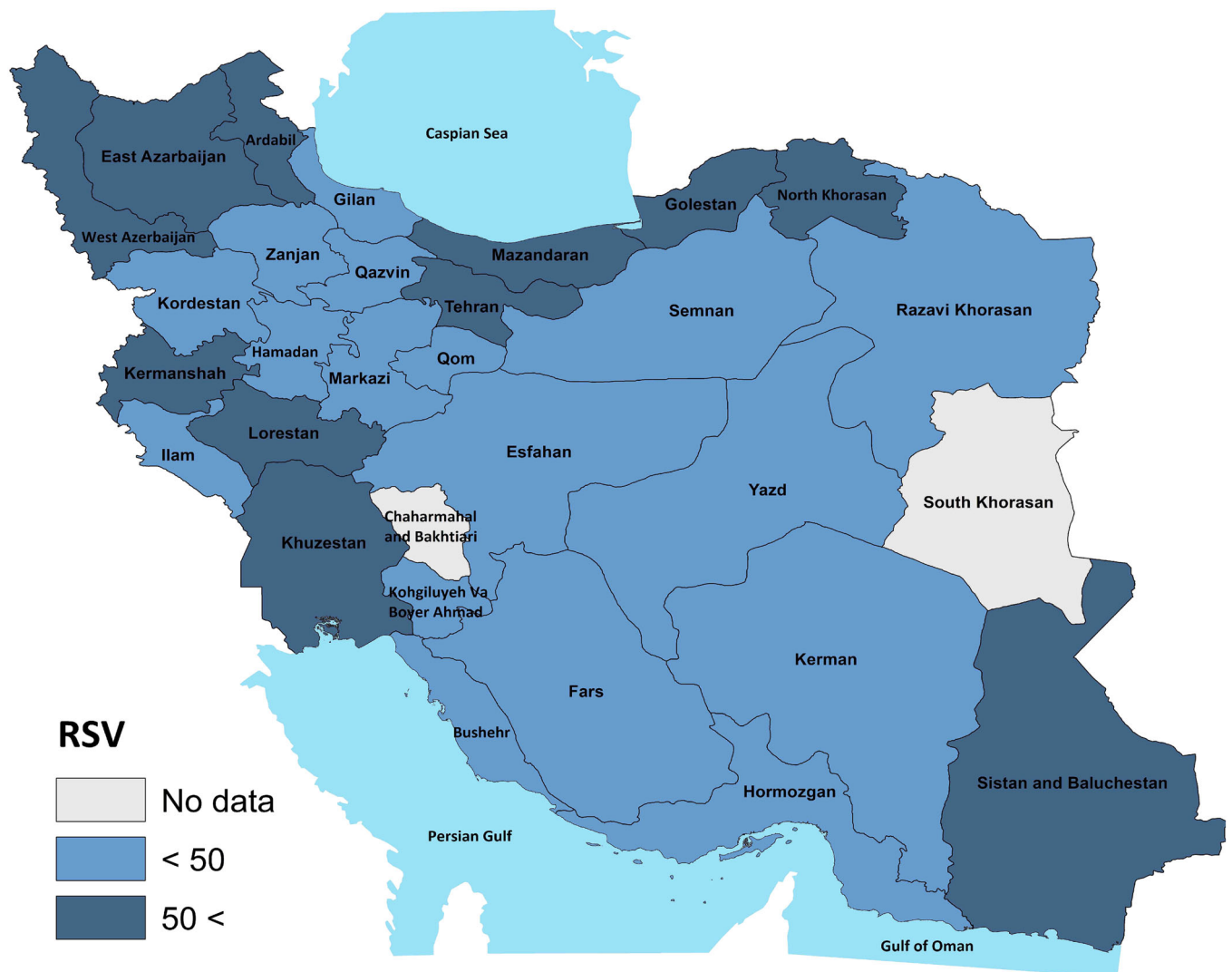**FIGURE 1** Google Trend of the topic "monkeypox" in Iran

FIGURE 2 Relative search volume (RSV) distribution about the topic "monkeypox" from July 1, 2022 to August 26, 2022 in Iran provinces

the RSV trend was observed from July 23 to July 24, 2022; this boost in the Iranian community's search interest was due to the declaration of the mpox outbreak as a global health emergency by WHO on July 23. Likewise, following the first report of the mpox confirmed case in Iran, the second sharp raised in the RSV trend was observed on August 16, 2022 (Figure 1). Furthermore, a schematic map illustrated the RSV distribution during the analysis period in Iran; accordingly, 11 provinces, such as Khuzestan (the first Iranian confirmed mpox case was reported from this province), had RSV greater than 50 (Figure 2).

A similar study revealed a positive correlation between the increasing COVID-19 cases and rising Google search interest in the United States, United Kingdom, Italy, Spain, France, China, India, and Iran.[10] Moreover, another infodemiological investigation in Taiwan suggested that the search trend in GT may predict or follow near the important convergence points of the COVID-19 prevalence rate.[11] The results of several studies have also suggested that data from Internet searches and social media can be used in conjunction with traditional surveillance data and even predict epidemic outbreaks several days or weeks in advance.[12–14] Therefore, these studies mentioned the potential of the Google Search Trend analysis to monitor the public's awareness toward following the COVID-19 outbreak in specific regions.[10,11,13]

In disease outbreaks, the GT analysis allows the researcher to determine the locations with the most and least search interest in a specific community.[15] Additionally, a study revealed the correlations between search interest related to COVID-19 and COVID-19 cases in different locations in Taiwan.[7] Likewise, this study's results in Iran indicated that the semantic analysis of search trend data might be valuable to find the spread of the public's interest in the prevalent disease, such as the mpox outbreaks, in specific regions. Accordingly, it can help provide and rapidly spread validated and helpful information during outbreaks via risk communication.

The importance of risk communication is evident in communities with raised GT search interest about outbreaks for preventing "infodemics" or circulation of the excessive amount of wrong information among the people, which might reduce public concern about mpox outbreaks and instructions on how to change behavior to mitigate those risks.[7,12,15] Therefore, utilizing GT data to provide accurate information during disease outbreaks can optimize risk communication; as well, the search trends analysis in GT brings awareness to health policymakers for determining the appropriate risk communications.

AUTHOR CONTRIBUTIONS

Mohammad Jokar: Conceptualization; data curation; formal analysis; investigation; methodology; visualization; writing – original draft; writing – review and editing. **Vahid Rahmanian**: Data curation; formal analysis; investigation; methodology; project administration; supervision; writing – original draft; writing – review and editing.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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