



Knowledge of Social Media Users about COVID-19 and its Challenges: A Mixed Methods Study

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Abstract

Background: In confronting coronavirus disease 2019 (COVID-19), informing the public through social media is one of the most important strategies.

Objectives: The present study aimed to assess the knowledge level of social media users about COVID-19 and its challenges in Iran.

Methods: This mixed-methods study was conducted in 2020. In the quantitative phase, the knowledge level of 299 social media users about COVID-19 was assessed in Khorramabad, Iran, using a questionnaire. Data were analyzed using the SPSS software version 23. The mean score of knowledge was measured utilizing the *t*-test and analysis of variance. In the qualitative phase, data collection was completed through semi-structured interviews. Purposive sampling was used, and ten faculty members and experts were interviewed. The content analysis method was used to analyze data using the MAXQDA10 software.

Results: We observed that the mean knowledge score was 73.73 out of 100. Knowledge score had a significant relationship with educational level, field, and profession. Challenges of raising the knowledge of social media users included five themes: The nature of the disease, challenges related to users, stewardship challenges, the nature of social media, and problems related to domestic messengers.

Conclusions: Proper and active management of social media, along with the decisive and effective presence of health system authorities in social media, can make this platform the most important source to the public for knowledge raising during the outbreaks of communicable diseases.

Keywords: COVID-19, Knowledge, Social Media

1. Background

Infectious diseases are deadly, debilitating, and appear unexpectedly. In recent years, despite human successes in overcoming these diseases, they have reappeared (1). Diseases management is one of the main responsibilities of all health systems. The management system should be designed and implemented based on the characteristics of diseases, facilities, needs, and in accordance with resources. The dynamics of epidemics of communicable and non-communicable diseases are very different. Therefore, the type of management for these two groups of diseases is not the same (2). Due to the environmental conditions, most countries face communicable diseases and the re-

currence of infectious diseases, such as severe acute respiratory syndrome (SARS), multidrug-resistant tuberculosis, and Ebola. The affected countries often lack the capacity for rapid detection and timely response (3, 4).

Coronavirus disease 2019 (COVID-19) is an emerging disease first reported on December 31, 2019, in Wuhan, China. The causative agent is a virus from the family Coronavirus (5). Coronaviruses are a large family of viruses that cause a wide range of illnesses, from the common cold to severe diseases, such as SARS and Middle East Respiratory Syndrome. The incubation period, as the time interval between pathogen entry into the body and the onset of symptoms, for COVID-19 has been reported to be 1-14 days. How-

ever, this period is about 5 days (5) in most cases. COVID-19 causes acute respiratory problems, and common symptoms are fever, fatigue, dry cough, and shortness of breath. The disease is asymptomatic in most cases (80%) (6-9).

COVID-19 has practically become a crisis worldwide, and the World Health Organization (WHO) claimed it as a pandemic. Success in crisis and emergency situations requires community knowledge of disease prevention methods and the cooperation of various specialties. Basic interventions, such as providing health education and knowledge, are essential to prevent disease spread (10-12). According to WHO, this disease is a public health threat and is often transmitted through respiratory droplets (13). Consequently, following the health tips recommended by WHO and other health organizations is essential.

The WHO recommends countries worldwide that the knowledge and preparedness of people and society play an important role in controlling the disease, regardless of the situation in coronavirus cases (14-16). With the worldwide development of information technology and the internet, social media as one of the main tools providing information and knowledge in healthcare has increased rapidly (17, 18). Since 2004 when social media was introduced, it has been increasingly used by people and patients on healthcare issues (18). The use of these tools is beneficial for patients and people and can affect the healthcare system on a large scale (19). According to the reports published in 2017 regarding internet users, up to 69% of people in Iran use the internet (20). Therefore, social media have provided an excellent opportunity to inform Iranian users.

One of the essential strategies for dealing with COVID-19 is to inform people through social media and investigate the knowledge level of social media users about COVID-19. In addition, educational programs can be developed to improve public knowledge. WhatsApp, Telegram, Facebook, and Instagram are among the most used social media (21). WhatsApp and Telegram have many users in Iran, and people receive a high rate of relevant information and news from them (22, 23). Despite the importance of these social media in increasing the knowledge of users about COVID-19 in Iran and the high number of their users, no study has been conducted in this field.

2. Objectives

This study aimed to investigate the knowledge of social media users in Khorramabad, Iran, about COVID-19.

3. Methods

This mixed-methods study was conducted in 2020, with the quantitative phase conducted cross-sectionally in

a representative sample of 299 social media users in Khorramabad, Iran. In this phase, the knowledge of people about COVID-19 was assessed using a researcher-designed questionnaire containing 22 questions. The questionnaire had five main parts, including the demographic characteristics of users, information about disease symptoms, users' knowledge about disease transmission ways, information on disease prevention methods, and the general knowledge of users about COVID-19.

It should be mentioned that the questions were in a true-false form, and finally, the individuals' knowledge score was calculated. To assess the content validity ratio and content validity index, the opinions of 12 experts and professors of the Department of Epidemiology, Social Medicine, Nursing, and Health of Lorestan University of Medical Sciences and the Ministry of Health and Medical Education experts were used. Moreover, the reliability of the questionnaire was evaluated using Cronbach's alpha coefficient for 20 users (85%). After confirming the reliability and validity of the questionnaire, data collection was started. The electronic questionnaire was distributed online, and users were asked to fill in the questionnaire. The data were analyzed by the SPSS software version 23 (IBM, IL, USA). The mean score of knowledge was measured using the t-test and analysis of variance.

The qualitative phase was conducted using the conventional content analysis method. The study population included faculty members and staff of health networks who had educational backgrounds in health education, epidemiology, health information management, and health services management. The purposive sampling method was applied in which samples are selected purposefully based on the study objectives and specific information needed. Therefore, who is selected next is influenced by who has already been interviewed and what information has been provided. Sampling was continued without limiting the number of participants until the saturation level was reached. Saturation is when continuing to collect data causes the collected data to repeat the previous data, and no new information is obtained (24, 25). In total, one person refused to participate for personal reasons.

The data collection tool was an interview. Before the interview, the study objectives and the characteristics of the research team were explained to the interviewees, and informed consent was obtained. Interviews were conducted in a semi-structured format by telephone and video call using Skype and WhatsApp at work or home and at the resting time of interviewees. The interview was organized with the participants and was conducted at a suitable time. Interviews were completed by two researchers (H.A. and A.G.). To conduct the interview, an interview guide was prepared using the opinions of experts and the research

team based on the study's aim. The duration of each interview was 30 - 65 min. One researcher completed each interview, and no one else was present during the interview. Participants' statements were recorded using a Sony ICD-PX33 voice recorder. Note-taking was also used to record information during the interview. The researchers listened to the recordings of interviews several times immediately after each interview, and transcripts were typed word by word to determine the degree of similarity and alignment of the participants' responses to achieve saturation. In the current study, data saturation was achieved by conducting eight interviews. However, the research team decided to conduct up to ten interviews to make sure.

Data analysis was performed using the MAXQDA 10 software (26). The content analysis method is a proper way to obtain valid and reliable results from textual data (27). To analyze the data, first, the text of the interviews was read once to obtain an overview. Next, the texts were read repeatedly to extract codes from the interviews. After identifying the codes, a final analysis was performed, and the relationship between codes and categories was determined. The agreement on codes and the revision of transcriptions were achieved by peer check within the research team, and the member check method was used to review the findings by interviewees. The Ethics Committee of Lorestan University of Medical Sciences (IR.LUMS.REC.1399.004) approved the study's protocol.

4. Results

The findings of this study showed that the mean age of participants was 30 years, with a range of 14 - 68 years. Moreover, we observed that the most important sources of information about COVID-19 for the studied population were social media (71.23%), Islamic Republic of Iran Broadcasting (61.20%), friends, and acquaintances (7.69%), and internet databases (7.02%). Demographic characteristics (Table 1), knowledge scores based on dimensions (Table 2), and the relationship between independent variables and knowledge score (Table 1) are presented in the tables. In the second phase of this study, ten participants were from the fields of health education (3), health information management (3), epidemiology (2), and health services management (2). The findings of the qualitative phase are presented in Table 3.

4.1. Challenges Related to the Disease Nature

This category includes two sub-themes of emergence and unknown, various disease aspects, and frequent changes of knowledge about COVID-19 and its transmission ways. In this regard, one of the study participants

mentioned, "Shortage of information is one of the main problems in the current situation, and even for me, as a faculty member of the university, when I wanted to extract information from the website of WHO, there was not much information available in the early days of the disease. Alternatively, for example, about the time required to wash hands, the information of WHO has been updated several times, and they changed the previous information." (Participant #3)

4.2. Challenges Related to Users

This theme of challenges included low media literacy, negative attitude towards social media, and the culture of using social media. The interviewees believed that users and their media literacy play a vital role in the success or failure of knowledge raising through social media. Regarding media literacy, one of the interviewees noted "Suppose that no matter how much the universities take action and form various working groups, such as the epidemiology working group, to extract and disseminate accurate information, there will be another person who may not have any organizational affiliation at all and produce some unrealistic material and share them. Well, many social media users cannot distinguish the difference between real and fake information and do not necessarily use the information produced by reliable sources." (Participant #3)

4.3. Stewardship Challenges

Stewardship refers to the accurate and responsible management of people's health. In other words, as the steward of the health system, the Ministry of Health did not have a proper organization for the strong presence of its subdivisions, such as medical sciences universities and the health networks of the cities on social media. It did not play its oversight role, and it did not perform well in the beyond-sectoral leadership to assess and evaluate information resources generated on social media. In addition, due to the negative attitude of the health system at policy levels toward social media, official channels in social media were not launched. In this regard, one of the interviewees stated "We have no organizational structure for the effective use of social media. There is no assessment of the content accuracy... The accuracy of the content posted on social media is not controlled, and there is no evaluation body... Unfortunately, we do not have specific organizational channels for publishing information." (Participant # 8)

4.4. Challenges Related to the Nature of Social Media

These challenges are issues that arise from the nature of social media and the status of information available on

Table 1. Demographic Characteristics of the Studied Population and Their Relationship with Knowledge Score

Variables	No. (%)	Mean Score of Knowledge \pm SD	P-Value Test Result
Gender			0.272
Woman	188 (62.9)	74.23 \pm 9.19	
Man	111 (37.1)	72.88 \pm 10.79	
Marital status			0.171
Single	131 (43.8)	74.61 \pm 10.53	
Married	168 (56.2)	73.04 \pm 9.19	
Place of residence			0.842
Urban area	233 (77.9)	73.67 \pm 9.85	
Rural area	66 (22.1)	73.94 \pm 9.77	
Educational level^a			0.013
Under high school	36 (12)	71.12 \pm 10.12	
High school	80 (26.8)	72.12 \pm 8.36	
Bachelor	146 (48.8)	74.28 \pm 10.36	
Master or above	37 (12.4)	77.54 \pm 9.16	
Profession^b			0.001
Governmental	72 (24.1)	76.10 \pm 9.06	
Private	36 (12.0)	71.37 \pm 12.54	
Student	84 (28.1)	75.61 \pm 9.28	
Housewife	66 (22.1)	72.36 \pm 7.67	
Unemployed	26 (8.7)	67.05 \pm 8.73	
Others	15 (5)	75.06 \pm 12.82	
Educational field			0.001
Medical Sciences	93 (31.1)	78.30 \pm 8.77	
Other sciences	206 (68.9)	71.67 \pm 9.58	
Having family members under 5 or over 65 years old			0.998
Yes	195 (65.2)	73.73 \pm 10.02	
No	104 (34.8)	73.73 \pm 9.47	
Underlying health conditions			0.879
Yes	109 (36.5)	73.84 \pm 9.38	
No	190 (63.5)	73.66 \pm 10.08	
Interruption in life			0.311
Yes	248 (82.9)	73.99 \pm 9.77	
No	51 (17.1)	72.46 \pm 10.06	

^a There was a significant difference between Master's and high school and under high school.

^b There was a significant difference between the mean score of knowledge among those in the governmental profession and the unemployed. There was also a significant relationship between the knowledge score of students and the unemployed.

social media. This theme of challenges included five sub-themes: The high speed of information dissemination, low information quality, large information amount, unscientific orientation, and the lack of time limit on social media. One of the study participants stated "Cyberspace is full

of false information... Unfortunately, rumors on social networks are too much, not only for the general public but also for highly educated individuals. It is not easy to understand what is true or not on social media... In our country, social media has not been used mainly for science and

Table 2. Knowledge Score and Its Various Dimensions in Social Media Users in Khorramabad

Knowledge Dimension	The Score Out of 100 ± SD
Epidemiology	73.73 ± 14.8
Disease symptoms	75.33 ± 17.73
Disease transmission ways	70.3 ± 17.97
Disease prevention methods	81.8 ± 16.57
Knowledge	73.73 ± 9.82

knowledge raising so far, meaning that it is more for fun, spending leisure time, listening to music, and watching movies. In the telegram channels, it can be said that few wells and updated scientific channels can be found, and most of the channels have much entertainment." (Participant #9)

4.5. Challenges Related to Domestic Messengers

Challenges related to local messengers included the lack of acceptance by users and the low technology. For example, a participant said "You know that domestic messengers have severe weakness, first of all, they were not liked by people and were not attractive to people. Second, different organizations could not use them. For example, we now have domestic messengers "Bale", "Eitaa", or "Shad" (my child also uses Shad), the new program developed by the Ministry of Education. We are annoyed when they have teaching programs through Shad... Domestic messengers are very weak in technology, and transmitting messages via them is very difficult. For example, in the case of Shad, you may not believe it, but when we leave a message, we have to exit the program once, then re-enter a few minutes later so that the message reaches the recipient." (Participant #1)

5. Discussion

The results of the current study showed that the knowledge score of the studied population was 73.73 out of 100. A study conducted using an online questionnaire revealed that the knowledge level of the American and British people about the ways of transmission and the symptoms of COVID-19 was appropriate. However, there have been various misunderstandings about the methods of causing the disease, which is being shared on social media (28). Therefore, although the knowledge level about the disease is relatively good, training should be continued.

Moreover, the present study indicated that social media is the most important source of information about COVID-19 for the studied population. Social media can be an excellent option to manage and control COVID-19

through public knowledge raising. According to the literature in this field, specialists can prevent the spread of epidemics by identifying the needs of social media users and providing appropriate public health training, and they can use social media in the disease control and management plans (29).

We found no significant relationship between the knowledge of social media users about COVID-19 and the variables of gender and marital status. Due to the high accessibility of smartphones, many people in the community use mobile phones and social media, such as WhatsApp, Telegram, and Instagram, to be aware of topics (30, 31). There is no difference between men and women in access to smartphones and social media, and the most popular social media can be used to raise knowledge and inform people.

Furthermore, our results demonstrated a significant relationship between the knowledge level of users and educational level as there was a significant difference between a Master's degree and high school and under high school degrees. However, some investigations showed no difference between individuals at different educational levels in terms of concern about the risk of developing COVID-19 (32). People with higher levels of education, due to their ability to retrieve relevant and valid information when using social media, can obtain the required information on various topics, including personal and social health. Therefore, they can prevent developing diseases and help to break the transmission chain. It is also suggested that due to the variable levels of individuals' education in the community, the producers of educational content on social media in coping with COVID-19 should pay attention to the needs of all individuals in the community. Meanwhile, UNICEF has also emphasized providing health training related to COVID-19 for students based on their level of education (33).

The results of the current study showed that users' knowledge level about COVID-19 had a significant relationship with individuals' professions as there was a significant difference between the mean knowledge score of people with governmental jobs and unemployed people. In addition, there was a significant difference between students' knowledge and unemployed people. Implementing comprehensive programs, such as social distancing, is one of the critical and practical points in managing and controlling COVID-19 (34, 35). In implementing this plan, required and specific training should be provided based on the types of professions and their activities. In order to successfully develop the social distancing program, it is suggested to prepare training materials and resources related to various occupations and provide to people through social media as the most important source of information.

Table 3. Challenges of Knowledge Raising of Social Media Users and Solutions for Promoting

Categories and Themes	Sub-themes
Challenges	
Disease nature	Emerging and being unknown; Shortage of information and frequent change in knowledge
Challenges related to users	Low media literacy; Negative attitude towards social media; Culture of using social media
Stewardship challenges	Weakness in supervision of social media and information resources; Improper organization of social media; Negative attitude towards social media
Nature of social media	High speed of information dissemination (valid and invalid); Low quality of information; A large amount of information; Non-scientific orientation; No time limit
Domestic messengers	Low acceptance by users; Low technology
Solutions	
Empowerment of end-users	Improvement of media literacy level; Internet subsidies for at-risk groups
Strengthening the intersectoral governance of the Ministry of Health	Decisive and influential presence in social media; Targeted information dissemination; Monitoring and evaluation of social media

Other findings of the present research revealed that one of the challenges of knowledge raising for social media users is related to the nature of COVID-19. Emergence, being unknown, information shortage about prevention methods, and the frequent information changes about this disease can make any kind of knowledge raising difficult. Information about the disease changes is published daily and in various articles. For example, there were numerous discussions concerning the effectiveness of quarantine, and there were different opinions (36). There were also various debates about masks by a healthy population, all of which are related to the emergence of the disease and the unknown aspects of prevention and control. WHO stated that the mechanism of disease transmission by asymptomatic individuals is still unknown. Information on transmission methods is still being developed, and research in this field continues (37).

The findings of the present study also showed that media literacy is the most important users-related challenge. Regarding media literacy, the results of various studies are controversial. In some studies, the level of media literacy among individuals was reported to be above average (38, 39), while in another investigation, it was reported to be inappropriate (40). Further studies on media literacy, especially health-related media literacy, are suggested. Consequently, educational planning and public knowledge raising can be performed, and required decisions can be made. The inclusion of media literacy training in the school curriculum is also recommended. In this regard, the Ministry of Education published a book entitled *Media Thinking and Literacy* in the 2016 - 2017 academic year (41). However, producing more and more comprehensive educational content for all levels of students is needed.

Stewardship challenges are among other current challenges in Iran's health system for raising the knowledge of social media users. In the previous studies, the stewardship weakness in Iran's health system (42) and the infectious diseases care system (43, 44) has been emphasized, which is consistent with the results of the present study. It is suggested that in order to face this challenge properly, popular channels be identified and certified. Next, appropriate and up-to-date content is produced and provided. It is also recommended that, in accordance with the dimensions of stewardship, policy-making in the face of crises be evidence-based, and intra-sectoral governance of the health system be examined, assessed, and reformed. Moreover, special attention should be given to inter-sectoral leadership focusing on the Ministry of Health.

Some other knowledge-raising challenges were related to the inherent characteristics of social media. The interviewees' concerns were the speed of message transmission, high information volume, unscientific orientation, and the lack of time limit in producing and using the information on social media. According to the cognitive load theory and dual coding theory, the high speed of message transmission and high information volume on social media may lead to less retention of messages. Therefore, it is necessary to increase the attractiveness of messages on social media to augment the likelihood of retention; for example, designing messages using infographics and images can be helpful (45).

The weakness of domestic messengers was another challenge in raising the knowledge of social media users highlighted by the study participants. The participants cited the weakness of domestic messengers as the reason for their unpopularity. In a study conducted by Delshadi

et al. in 2016, it was found that students used foreign social media, and none of them used domestic ones (46). Due to the low acceptance of domestic social media, it is suggested that during the outbreak of diseases, the Ministry of Health, medical sciences universities, and health networks of the cities play an active role in other widely used social media.

The current study had some limitations. First, the participants in the study may not be fully representatives of those citizens of Khorramabad who use social media. People who tend to participate in studies have better health status and higher health literacy. Since the participants were not randomly selected, some overestimation in the knowledge score is expected. Second, the relatively small sample size of the study can lead to a random error in the study. Therefore, the study power in differentiating differences and relationships decreases. Despite the challenges in using social media for raising knowledge about COVID-19, with proper and active management of social media and a decisive and effective presence of health care authorities in social media, this platform can be the most important source of public knowledge raising during the outbreak of infectious diseases.

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Footnotes

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Data Reproducibility: The data presented in this study are openly available in one of the repositories or will be available on request from the corresponding author by this journal representative during submission or after publication. Otherwise, all consequences of possible withdrawal or future retraction will be with the corresponding author.

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