Information and information resources in COVID-19: Awareness, control, and prevention

Mohammadhiwa Abdekhoda (iD)
Tabriz University of Medical Sciences, Iran

Fatemeh Ranjbaran
Iran University of Medical Sciences, Iran

Asghar Sattari
Tabriz University of Medical Sciences, Iran

Abstract

This study was conducted with the aim of evaluating the role of information and information resources in the awareness, control, and prevention of COVID-19. This study was a descriptive-analytical survey in which 450 participants were selected for the study. The data collection instrument was a researcher-made questionnaire. Descriptive and inferential statistics were used to analyze the data through SPSS. The findings show that a wide range of mass media has become well known as information resources for COVID-19. Other findings indicate a significant statistical difference in the rate of using information resources during COVID-19 based on age and gender; however, this difference is not significant regarding the reliability of information resources with regard to age and gender. Health information has an undisputable role in the prevention and control of pandemic diseases such as COVID-19. Providing accurate, reliable, and evidence-based information in a timely manner for the use of resources and information channels related to COVID-19 can be a fast and low-cost strategic approach in confronting this disease.

Introduction

Immediately after COVID-19 was declared an international emergency concern at the public health level, World Health Organization's (WHO) risk communication team initiated a new information platform with the aim of providing accurate information and sharing information among specific groups known as the WHO Information Network for Epidemics (EPI-WIN) (Zarocostas, 2020).

Sylvie Briand, director of Infectious Hazards Management at WHO's Health Emergencies Program and architect of WHO's strategy to counter the risk of infectious diseases, stated: "We know that the outbreak of any disease will be accompanied by a tsunami of information; however, this information always includes misinformation and rumors. We know that this was the case even during the Middle Ages" (Zarocostas, 2020). This issue poses such a threat for public health that after the outbreak of COVID-19 across the globe, at the security conference in Munich on February 15, the president of WHO, Tedros Adhanom, stated that: "We are not only fighting with a pandemic, but are also fighting with an infodemic." The term infodemic, as put forth by Tedros, refers to the tsunami of information, contamination of information, and distortion of accurate information with inaccurate information from among various resources (Zarocostas, 2020). Meanwhile, Barua et al. (2020) state that the spread of misinformation on the Internet and social medial is faster than the prevalence of COVID-19, so it can be catastrophic

Corresponding author:
Mohammadhiwa Abdekhoda, Department of Medical Library and Information Sciences, School of Health Management and Medical Informatics, Tabriz University of Medical Sciences, Tabriz 51368, Iran.
Email: Hiwaabdekhoda@gmail.com

and have devastating effects on peoples' health and the health system.

Today, it is well known that information is among the most necessary factors in many activities, including therapeutic activities. Information is an effective factor in confronting or reducing stress, increasing self-confidence, and increasing self-care in fighting a disease (Akhu-Zaheya, 2007; Longo et al., 2010). As Sylvie Briand reports to Lancet,

> . . . the difference between the current era and the Middle Ages regarding the transfer of information is that awareness is now enhanced using social media, while news and information grows at a faster rate similar to viruses that travel with people and go faster and further. Therefore, this is a new challenge, and the challenge is [timing] because if you want to fill the gap, you have to be faster . . . what is at stake during the outbreak is to assure that people do the right thing to control the disease or mitigate its impact. Thus, it is not only information that assures people are informed; but also making sure that people are informed to act appropriately. (Zarocostas, 2020)

The needs of patients to enhance their abilities and skills in searching for health information and obtain reliable and valid information from information resources are on the rise. The ever-increasing attention of the medical community toward self-care, motivating patients to become autonomous, and recognize health rights on one hand, and their enthusiasm for obtaining information related to diseases on the other hand, has strengthened this need (Sabzevari et al., 2015; Slauson-Blevins et al., 2013). Based on the information obtained from various information sources, patients are able to decide and select the most effective intervention method (Davison and Breckon, 2012; Yan, 2010). Often, health information resources are very significant, because the quality, precision, accuracy, and reliability of information initiate from its source.

The Online Dictionary of Library and Information Science (ODLIS) defines accuracy as "The quality of correctness as to fact and of precision as to detail in information resources and in the delivery of information services." In addition, in online information, accuracy is an important determinant in judging the reliability of information. "The accuracy of a statement is verified by consulting other sources that provide the same information. The opposite of inaccuracy is the quality of being incorrect or mistaken (ODLIS, 2021)." Reliability of information is defined as the information's ability to reveal the facts with the required accuracy (Katenko and Petrenko, 2019). Being dependable, trustworthy, unfailing, sure, authentic, genuine, and reputable are the main attributes of reliable information.

Evaluating information-seeking behavior in patients is a complicated issue (Allen, 2013). Studies indicate that patients' information-seeking behavior is continuously changing as they are always selecting various resources to obtain information (Zare-Farashbandi et al., 2015). On the other hand, regardless of access to the massive amount of information resources, many people lose their lives each year due to lack of access to information about their disease (Freimuth et al., 1989).

Patient's information-seeking behavior and their information resources have been revolutionized through the contamination of information and infodemics. Numerous patients have become confused in finding accurate and reliable information, or do not trust the provided information. They are continuously changing their information resources and methods and means of receiving health information and are somehow confused among a massive load of information (Freimuth et al., 1989; Jamal et al., 2015).

Even though numerous studies have been carried out regarding the information-seeking behavior of patients thus far, as Jung (2013) puts forth in his study, there is still no comprehensive information available regarding patients' information-seeking behavior. That is, it is still not clear by what means patients obtain the health information they require. Also, it is not clear what factors have been effective in their selection of information resources (Jung, 2013).

COVID-19 has generated a significant amount of coverage and discussion in our country and across the globe. This viral disease that initiated from China has currently spread to over 70 countries worldwide, including our country, and is becoming more prevalent each day. One of the main ways to fight this disease is prevention. In order to prevent infection, obtaining necessary information regarding this disease and observing the required health issues have an effective role (Qazi et al., 2020). During this time, various media sources have begun spreading awareness regarding this disease and much information has been circulated. As mentioned in the introduction of this section, one of the problems created in this regard is misinformation and the combination of accurate and inaccurate information, hence resulting in confusion and misleading people in obtaining accurate information related to COVID-19 (Baines and Elliott, 2020).

With regard to this issue, this study was conducted quantitatively with the aim of evaluating the role of information and information resources in awareness, control, and prevention of COVID-19. Based on this aim, eight questions were put forth in this study:

1. From the viewpoint of participants, what are the most common COVID-19 information resources?
2. From the viewpoint of participants, what are the most accurate and reliable COVID-19 information resources?
3. From the viewpoint of participants, what COVID-19 information resources are the most appealing and understandable?

4. From the viewpoint of participants, what is the official health information resource for COVID-19?
5. Is there a significant difference between uses of information resources to obtain health information regarding COVID-19 among different age groups?
6. Is there a significant difference between the reliability rates of information resources to obtain information related to COVID-19 among different age groups?
7. Is there a significant difference among male and females' rate of using COVID-19 information resources?
8. Is there a significant difference in the reliability rate of COVID-19 information resources among males and females?

The results of this research can be beneficial in developing the resources necessary to obtain health information related to COVID-19 by communities, intervention in their information-seeking behavior, and shift attention toward information resources and their enhancement.

Method

This study was a quantitative study using a survey method conducted from March to May 2020. The study population included the population of Tabriz, East Azerbaijan province, estimated at about 2 million people. The study sample was selected as greater than 384 people, based on the Morgan Table for populations greater than 100,000. In this study, in order to validate the data, 450 participants were selected as the sample population. A simple random sampling method was used for samples accessible throughout the city.

The data collection instrument was a researcher-made questionnaire, which was prepared based on a review of the literature. Ten specialists in the field of librarianship and medical informatics evaluated the validity of the questionnaire and content validity ratio (CVR) and content validity index (CVI) were calculated for the questionnaire. The questionnaire reliability was calculated using Cronbach's alpha coefficient and was approved with regard to test results ($\alpha = 0.83$).

The questionnaire comprised six items related to demographic information including gender, age, level of education, occupation, and income; three items related to means of awareness regarding COVID-19, COVID-19 information related to the participant or his or her family, and four main items. The main items on the questionnaire include (1) the most common health information resources for coronavirus; (2) the most reliable and accurate resources that provide health information for coronavirus; (3) the most appealing, simple, and understandable resources that provide health information for coronavirus; and (4) participants' official resource for obtaining information on

COVID-19. Options provided for the four main items include radio, national television, provincial news network, satellite networks, SMS received from Ministry of Health, newspaper, library, Internet, university of medical sciences websites, healthcare center websites, telegram, WhatsApp, Facebook, news websites, educational pamphlets and brochures, healthcare messages in the form of brochures distributed across the city, friends and acquaintances, family, mosques, cultural centers, available physicians, nurses and healthcare staff, health care centers, presence in the community, and other resources, of which participants were able to select one or more than one of the resources.

Questionnaires were completed based on researcher's presence across the city and in various locations, giving questionnaires to literate individuals or completing the questionnaire by the researcher as a planned out interview for illiterate participants. Then data analysis was conducted using SPSS by applying descriptive and inferential statistics. The findings have been provided in the tables and graphs as follows. Different ethical aspects of the present research were approved by the Ethics Council of Tabriz University of Medical Sciences (IR.TBZMED. REC.1398. 1280).

Results

The demographic data shows that 220 participants (48.9%) were female and 221 (49.1%) were male. Nine of the participants (2%) did not complete this item. Other findings show that 26 participants (5.8%) were illiterate, 226 (50.2%) had diploma or below diploma, 22 (4.9%) had an associate degree, 101 (22.4%) had a bachelor's degree, 49 (10.9%) had a Master's degree, and 12 (2.7%) had a PhD. In total, 14 participants (3.1%) did not respond to this item.

Other demographic findings indicate that 142 (31.7%) of the participants had average income between 0 and 5 million tomans, 3 (0.7%) had income between 6 and 10 million tomans, and 1 participant (0.2%) had income between 26 and 30 million tomans. A total of 304 (67.4%) participants did not respond to this item; 102 (22.7%) of the participants were housewives, 22 (4.9%) were university students, 26 (5.8%) were unemployed, 45 (10%) were self-employed, 22 (4.9%) were in high school, 17 (3.8%) were employees, and 8 (1.8%) were retired.

Other findings showed that 370 (82.2%) of the participants, their families, or relatives had not been diagnosed with COVID-19 up to the time they completed the questionnaires (end of March 2020). Four (0.9%) of the participants were diagnosed with COVID-19, and 13 (2.9%) participants declared one of their family members was diagnosed with the disease.

Also, the findings indicate that 267 (59.3%) of the participants took COVID-19 very seriously, 116 (25.8%) took it seriously, and 29 (6.8%) did not take this disease seriously.
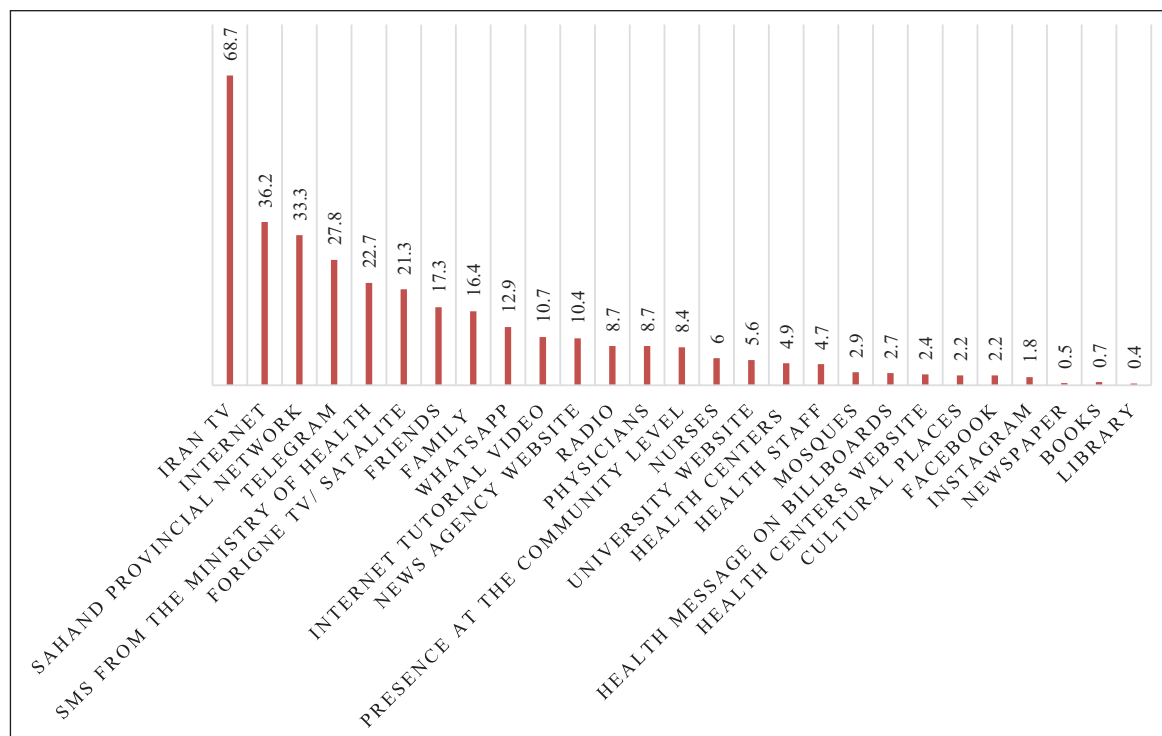
Figure 1. The most common COVID-19 information resources.

Other findings indicate that 109 (24.2%) of the participants were very satisfied of the information received regarding the disease, 151 (33.6%) were satisfied, 83 (18.4%) were unsatisfied, and 28 (6.2%) were very unsatisfied.

Figure 1 shows information resources for COVID-19 based on the highest frequency rate.

As shown in Figure 1, national television, the Internet, Sahand provincial network, telegram, SMS sent by the Ministry of Health, satellite networks, friends, and family were among the most common forms of information resources for COVID-19.

Figure 2 provides information resources for COVID-19 based on the most accurate and reliable information from the viewpoint of participants.

As the findings of this figure suggest, national television, the Internet, Sahand provincial network, Telegram, satellite networks, SMS sent from the Ministry of Health, university websites, and radio provided the most accurate and reliable information resources regarding COVID-19.

Figure 3 shows the most appealing, understandable, and simplest COVID-19 health information resources based on rate of frequency.

As the findings in the figure show, Iran's national television, the Internet, Telegram, Sahand provincial network, satellite networks, SMS sent by the Ministry of Health, friends, WhatsApp, and family were among the most appealing, understandable, and simplest information resources for COVID-19.

Figure 4 shows the official health information resources for COVID-19.

The findings of the figure show that national television, the Internet, Sahand provincial network, Telegram, SMS sent by the Ministry of Health, satellite networks, and news websites are the official health information resources for COVID-19.

Table 1 shows the results for significance tests between usage of COVID-19 information resources and age.

The results of the Independent Sample T-Test shows that there is a significant difference between use of national television, the Internet, Telegram, WhatsApp, and news websites to obtain health information regarding COVID-19 among different age groups.

Table 2 shows the results for significance tests between reliability of COVID-19 information resources and age.

The Independent Sample T-Test results indicate that there is a significant difference between the reliability rate of national television, the Internet, Telegram, and WhatsApp to obtain information related to COVID-19 among different age groups. However, this difference was not significant regarding news websites.

Table 3 shows the significance test results for use of COVID-19 information resources based on gender.

Chi-square test results indicate that there is no significant difference among male and female rate of using COVID-19 information resources.
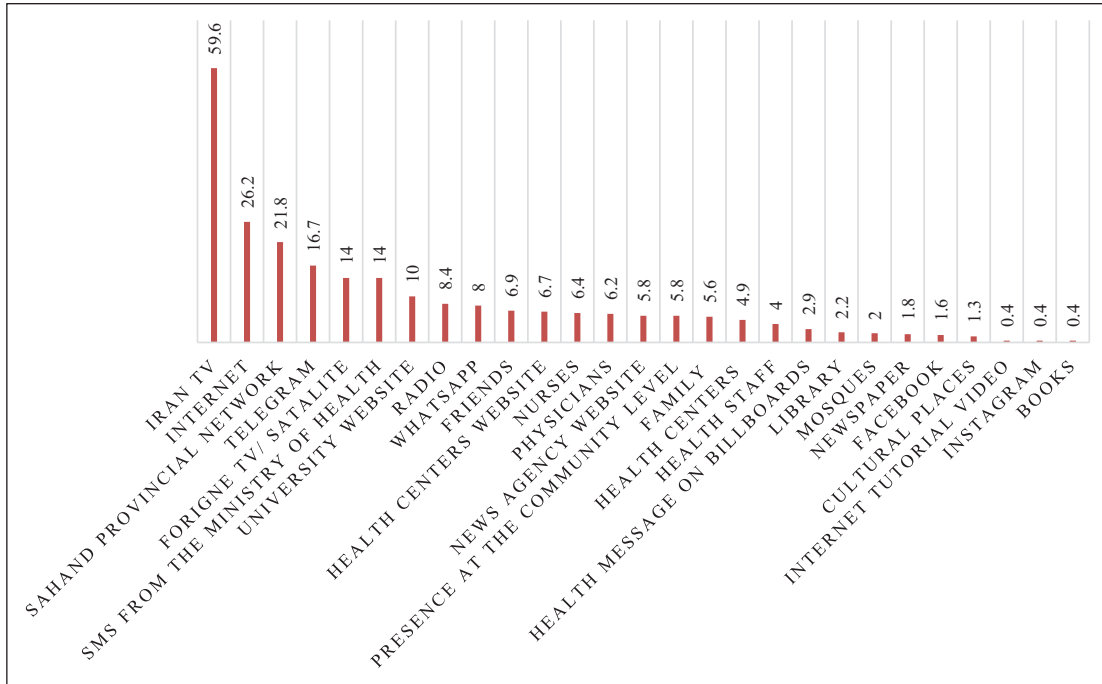
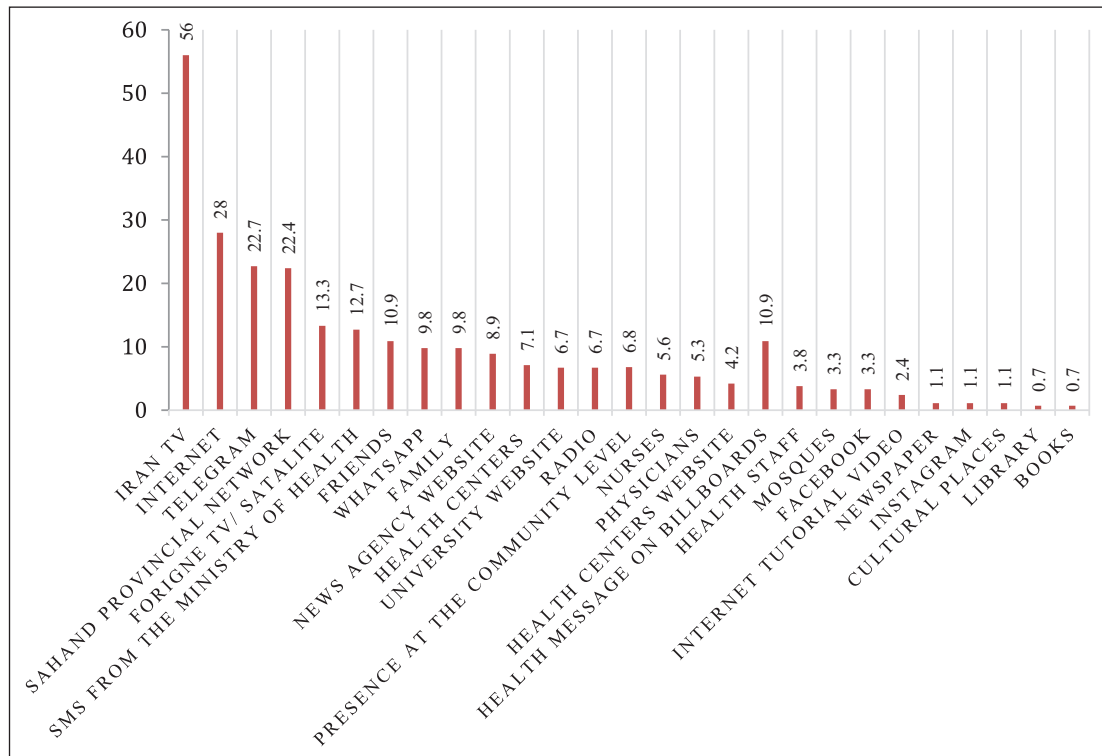**Figure 2.** The most accurate and reliable COVID-19 information resources.

Figure 3. The most appealing and understandable COVID-19 information resources.

Table 4 shows the results of significant tests for reliability rate of COVID-19 information resources based on gender.

Chi-square results indicate that there is no significant difference in the reliability rate of COVID-19 information resources among males and females.
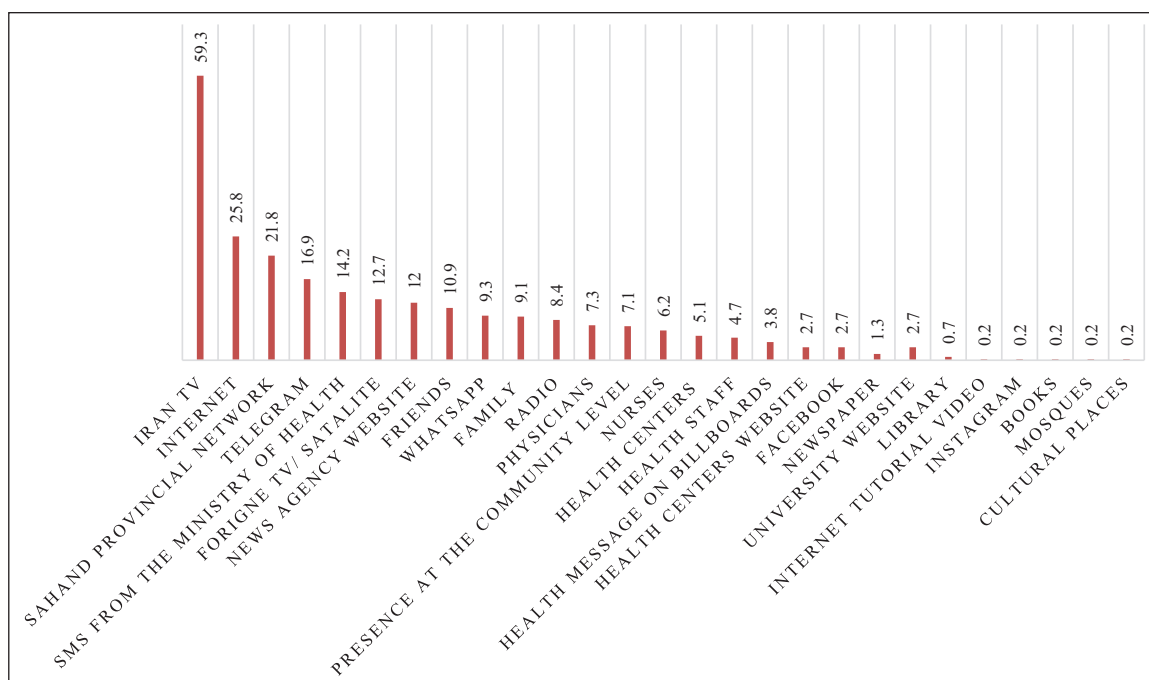
Figure 4. Official health information resources for COVID-19.

Table 1. Results for significance tests between usage of COVID-19 information resources and age.

Resources	Age		Result
National TV	t	−3.13	Significant
	df	370	
	sig	0.00	
Internet	t	8.33	Significant
	df	365.3	
	sig	0.00	
Telegram	t	7.27	Significant
	df	302	
	sig	0.00	
WhatsApp	t	3.70	Significant
	df	79.3	
	sig	0.00	
News website	t	2.46	Significant
	df	370	
	sig	0.01	

Table 2. Results of significance tests between reliability of COVID-19 information resources and age.

Resources	Age		Result
TV	t	−4.16	Significant
	df	28.72	
	sig	0.00	
Internet	t	5.56	Significant
	df	224.7	
	sig	0.00	
Telegram	t	5.83	Significant
	df	121.6	
	sig	0.00	
WhatsApp	t	2.45	Significant
	df	370	
	sig	0.015	
News website	t	1.88	Non-significant
	df	370	
	sig	0.06	

Discussion

This study was conducted with the aim of evaluating the role of information and information resources in awareness, control, and prevention of COVID-19. The results of this study have identified and introduced COVID-19 information resources based on highest usage rate, highest reliability rate among information resources, highest clarity, ease-of-use and accessibility, and official resources available. In addition, accurate statistical analyses were conducted to obtain information for COVID-19 regarding significant statistical differences among various groups based on age and gender.

As put forth in the introduction of this article, information has a basic role in prevention and control of diseases, especially infectious diseases. COVID-19 is also not an exception (Ashrafi-rizi and Kazempour, 2020). Qazi et al. (2020) evaluated situational awareness through social distancing and came to the conclusion that COVID-19 information resources, whether official or unofficial, have an effect on situational awareness and the adoption of social distancing is significantly affected by situational awareness

Table 3. Results of the significant test for use of COVID-19 information resources based on gender.

Resources	Sex		Result
TV	Value	2.28	Non-significant
	df	1	
	sig	0.13	
Internet	Value	0.905	Non-significant
	df	1	
	sig	0.341	
Telegram	Value	1.29	Non-significant
	df	1	
	sig	0.25	
WhatsApp	Value	0.026	Non-significant
	df	1	
	sig	0.87	
News website	Value	1.13	Non-significant
	df	1	
	sig	0.28	

Table 4. Results of significant tests for reliability rate of COVID-19 information resources based on gender.

Resources	Sex		Result
TV	Value	1.74	Non-significant
	df	1	
	sig	0.187	
Internet	Value	3.6	Non-significant
	df	1	
	sig	0.56	
Telegram	Value	0.132	Non-significant
	df	1	
	sig	0.716	
WhatsApp	Value	0.131	Non-significant
	df	1	
	sig	0.717	
News website	Value	0.635	Non-significant
	df	1	
	sig	0.426	

(Qazi et al., 2020). Thus, it can be concluded that obtaining information regarding COVID-19 has a significant effect on the prevention and control of this disease, which was one of the reasons for conducting this study. By using this resource and its more effective management, the epidemic potential of this disease or its duration can be reduced, which is extremely significant.

One of the vital issues in using information for prevention or control of a disease such as COVID-19 is the accuracy and precision of information provided. In other words, it is very important that information provided be based on accurate scientific evidence and refrain from misinformation, so that the information can be reliable. Yousef Ali and Gatiti (2020) state that during this era of diverse information resources, users do not usually have access to reliable information. Baines and Elliott (2020) state that without an accurate understanding of misinformation concepts, providing an adequate mechanism to analyze various data, existence of a scientific approach to evaluate the methodology of research conducted, and disregarding inaccurate information, this crisis can have serious global impact. Rovetta and Bhagavathula (2020) acknowledged that during the COVID-19 pandemic, a large amount of fake news, misinformation, and racism-related information circulated and spread throughout Italian cities (Rovetta and Bhagavathula, 2020). Ahmed et al. (2020) found that the source of fake information should be delegitimized as a key to reducing their impact, which requires a combination of quick and targeted intervention to take place. Bastani and Bahrami (2020) identified cultural factors, information needs during the crisis, appealing information dissemination by social media, marketing incentives, and the pool of legal regulation on cyberspace as the main determinant factors of dissemination of fake information during COVID-19.

The findings of this research show that from the participants' viewpoints, Iran's national television, the Internet, Sahand provincial network, short text messages sent by the Ministry of Health, university websites, and radio provide the most accurate and reliable information regarding COVID-19. Accuracy of information is determinant of information quality and has been addressed in several studies. Also, the accuracy of information affects the usefulness of information and end-user satisfaction. Thus, inaccurate information raises unreliability about the source of information and reduces trust, eventually misleading the users (Herrera-Viedma et al., 2006; Lee et al., 2021). These findings are in line with results from Qazi et al. (2020) and other studies that came to the conclusion that the reliability rate of official resources was greater than unofficial ones (Gattuso et al., 1993; Qazi et al., 2020). Ko et al. (2020) found that the public consider medical staff and the Internet as main resources of receiving information concerning COVID-19, respectively.

Yousef Ali and Gatiti (2020) state that libraries, as social institutions, have a responsibility of raising awareness regarding health information in society and providing up-to-date information to medical staff and managers. Librarians also have three basic roles in this regard: (1) providing awareness to ensure public health, (2) providing up-to-date information to researchers and faculty members, and (3) providing library services to users in order to prevent closure of libraries (Ali and Gatiti, 2020). Ashrafirizi and Kazempour (2020) also emphasized the role of medical librarians in teaching information literacy concepts and providing accurate and reliable information during crises such as the COVID-19 pandemic. This is while the results of this study indicate that libraries, as one of the official and reliable sources of information for COVID-19, have not been considered by the participants and based on the usability indices, reliability, and accessibility rates are

at a low level. Even though these results might be due to the government's policy for closing educational centers and libraries, the data collection procedure of this study was done when the closures were not yet implemented. Another important point is that supposing that libraries are closed, it is concluded that participants of this study have not considered their online services that provide information resources for this disease.

Findings of this study indicate that the Internet and social media are one of the most popular and reliable information resources for COVID-19, whereas they stand in second and third place based on frequency of use after television. In line with these results, Ko et al. (2020) found that a variety of sources of information on COVID-19 used by people, such as the Internet and local media, are the most common resources. Cuan-Baltazar et al. (2020) raised the issue that the use of the Internet to receive information about COVID-19 has a risk for public health; thus, governments should develop determinant strategies to monitor information on the Internet.

In their study, González et al. (2011) came to the conclusion that the Internet, as a source of gaining health information for teenagers, stands in fourth place after family, physicians, and friends. Contrary to the results of González et al. (2011), the results of our study indicate that participants obtained their information regarding COVID-19 mostly from the Internet, as compared to physicians, family, and friends. These results might be due to the type of COVID-19 disease and its pandemic nature, in which people's access to physicians and friends has become less due to quarantine conditions, and information seekers mostly prefer information resources that are more available. That television was the most common official source of obtaining information about COVID-19 by the participants can indicate the importance of the easy accessibility index for information resources in their selection. In line with this study, Gray et al. (2005) came to the conclusion that the Internet is the primary source for obtaining health information in England.

Other studies also refer to the crucial role of the Internet as an important source of obtaining health information for diseases. The findings of the study by Gollop (1997) show that elderly African American women obtain their necessary health information by means of physicians and medical staff, mass media, and social networks. Findings of the study by Hershberger et al. (2013) indicate that young women obtain information related to infertility from physicians and Internet sources. Obtaining experimental information face to face usually from peers is the next stage (Hershberger et al., 2013). Results of the study by Akhtari-Zavare et al. (2014) also show that patients diagnosed with breast cancer obtained their required health information from physicians, friends, and nurses (Akhtari-Zavare et al., 2014).

Farooq et al. (2020) found that "During COVID-19, frequent use of social media contributed to information overload and over concern among individuals." Also, Zhao et al. (2020) concluded that social media could be utilized to enhance public attention measurements in public health crises. They found that during COVID-19, a large amount of health information regarding this novel coronavirus was disseminated by local social media (Sina Microblog) and considered by many people (Zhao et al., 2020).

Abd-Alrazaq et al. (2020) acknowledge that social medial is an opportunity to disseminate health information during pandemic diseases. Thus, the health care system should consider social media as a platform to detect and monitor a pandemic such as COVID-19 (Abd-Alrazaq et al., 2020).

Conclusion

Health information and the literacy to use this information, health literacy, have an inevitable role in the prevention and control of pandemic diseases such as COVID-19. Providing accurate, reliable, and evidence-based information and timely notification to communities can be considered a low-cost and fast strategy used to combat COVID-19. Considering the numerous information resources available for COVID-19 and the probability of misinformation and pseudo-information, the existence of accurate and available information at a low cost is essential for all societies. Today, most households and offices have a television. Considering the findings of this study, and that television is the most common, official, reliable, and easy to access source of information for COVID-19, the main role of this media source in the awareness of society can be invested on. Social media is another one of the resources that should be further considered, and in addition to providing the necessary infrastructures for its use, education should also provided on how to use this resource. Considering that the findings of this study show that physicians, nurses, family, friends, and libraries did not have a significant role in providing information for COVID-19, redefining the role of these information resources in crises such as the coronavirus seem to be essential.

Study limitations

This study was conducted immediately after the outbreak of COVID-19 in Iran. Even though there were no commuting limitations and quarantine was not in effect at the time of data collection, these issues can have an influence on selection of the sample population and hence the results.

Declaration of conflicting interests

ORCID iD

Mohammadhiwa Abdekhoda https://orcid.org/0000-0002-1797-8916

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Author biographies

Mohammadhiwa Abdekhoda received his PhD in Health information sciences form Iran University of medical Sciences. Currently working as an associate professor in Health Information Management, Department of Medical Library and Information Sciences, School of Health Management and Medical Informatics, Tabriz University of Medical Sciences, Tabriz, Iran.

Fatemeh Ranjbaran is a PhD graduate in Applied Linguistics from the University of Tehran. She has been teaching EAP courses at Iran University of Medical Sciences for the past 6 years and has experience teaching English courses in higher education for the past 15 years.

Asghar Sattari received her MSc (Medical library and information sciences) from School of Health Management and Medical Informatics, Tabriz University of Medical Sciences, Tabriz, Iran. Currently working as librarian in public library of Tabriz.