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COVID-19 information seeking needs and behaviour among citizens in Isfahan, Iran: A qualitative study

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Abstract

Background: Access to reliable and credible health information improves individuals' personal care level in crises, such as the coronavirus disease 2019 (COVID-19) pandemic. It subsequently results in enhancing the community's health and reducing the health system's costs.

Objectives: This study aimed to investigate the COVID-19 related information seeking behaviour demonstrated by citizens in Isfahan, Iran.

Methods: This research was conducted in 2020 and employed a qualitative approach using conventional content analysis. The research population was selected from almost different social classes of people in Iran using purposive sampling. The saturation point was reached at 24 semi-structured interviews. The data's soundness was confirmed based on the criteria of credibility, confirmability, dependability and transferability proposed by Guba and Lincoln.

Results: The findings revealed five subcategories and 25 codes within the information seeking behaviour. The subcategories included attitude towards the COVID-19 crisis, information needs, information resources, information validation and information seeking barriers.

Conclusion: People seek information from various resources to update their knowledge and become more prepared in the face of COVID-19. The findings can be used to develop policies on informing and preventing the dissemination of false information in crises, such as the COVID-19 crisis.

KEYWORDS

COVID-19, information seeking behaviour, misinformation, social media

BACKGROUND

Shortly after the coronavirus outbreak, almost all aspects of individuals' lives were affected by the virus. Previously, communities had not encountered a phenomenon of such magnitude and extent. The overflowing news regarding the various dimensions of the coronavirus pushes people further into a state of wonder. News and rumours concerning the coronavirus outbreak spread as fast as the virus itself.

Bento et al. (2020) revealed that the first official statement concerning the coronavirus disease 2019 (COVID-19) in the United States led to a massive increase in the number of Internet searches for the pandemic. Accordingly, people began to learn about COVID-19 and its effects. They wanted to know what they could and should do to fight the disease. Bento et al.'s research also demonstrated that official news reduced people's anxiety and concerns about fake news. One reason for the people's rising state of fear

and anxiety during the COVID-19 crisis is the spread of false news and information about the virus.

Health information seeking behaviour includes searching, finding and using information related to diseases, health threatening factors and health related activities done by a person (Lambert & Loisele, 2007). In other words, health information seeking behaviour includes obtaining meaningful information from different resources for better awareness and health literacy promotion to manage one's health (Kim & Park, 2012). Wilson (2000) believes that psychological, demographic, environmental and resource orientated factors affect information seeking behaviour. He regards information seeking behaviour as active and inactive seeking behaviour. The literature on health information seeking has shown that people search for their health information needs in different situations using various information resources and usually encounter various problems and obstacles in obtaining the required information. Saffi and Zhao (2020) showed that style, credibility, usefulness and recommendation were substantive predictors for channel selection of online health information.

Gutteling and Vries (2017) found out that in severe and critical cases, information seeking behaviour was predicted by perceiving the risks involved, while dangerous behaviours were predicted through self-efficacy and social norms. Vigsø and Odén (2016) reported that when individuals felt threatened in a dangerous situation, the first natural step they would take was to search for information about what happened and whether their families and friends were in any form of danger. Furthermore, under critical circumstances, the information seeking method is influenced by various factors, such as one's perceived levels of media credibility, accessibility and cost. Liu (2020) realized that although the information provided by different media could lead to preventive behaviours regarding COVID-19, there were serious concerns about information provided by social media. Other studies showed that people used social media, such as Telegram and Twitter, more often than other media to obtain information in the COVID-19 crisis.

The findings of the studies indicate that access to reliable and high-quality health information improves individuals' personal care capabilities, which is then extended to their children, families, friends, neighbours and local communities (Latifi, 2019; Latifi et al., 2017; Nasrollahzadeh, 2015). Therefore, in the case of the COVID-19 crisis, it can be proclaimed that personal care is the primary step in keeping safe against the virus.

Objectives

The present study aimed to investigate COVID-19 related information seeking needs and behaviour demonstrated

Key messages

- As in other countries citizens of Iran spent a lot of time following news and trying to obtain more information about Covid-19 and how to deal with its consequences.
- Many different sources of information, e.g. official government agencies, health professionals, media (national and international) international organisations (WHO) and social media are used.
- With so much disinformation available, many people cross check and try to verify the information they obtain. Ideally information from governments should be transparent and its accuracy easy to check.

by citizens in Isfahan, Iran. According to the daily statements of the Ministry of Health and Medical Education's spokesperson as well as the reports of the National Coronavirus Combat Headquarters' spokesperson, Isfahan is one of the first cities where the coronavirus spread and the number of COVID-19 cases have always been high in the city. Although some social media, including Telegram, Facebook and Twitter, are filtered in Iran, other social media, including WhatsApp and Instagram, are accessible, and most Iranians obtain COVID-19 news and information using these media. A study of coronavirus related information seeking behaviour in this country provides adequate information for health information policymakers. It also helps remove information seeking barriers and prevent the spread of false news in critical circumstances.

METHODS

The present qualitative study was conducted from March to May 2020 using conventional content analysis. The participants were selected through the convenience sampling method, taking into account the diverse social classes of people in the province of Isfahan. The inclusion criteria were the predisposition to participate in the study and having at least a high school diploma, and the exclusion criterion was withdrawal from the study. The required data were collected after obtaining the necessary permits and going to the participants' workplaces or homes. The research objectives were then explained to the participants, gaining their approval to participate in the study. The time and place of the interviews were subsequently coordinated.

TABLE 1 Interview guide

Primary question	Secondary question
1. What is your opinion regarding COVID-19? Please explain.	<ul style="list-style-type: none"> • Knowledge of COVID-19 • Attitude towards COVID-19
2. When you need information regarding COVID-19, how do you satisfy the need?	<ul style="list-style-type: none"> • Used information resources • Reasons for trust or distrust for information resources • Possible evaluation of information accuracy
3. What problems and barriers do you face in obtaining and using information regarding COVID-19?	<ul style="list-style-type: none"> • Individual limitations • Media related imitations

The required data were gathered through semi-structured interviews with the participants by an experienced researcher (Table 1). Twenty-two of the participants underwent face-to-face interviews, and only two of them did not consent to face-to-face interviews due to the fear of developing COVID-19 and preferred tele-interviewing, with one of them having a telephone interview and the other having a video call on WhatsApp. The interview began with an open-ended question, "please explain your views on COVID-19," to gain the interviewees' trust. The saturation point was reached at 24 semi-structured interviews. When the researchers realized that no new information would be obtained in further interviews and that the interview content was repetitive and similar to the previous findings, they found that they had reached a point of theoretical saturation. The interviews were recorded using a tape recorder, and each interview lasted from 25 to 50 min, with an average of 40 min, depending on the interviewee's level of interest and information.

The data from the interviews were analysed thematically. Data analysis was performed continuously and simultaneously with data collection based on the process proposed by Graneheim and Lundman (2004). The interviews were first transcribed from the voice recordings and typed into a Word document. The transcriptions were subsequently read several times. Afterwards, sentences and paragraphs containing concepts related to the research topic were selected as semantic units, and initial codes were extracted by converting semantic units into more concise phrases. After reviewing the original codes and clustering similar ones, the coding process was performed. Finally, by reviewing the codes and categories, hidden concepts and content within the data were extracted as the main class.

The four trustworthiness criteria of credibility, confirmability, dependability and transferability proposed by Lincoln and Guba (1985) were used to assess the quality of the current qualitative study. Credibility was ensured with the researcher's prolonged engagement in the research subject and continuous interaction with the participants. Given that the interview process took several months, the researcher provided the interviewees with the interview

text and asked them to confirm the correspondence of the text with their points of view. It facilitated attracting the participants' trust and achieving a better understanding of their experiences. Furthermore, performing a second interview with two of the participants helped solve the ambiguities in the interview content and evaluate data validity. Parts of the interviews' transcriptions, along with the codes and categories extracted for evaluation, were provided to three experts familiar with the qualitative research method to ensure the confirmability of the research. The dependability of the research was ensured by quickly implementing interviews, making an accurate recording of all stages of the research and providing a similar setting for all the participants.

Moreover, to increase the transferability of the results, a diverse group of participants was selected in terms of age, gender, marital status, degree, employment. Individuals with different demographics were identified from over the province using this approach, and if they consented, they were selected to participate in the study. The purpose was to assess the information seeking behaviour of almost all social groups and classes.

The Ethics Committee of X University of Medical Sciences approved the present study (ethical code: IR.MUI.MED.REC.1398.654). Before the interview, the participants were informed of the study's purpose, the data confidentiality, how the interview would be recorded and the freedom to withdraw from the study. Furthermore, informed consent was obtained from the subjects for participating in the study and recording their voices. A code was assigned to each participant, and the participants remained anonymous to protect their privacy.

RESULTS

Twenty-four individuals from several different social classes in Isfahan participated in the present study, whose personal characteristics including gender, age, marital status, education and employment are listed in Table 2. Five subcategories of "attitudes towards COVID-19," "information needs," "information

TABLE 2 Characteristics of participants

Participant	Gender	Age	Marital status	Degree	Employment
1	Female	40	Married	Bachelor	Employee
2	Female	45	Single	Ph.D.	Employee
3	Male	35	Married	Diploma	Self-employed
4	Female	35	Married	Bachelor	Employee
5	Female	34	Married	Bachelor	Employee
6	Male	39	Married	Bachelor	Employee
7	Male	38	Married	Bachelor	Employee
8	Female	31	Married	Bachelor	Housewife
9	Male	32	Single	Bachelor	Lawyer
10	Female	31	Single	Master	Teacher
11	Female	60	Married	Diploma	Teacher
12	Male	39	Married	Master	Employee
13	Male	30	Single	Bachelor	Self-employed
14	Female	41	Single	Ph.D.	Faculty member
15	Female	40	Married	Ph.D.	Faculty member
16	Male	47	Married	Master	Student
17	Male	42	Married	Ph.D.	Faculty member
18	Male	35	Married	Master	Student
19	Male	38	Married	Master	Student
20	Female	55	Married	Diploma	Self-employed
21	Female	50	Married	Diploma	Self-employed
22	Male	27	Single	Bachelor	Employee
23	Female	17	Single	Vocational school	Student
24	Female	17	Single	High school	Student

resources,” “information validation” and “information seeking barriers” were extracted from the qualitative content analysis of the interviews with citizens of Isfahan regarding their information seeking behaviour concerning COVID-19 (Table 3).

A. Attitude towards the COVID-19 crisis

The results of the interview analysis indicated that the COVID-19 crisis was a significant event for many of the participants, and they spent much time following the news and obtaining information about COVID-19. In other words, each of the participants had a specific attitude towards the crisis, and for each participant, a particular aspect of the crisis and disease was remarkable.

Fear of infection and death

The sudden COVID-19 outbreak in Iran and the news of the virus related death toll in China terrified many people. Many

people developed an illusion of being infected by the coronavirus as they hear news about the patients and, most notably, their deaths. Fear of being infected or having infected family members and relatives was one of the main concerns of the interviewees, which made them more sensitive to the coronavirus news. “With the slightest sign, such as a sore throat, I was afraid it might be COVID-19. Because I go to work and interact with different people. I am concerned about my family members because if one person gets sick, the whole family becomes infected”, stated Interviewee number 4.

Fear of food shortages

The closure of factories and shops to prevent the coronavirus transmission caused a wave of concern among people about food shortages. Many of the participants expressed their main concerns about high prices and lack of access to food and basic needs. “In a crisis and quarantine situation, there is certainly a great concern about providing food and shelter, especially for the financially weak families” (Interviewee number 3).

TABLE 3 Category, sub-categories and codes related to the health information seeking behaviour

Category	Sub-categories	Codes
Information seeking behaviour	Attitude towards the COVID-19 crisis	Fear of infection and death
		Fear of food shortages
		Concerns about the shortage of disinfectants and preventive equipment
		Unemployment and job loss anxiety
	Information needs	The nature of the disease
		COVID-19 symptoms
		Viral transmission modes
		Effective medication and COVID-19 treatments
		COVID-19 specific hospitals
		News on the patients, the recovered and the deceased
		Instructions for preparing and using disinfectants
		Information resources
	Information resources	Medical staff and specialist physicians
		Reputable organizations' websites and phone counselling systems
		Social media
		Foreign TV channels
		National radio and television
		Printed and electronic information resources
	Information Validation	Conformity with official and reliable media resources
		Enquiring from doctors and specialists
Personal experiences		
Information seeking barriers	Rumours, misinformation and anti-information	
	Large amounts of information	
	The anonymity of information resources in social networks	
	The poor performance of the state media	
	Lack of access to social media	

Concerns about the shortage of disinfectants and preventive equipment

After the coronavirus outbreak in Iran, Iranians faced a severe scarcity of masks, disinfectants and other equipment needed to combat the growing COVID-19, especially in the early weeks. This shortage led to an increase in the prices of these materials and equipment, and as a result, caused concerns among many people, particularly low-income families. "What was alarming about the COVID-19 crisis, especially at the beginning of the outbreak, was the lack of disinfectants. Prices were very high, and alcohol and masks were scarce" (Interviewee number 6).

Unemployment and job loss anxiety

In most affected countries, such as Iran, COVID-19 has targeted first human health and then employment, causing to increase unemployment rates. The pandemic may continue for a lengthy period of time, and conditions

could be worse. Unemployment has made life difficult for low-income groups and day labourers and stagnated businesses. "I can't do anything at home during the quarantine. I'm worried about my job. 90% of my business activities were canceled" (Interviewee 9).

B. Information needs

The nature of the disease

Given that the coronavirus is an unknown virus that has suddenly entered the country, one of the most critical information needs of the interviewees was about the nature of the disease. New information concerning the virus is published every day. However, in many cases, new findings refute the previous ones. One of the interviewees said, "I did a lot of research on the root cause of the disease and its origins. I also did some research on the origin of the disease as well as bats and other diseases such as cholera, SARS, and Ebola" (Interviewee 4).

COVID-19 symptoms

Since the interviewees found COVID-19 infection highly dangerous, almost all of them were afraid of becoming infected and had constantly been looking for information about the disease's symptoms and manifestations. They attempted to realize whether they or their family members showed the symptoms. One of the interviewees expressed, "I usually searched the Internet for information such as how do the COVID-19 symptoms appear? I almost familiarized myself with symptoms such as fevers, body aches, coughs, and the shortness of breath" (Interviewee 3).

Viral transmission modes

The findings showed that many of the interviewees sought information on COVID-19 transmission modes and health care measures to prevent the disease due to the transmission speed and potency of the virus. One of the interviewees stated, "I was looking for the most effective way to prevent it, the easiest methods that bring about the highest level of prevention, and the strategies suggested by experts in this regard" (Interviewee 16). "I was constantly searching for preventive measures, the effects of home quarantine, how to shop, how to go to work, and what to do at work," said another one of the interviewees (Interviewee 6).

Effective medication and COVID-19 treatments

Awareness of the COVID-19's mortality rate and its treatment methods were another topic, in which the interviewees attempted to educate themselves. Examples of the participants' inquiries included "when will a coronavirus vaccine be made?" and "which medications are effective in treating the disease?". "I obtained information about the disease's process and how it was treated mainly through guidelines published by specialists and medical staff in reputable social media groups," said Interviewee 14.

COVID-19 specific hospitals

Additionally, many of the participants attempted to refer to medical centres specialized in providing care to coronavirus patients. They wanted to know which centres were performing coronavirus tests, and given that many of them had financial problems, how much it would cost to take the test at each of these centres. They also wanted to learn which centres would perform the tests or treat

patients for free or at a low cost. "I was looking for people we could get help from and medical centers we could refer to in case of infection, and phone numbers we could call to get advice," said one of the interviewees (Interviewee 2).

News on the patients, the recovered and the deceased

One of the significant aspects of the COVID-19 crisis was the bombardment of people with information about the number of identified cases, deaths and recovered patients. In many cases, the interviewees received conflicting news. In particular, many opposition media outlets attempted to question the government's performance by exaggerating the weaknesses and spreading suspicions, which is why the interviewees sought reliable news about the patients, those recovered and the deceased. "I was following the official news about the death toll, the number of patients, and the high-risk groups on national TV. However, I was simultaneously following the news of the mortality rates among bank employees and my colleagues only on the union channel every day", said Interviewee 7.

Instructions for preparing and using disinfectants

Since the coronavirus outbreak led to a sudden increase in the use of disinfectants and, consequently, a shortage of these substances in the market, many people began to prepare disinfectants in their homes. Therefore, one of the information needs of the interviewees was how to make disinfectants and how to use them properly. "We bought our disinfectants and washing gel in the early days, but because of the high costs of these materials, I'm looking for ways to make them at home for a more affordable price," stated Interviewee 1.

C. Information resources related to the coronavirus

The results of the interviews showed that the people of Isfahan used the following information resources to obtain information about COVID-19 per their means and mentalities:

Medical staff and specialist physicians

The content analysis of the interviews showed that the participants obtained their required information about

the COVID-19 virus from various information resources. Based on the interviewees' experiences, many of them considered medical staff and specialist physicians to be the most reliable information resources due to their professional knowledge and expertise. "Most of the time, I follow the interviews with physicians. I trust doctors who give accurate information while introducing themselves and their workplace and are in direct contact with their patients" (Interviewee 5).

Reputable organizations' websites and phone counselling services

Some of the interviewees also considered the websites of reputable organizations, such as the World Health Organization, and phone counselling services offered by medical universities for coronavirus awareness reliable information resources. Interviewee 2 said, "I check the World Health Organization's website because I know it is an impartial organization."

Social media

Many of the interviewees acknowledged that social media was one of the most important information resources related to COVID-19. The main reason for using such resources was the ease of access to a wealth of information through social networks, especially those available on cell phones. One of the interviewees said, "I follow the news mostly through virtual media, including the Health Media Telegram channel. Because it can be trusted and is run by the X University of Medical Sciences. I am also following the Instagram page of the Ministry of Health's spokesperson" (Interviewee 6).

Foreign TV channels

One of the essential coronavirus-related information resources was revealed to be international satellite networks. Some of the interviewees regarded these networks as reliable information resources since they provide uncensored news about the coronavirus. One of the interviewees said: "I follow the news of Iran International and BBC satellite channels. I trust their suggestions regarding prevention, etc., because their news is in line with logic." In contrast, some interviewees believed that satellite networks, especially opposition networks, were trying to create scepticism in the audience about the government's performance in the battle against COVID-19 by disseminating biased

information and one-sided judgments. This is why some participants did not consider such networks as reliable information resources. "I do not trust resources belonging to the detractor enemy because their news coverage is biased" (Interviewee 19).

National radio and television

Some of the interviewees considered national radio and television networks a reliable resource of coronavirus-related information for various reasons, such as reporting trustworthy news and fact-based information through the Ministry of Health Spokesperson. "In the case of the COVID-19 crisis, I hold great respect for national radio and television medical programs, especially the "Tabib." I also rely heavily on statistics from the Ministry of Health's spokesperson," stated Interviewee 20. Unlike Interviewee 20, some of the participants did not consider national news outlets reliable due to what they believed to be publishing slanted news based on political interests, among other reasons. Interviewee 1 said, "I don't trust the national television since they have been known to spread fake news repeatedly and not reporting the real statistics, although they must remain honest with the people."

Printed and electronic information resources

Printed and electronic information resources were another resource of information trusted and used by some of the interviewees, especially those with academic degrees in medical sciences, to obtain coronavirus-related information. In particular, the participants followed protocols and guidelines published by the Ministry of Health and Medical Education and medical universities thoroughly. "I sought the credible and practical guidelines provided by the Ministry of Health and the universities of medical sciences from the professional academic groups and used them as a reference," said Interviewee 14.

D. Information validation

According to the findings from the interviews, most of the participants reported that they rarely used information about the coronavirus before validating it. They attempted to verify the accuracy of all health related information and the information about COVID-19 in particular in various ways. The most crucial validation methods used were as follows:

Conformity with official and reliable media resources

Every day, much information is published about COVID-19 through various media, especially social networks. These pieces of information spread anonymously and cannot be easily trusted. Thus, it is necessary to validate such information by cross-referencing it with information published through official and reliable resources." The information published in Telegram and WhatsApp is complicated to trace back to their publishers, as the identities of those who publish the material are not clear and very misleading. Alternatively, other resources such as the national television or the Ministry of Health's website are more credible and sounder reliable to me", said Interviewee 10.

Enquiring from doctors and specialists

People have always trust physicians and specialists as a health information resource. During the COVID-19 crisis, some of the participants, especially those who had access to health professionals or could afford to see a doctor, preferred to bring information from other resources to doctors and ensure their accuracy. "I was guided by trusted professionals through WhatsApp and other media. Of course, my colleagues at the university also formed a virtual group and shared information and the latest news" (Interviewee 2).

Personal experiences

A few of the interviewees reported that they pondered the accuracy of information obtained from various resources from a critical viewpoint and only trusted such information if it appeared logical based on personal experience. "Of course, from time to time I observe other resources. I then analyze them and form a personal conclusion, which increases my patience and reduces my anxiety" (Interviewee 19).

E. Information seeking barriers

Rumours, misinformation and anti-information

According to the research findings, one of the most critical problems for the interviewees was to encounter a considerable amount of rumours and misinformation related to the coronavirus. Many people have spread misinformation and rumours with different motives during

the COVID-19 crisis as in other crises. Consequently, the public finds it hard to distinguish between valid and unreliable information due to their low media literacy level. "There are a lot of fake videos being posted on social networks like Telegram and WhatsApp. For example, a video of students becoming infected with the coronavirus was shared in the school's virtual group, which caused fear among group members, although it was obviously a fake" (Interviewee 1).

Large amounts of information

There has been an issue of information bombardment during the COVID-19 pandemic. People, mainly social media users, receive confusing information about the virus, which is mostly superficial and has spread repeatedly via different channels. "The information suddenly bombards people, while the official news system and the government fail to provide timely accurate information, which causes the right and wrong to be mixed up and become unrecognizable" (Interviewee 2).

The anonymity of information resources in social networks

A significant feature of social networks is that users can anonymously post images and videos through them. Many people take advantage of this feature to spread false news and information. Regarding COVID-19, a large amount of information has been published on social media, which might be inaccurate. "The anonymity of the news resources on social media encourages people to publish anything. For instance, I saw a piece of news on social media that recommended Imam Kazem's prayer to prevent COVID-19 infection, which was clearly false" (Interviewee 6).

The poor performance of the state media

Most of the interviewees stated that they considered the poor performance of the national press and the lack of transparency in reporting the COVID-19 news to be the most critical problems in obtaining reliable information about the pandemic. They believed that the government had not been honest in their coverage of the coronavirus and had only reported the news that benefited the state. "What is clear is that the government announced the outbreak of the coronavirus several weeks late, they were not honest" (Interviewee 12). Many news items published through the state media have been denied by other media outlets. Thus, people distrust the information published by

the national media. "I can't trust any national media at all; one official confirms one news story and the other denies it. No one believes the news, and anyone who dares to publish the truth will be eventually fired" said Interviewee 4.

Lack of access to social media

The emergence and rapid growth of information technology, especially social networks, have provided many people within various layers and age groups in the society with the most up-to-date information in various fields. Many social networks, such as Telegram, Twitter and YouTube, are blocked in Iran for different reasons. Thus, people do not have access to the latest news and educational content related to COVID-19. "Even if one does know a trustable news outlet in Telegram, they are not able to access it due to the filtering. We would have to install a VPN software, which also entails many consequences" (Interviewee 9). In addition to the filtering, the slow Internet speed during the days of home quarantine has exacerbated access to COVID-19 news and information through Internet based media. Interviewee 24 said, "When it comes to spreading awareness about the virus, the low speed and frequent disconnections of the Internet has brought about many problems."

DISCUSSION

The present study aimed to identify the information seeking behaviour related to COVID-19 among the citizens of Isfahan, based on a qualitative approach. The results revealed five subcategories, including attitudes towards the COVID-19 disease, information needs, information resources, information validation and information seeking barriers.

Given that information seeking behaviour is influenced by various factors, such as demographics, under the critical condition of COVID-19, different individuals show different information seeking behaviours. As an illustration, older and less educated individuals prefer unofficial information resources, such as their friends and family members, to other resources for gaining information pertinent to COVID-19. On the contrary, younger individuals with higher academic education are not easily influenced by received information, and they attempt to evaluate the validity and correctness of the information.

The interviewees sought information about COVID-19 for various reasons, including fear of infection and death, fear of food shortages, concerns about the shortage of disinfectants and preventive equipment, and unemployment and job loss anxiety. Information need encourages students to show health information seeking behaviours. In

Wilson's opinion, information need is one of the secondary needs, rising from the primary psychological, cognitive and affective needs (Wilson, 2000). Furthermore, the first stage of Kuhlthau's model of the information search process is "initiation," in which the person realizes that some information is required to resolve a specific problem (Kuhlthau, 1991). This stage is similar to Wilson's model of information seeking behaviour, in which the person identifies a perceived information need within a particular environment (Wilson, 2000).

The findings of Sulistyawati et al. (2021) showed that most people had a positive attitude about COVID-19, but they provided a negative response to government policies. Austrian et al. (2020) found that about 61% of their participants were deeply concerned about the decline in their income levels during the COVID-19 crisis, despite their excellent knowledge of the coronavirus. It appears that although people have adequate information about the potential risks of COVID-19, they are not respecting the social distancing protocols thoroughly on account of having more significant concerns, such as the decline in their income or losing their jobs.

The findings indicated that nature, COVID-19 symptoms, COVID-19 transmission modes, effective COVID-19 medications and treatment methods, COVID-19 specific hospitals, news and statistics of COVID-19 patients, recovered patients and the deceased, and instructions for preparing and using disinfectants were among the essential information needs of the participants. Zamani et al. (2014) showed that awareness of the possibility of recovery, identification of reputable medical centres and the knowledge of effective treatment methods were the most critical information needs of COVID-19 patients, respectively. Kalankesh et al. (2019) demonstrated that the most critical information needs of their research population included disease prevention methods and general health knowledge, most of which were met by referring to a physician. Bento et al. (2020) found that COVID-19 symptoms and treatments, disinfectants and laboratory tests were among the most critical factors searched by their participants on the Internet. Undoubtedly, the sudden emergence and spread of COVID-19 in various countries, including Iran, has surprised people. The unknown nature of this virus to people and even to the medical staff on the one hand and its fast outbreak and severe risks on the other lead people to seek credible information about the disease.

Nevertheless, one of the most critical aspects of health information seeking behaviour is choosing the right information resource. According to the research findings, medical staff, reputable organizations' websites and phone counselling services, social media, international satellite networks, national radio and television, and printed and electronic information resources were the most critical

information resources used to obtain knowledge about the coronavirus. Wang et al. (2020) showed that the quality, trustworthiness and utility of online health information were the main determinants of people's online search behaviour. Adekunle et al. (2020) found that medical staff, search engines and social media were, respectively, the top three resources for their research population to seek health information. The results of many studies on online information seeking behaviour indicate that most people use the Internet and online resources to obtain health information (Bigdeli et al., 2016; Dau et al., 2020; Russo et al., 2020; Khoong et al., 2019; Magsamen-Conrad et al., 2019; Obasola & Agunbiade, 2016). Nasrollahzadeh (2015) revealed that books, media (radio and television), educational classes in health centres, the Internet and magazines were the most critical information resources for his research population.

Given that the COVID-19 issue is of great importance in the public's opinion, officials must provide consistent hourly information and deliver the latest news and instructions to the public. However, official resources provide several contradictory statistics every 24 h, which do not satisfy users' information thirst and force them to seek information from other resources, such as the Internet and social networks. In many cases, the information lacks a definite and imperative source of credibility. On the contrary, despite many people's trust in doctors and medical staff for obtaining health information, many do not practically have access to these sources for various reasons, such as high medical costs or fear of going to hospitals and becoming infected with the coronavirus.

One of the main reasons for the spread of rumours and misinformation about a particular issue is its importance and ambiguity. Since many of the features of the coronavirus are still unknown to the general public and even to the medical professionals, there are many rumours and misinformation about the virus; hence, it is vital for people and, particularly social media users, to make sure that the information they have obtained is reliable before using it. The study found that the participants used three methods of "inquiry from physicians and specialists," "conformity with scientific resources" and "consulting with friends and acquaintances." The verification behaviour of the obtained information is similar to the "verifying" stage in Ellis' model of information seeking behaviour, believing that the authenticity of the obtained information must be ensured by various methods before their practical application (Ellis, 1993). Nasrollahzadeh (2015) showed that inquiry from physicians, asking trustworthy people, using multiple resources, referring to logic and personal experience, and being meticulous in choosing information resources were the methods used by the participants to validate the information. One of the main reasons for

trusting doctors is the sensitive and vital nature of health information. Since a slightest mistake and a distrust of reliable information can cause irreparable damage, people are naturally more inclined to trust doctors rather than other people and resources. Many always believe that "the doctor knows best." Also, social media users appear to use their deep-seated beliefs to trust any information subconsciously. In the case of COVID-19, these beliefs convince them that sometimes the simplest and most unscientific method is more effective than scientific solutions, leading them to quickly regard misinformation as true.

The last aspect of health information seeking behaviour is information seeking problems and barriers. The findings showed that the dissemination of rumours and misinformation, the bombardment of information through social media, the anonymity of information resources on social networks and the lack of access to social media were obstacles to the participants' access to information related to the virus. Zamani et al. (2014) found that unfamiliarity with medical terms in dealing with physicians and the lack of accountability of hospital staff were the main problems for cardiovascular patients in obtaining health information. In their research, Latifi et al. (2017) pointed out two categories of individual barriers and contextual barriers to obtaining health information. Based on the research mentioned above, "fear," "shame and shyness," and "insufficient information literacy" are among personal barriers to health information whereas "economic situation," "doctors and medical staff," "unavailability of information resources," and "others' behaviour" are among contextual barriers to health information. The significance and ambiguity in the subject matter are two critical factors that lead to the spread of rumours and misinformation. Coronavirus has both mentioned features, and thus rumours easily spread about it. Inadequate media literacy has made it difficult for non-credible information to be discerned. Also, it is widely believed today that official and national government resources in Iran are concerned with their own interests and not those of people. Therefore, distrust in the country's official news system has led people to believe rumours rather than official news. Moreover, the filtering of social networks, such as YouTube, Twitter and Telegram, has deprived people of helpful news and educational content about COVID-19.

RESEARCH LIMITATIONS

Since the study was conducted at the peak of the COVID-19 outbreak and many people were in quarantine, the majority of offices were closed, and employees were telecommuting, it was challenging for people to participate in the interview; thus, the authors used a variety of strategies,

such as conducting telephone interviews and remote video conferencing in addition to face-to-face interviews. Also, people's fears and anxieties in the early stages of the virus outbreak may have led to unusual information seeking behaviours. Although this study attempted to examine the information seeking behaviour of Isfahan citizens from almost all social classes, the study findings may still not represent the whole population, which complicates generalization of the findings.

CONCLUSION

Being aware of individuals' informational requirements and information seeking behaviours regarding COVID-19 is of paramount importance in performing interventions to reduce the adverse effects of this disease. This investigation revealed the informational requirements of Isfahan citizens regarding COVID-19 and how to meet these requirements. Television and social media are more frequently used than other media to gain information regarding COVID-19. Thus, this study recommends that Iran's health care field managers provide the most up-to-date news pertinent to COVID-19 through appropriate media. Increasing people's media literacy reduces the negative impacts of pseudo-information and misinformation. Moreover, it is better to take into account the characteristics and perception level of different social groups when providing them with health information. Ultimately, it is recommended to examine patients' and high-risk groups' information requirements and information seeking behaviours regarding COVID-19.

CONFLICT OF INTEREST

The authors declared no conflict of interest in submission of this article.

AUTHOR CONTRIBUTIONS

Mohammad Reza Soleymani, Hasan Ashrafi-rizi, Maedeh Esmaeilzadeh involved in conceptualization; Mohammad Reza Soleymani contributed to formal analysis, methodology and supervision; Faezeh Taghipour involved in writing—original draft; Hasan Ashrafi-rizi involved in writing—review and editing.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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