

## Examining the Status of Health Literacy, E-Health Literacy and Acceptance of Conspiracy Beliefs in the Face of COVID-19

Shahnaz Khademizadeh<sup>1</sup> , Maryam Aghaei<sup>2</sup> , Roghayeh Ghazavi<sup>3</sup> 

1. Corresponding author, Associate Professor, Department of Knowledge and Information Science, Shahid Chamran University of Ahvaz, Ahvaz, Iran. E-mail: [s.khademi@scu.ac.ir](mailto:s.khademi@scu.ac.ir)
2. MSc in Knowledge and Information Science, Department of Knowledge and Information Science, Shahid Chamran University of Ahvaz, Ahvaz, Iran. E-mail: [maryamaghaei.scu@gmail.com](mailto:maryamaghaei.scu@gmail.com)
3. Assistant Professor, Department of Knowledge and Information Science, Shahid Chamran University of Ahvaz, Ahvaz, Iran. E-mail: [roghazavi@gmail.com](mailto:roghazavi@gmail.com)

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### ABSTRACT

**Objective:** This study investigates the status of health literacy, e-health literacy, and acceptance of conspiracy beliefs in the face of COVID-19 among graduate students of Shahid Chamran University of Ahvaz in Iran.

**Materials and Methods:** The current research is a descriptive survey. Data were collected by a researcher-made questionnaire. The statistical population of the research consists of graduate students of Shahid Chamran University of Ahvaz in the academic year 2020-2021. The sampling of the research was determined based on the Kurjesi-Morgan sample size table and the sample size was 362 people.

**Results:** According to the findings, the level of health literacy, e-health literacy, and acceptance of conspiracy beliefs in the face of COVID-19 among students was above average.

**Conclusion:** During a crisis, more than any other time, attention should be paid to the promotion of health literacy and e-health literacy of students. Due to the higher acceptance of conspiracy beliefs among students compared to the average level, the need to inform them about the infodemic phenomenon and improve the level of health literacy and e-health literacy among them is felt.

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## **Introduction**

Coronavirus disease (COVID-19) was first observed at the end of 2019 in Wuhan, China, and due to its high spread in a short period of time, it involved all the countries of the world. The spread of the COVID-19 pandemic took the world by surprise, and unlike most health crises in recent decades, it affected the daily life of all people in all aspects of life (Mallah et al., 2021). Whenever a health crisis emerges, such as the outbreak of the COVID-19 pandemic, the amount of information flow is enormous, and this requires extra care to minimize the risk of a crisis. Therefore, epidemics must be reported in a way that helps to reduce the risk of crisis instead of increasing it (Vos & Buckner, 2016).

The COVID-19 pandemic has shown that major public health challenges are associated with various forms of misinformation (Biddlestone et al., 2020); and the World Health Organization in 2021 stated that COVID-19 as an information disease is associated with information overload and information complexity, which makes it difficult for the public to find relevant and correct information. Health literacy is also defined as the ability to access, understand, evaluate, and apply health information (Okan et al., 2020). Providing evidence-based information and supporting community health literacy have been introduced as effective approaches to increase preventive measures and combat information diseases in the health crisis of the COVID-19 pandemic (Abdel-Latif, 2020; Sentell et al., 2020). Studies have shown that adequate health literacy increases the effectiveness of health promotion programs and improves people's health status (Tehrani Banihashemi et al., 2007). In expressing the importance of health literacy during the time of COVID-19, it can be said that health literacy is underestimated during the time of the COVID-19 pandemic because it is very important to understand and use health information (Paakkari & Okan, 2020).

Electronic health literacy, which according to Mehoudar (2014) is considered a part of health literacy, refers to the ability to find and understand medical information from electronic sources, evaluate its quality, and apply it in the field of health. In 2006, Norman and Skinner presented a definition and a model of e-health literacy (Norman & Skinner, 2006), which is derived from a set of six main elements including reading and calculation, as well as literacy related to health, information, science, and information technology. According to Kutner et al. (2007), effective internet searches are important for locating health information, especially for students. But students' access to much available health information does not guarantee their fruitful search for health information on the Internet. Therefore, Nugent, Band, and Kane state that those who have e-health literacy skills use better and more efficient web search strategies and have a high ability to identify high-quality health information (Quinn et al., 2017).

Human, economic, and social crises and pandemics are accompanied by a series of conspiracy theories and beliefs that are spread through the mainstream and social media (Schaeffer, 2020). People who believe in conspiracy theories and beliefs tend to assume that an important social event is organized by sinister and unknown people (Douglas & Uscinski, 2019). With the occurrence of a national or global disaster, some people are looking for reason and logic to guide their behavior and thoughts and to give meaning to the disaster they are experiencing by producing and nurturing conspiracy theories or beliefs (Oleksy, 2022). According to Allport and Postman, people resort to conspiracy beliefs when there is no access to accurate and reliable information, as well as low trust in information, information sources, and informants, or when complete and solid information is rarely available (Allport & Postman, 1946). The COVID-19 crisis has provided the basis for the expansion of conspiracy theories, and belief in these theories is considered important due to their influence on public health behavior about preventing the spread of the COVID-19 disease and facilitating the vaccination process (Nejat et al., 2021).

Taking into account the above-mentioned materials and taking into account the role of students during the COVID-19 crisis, who are at a young age and can play a significant role in the family and society, examining the status of health literacy. Electronic health literacy and acceptance of conspiracy beliefs in students can be important because students can influence society by spreading their knowledge and acting as publishers of knowledge from the university to society. According to the cases mentioned in this research, the researchers are looking to investigate the status of health literacy, e-health literacy, and acceptance of conspiracy beliefs in the face of COVID-19 among postgraduate students of Shahid Chamran University of Ahvaz in Iran. The result of the research can provide the basis for planning the necessary interventions to recognize the correct information during health crises by specifying the status of health literacy, e-health literacy, and acceptance of conspiracy beliefs in students and providing effective solutions.

## **Materials and Methods**

The current research is a survey-descriptive type of research. The tool for collecting information was a questionnaire. The statistical population of the research is the graduate students of Shahid Chamran University of Ahvaz in Iran in the academic year 2020-2021. The number of graduate students at the Shahid Chamran University of Ahvaz is estimated at 6195. Sampling of the research was done based on the Kurjesi-Morgan sample size table and the sample size was determined to be 362 people. A stratified random sampling method was used to collect students' data. Considering that the population of this research is the post-graduate students (master's and doctorate) of the Shahid Chamran University of Ahvaz in Iran, and they are from different faculties in the university, a stratified random sampling method was used to collect the students'

data. Due to the lack of information about the variance of the classes, the statistical sample was selected according to the number of people in each faculty.

The questionnaire was prepared using Google form and the link of the questionnaire was provided to the research sample online through social networks to collect information. The tool that was used in the present study consisted of a three-part questionnaire, the first part of which was related to demographic information, including age, gender, marital status, occupation, level of education, and field of study, and the second part included questions related to the status of each person's infection with the virus. Corona and the third part is a questionnaire containing 27 items, three questions of the questionnaire are related to the conspiracy beliefs variable from Duplaga (2020), and sixteen questions are related to the health literacy variable, which is from the 16-item short version of the European Health Literacy Survey Questionnaire (HLS-EU-Q16). and the last 8 questions are related to the electronic health literacy variable, which was taken from the Norman and Skinner questionnaire (Norman & Skinner, 2006).

The scoring method of the present study questionnaire is based on a 5-point Likert scale and its scoring method is from 1 to 5. The criteria for entering the questionnaire included people who themselves or one of their family members or relatives were involved in COVID-19, and people who did not meet these conditions were excluded from completing the questionnaire. The validity of the questionnaire has been confirmed in various studies, including the study of Duplaga and Grysztar (2021). However, due to the translation of the questionnaire, to determine the formal validity of the data collection tool and to find the difficulties, inadequacies, and ambiguities that may be encountered, the questionnaire was presented to three professors of the Department of Knowledge and Information Science and two professors of the Department of Psychology of the Shahid Chamran University of Ahvaz. The reliability of the questionnaire was also measured using the Cronbach's alpha. The Cronbach's alpha of health literacy was equal to 0.90, electronic health literacy was equal to 0.89, and the acceptance of conspiracy beliefs was equal to 0.81, which indicated that the research instrument tool has acceptable reliability and is approved. Finally, the data were analyzed by SPSS version 26 software.

## **Results**

In terms of gender, 61.04% of the statistical population of this study, equal to 221 people, are boys and the rest (141 people) are girls. In terms of age, about half of the participants, equivalent to 50.8%, i.e., 184 people, were between 25 and 35 years old. 81.2% of the students were senior students and 18.2% were doctoral students. 82.9 percent of single students and the rest are married students. Statistics also show that the majority of the participants in this research were unemployed.

In Table 1, the condition of contracting and not contracting the corona disease of the people participating in the research and their relatives are presented in the form of frequency and percentage.

**Table 1. The state of infection and non-infection of people participating in the research with corona disease**

Component	Status	Frequency	Percent
I was infected with the coronavirus.	Yes	227	62.7
	No	129	35.6
	No Response	6	1.7
I was hospitalized due to the coronavirus.	Yes	16	4.4
	No	338	93.4
	No Response	8	2.2
My family members got infected with the coronavirus.	Yes	283	78.2
	No	75	20.7
	No Response	4	1.1
My family members were hospitalized due to the coronavirus.	Yes	72	19.9
	No	286	79
	No Response	4	1.1
My relatives were infected with the coronavirus.	Yes	348	96.1
	No	10	2.8
	No Response	4	1.1
My relatives were hospitalized due to the coronavirus.	Yes	238	65.7
	No	120	33.1
	No Response	4	1.1

According to the results of the above table, it can be seen that 62.7% of the participants claimed that they were infected with corona disease and 4.4% of the total number were admitted to the hospital due to this disease. In examining the condition of the participants' family members, it was observed that 78.2% of the participants' family members were infected with corona disease and 19.9% of their family members were admitted to the hospital. Of the total number of participants in the research, 96.1% claimed that their relatives were infected with the coronavirus, and 65.7% of their relatives were hospitalized.

In the following, to check the normality of the data and the existence of an interval scale of the data, a sample t-tech test was used, and based on the comparison of the theoretical average and the average observed in the data; the level of health literacy, e-health literacy, and belief acceptance Conspiracy has been measured in students. According to the level of health literacy of students according to the results of Table 2, based on the comparison of the theoretical average ( $X=3$ ) and the observed average ( $X=3.476$ ) in the research and the absolute value (9.05) and the degree of freedom (361) it can be seen that There is a difference (0.476) between the theoretical and observed average. The obtained results show that the level of health literacy during the covid-19 epidemic among graduate students of Shahid Chamran University of Ahvaz is equal to 3.476, which is higher than the average. And graduate students of this university have a good position in health literacy.

The question, "*Do you find it difficult to judge the reliability of information about health risks in the media?*" among the questions related to the variable of health literacy in the questionnaire, has the highest average value with an average of 2.552.

**Table 2: The level of health literacy during the COVID-19 pandemic among graduate students of Shahid Chamran University of Ahvaz**

Variable	Number	Average	Average difference	Confidence interval 95%	
				High Limit	Lower Limit
Health literacy	362	3.476	0.476	0.579	0.372

According to the results of Table 3, based on the comparison of the theoretical mean ( $X=3$ ) and the observed mean ( $X=3.294$ ) in the research and the degree of freedom (361), it can be seen that the difference between the theoretical and observed mean is (0.294). The results obtained from the present research show that the level of e-health literacy among graduate students of the Shahid Chamran University of Ahvaz during the outbreak of Covid-19 is higher than the average and the post-graduate students of this university have a good level of e-health literacy. Among the questions related to the electronic health literacy variable in the questionnaire, is the question "*Do you know how to use the Internet to answer your questions about health?*" It has the highest average with an average of 3.594.

**Table 3. E-health literacy rate during the COVID-19 pandemic among graduate students of Shahid Chamran University of Ahvaz**

Variable	Number	Average	Average difference	Confidence interval 95%	
				High Limit	Lower Limit
E-health literacy	362	3.294	0.294	0.374	0.215

According to the results of Table 4, based on the comparison of the theoretical mean ( $X=3$ ) and the observed mean ( $X=3.490$ ) in the research and according to its absolute value (9.312) and the degree of freedom (361), it can be seen that there is a difference between the theoretical mean and the observed mean (0.490) exists. The results indicate that the level of belief in the conspiracy during the covid-19 epidemic among graduate students of the Shahid Chamran University of Ahvaz is higher than the average. Among the questions related to the conspiracy beliefs variable in the current research questionnaire, the question "*Do you think the coronavirus that is responsible for the COVID-19 pandemic is the result of genetic manipulations done by humans?*" has the highest average with an average of 3.767.

**Table 4. Conspiracy beliefs rate during the COVID-19 pandemic among graduate students of Shahid Chamran University of Ahvaz**

Variable	Number	Average	Average difference	Confidence interval 95%	
				High limit	Lower limit
Conspiracy belief	362	3.490	0.490	0.594	0.387

## Discussion

The results obtained from the findings of the present research indicate that the level of health literacy during the COVID-19 pandemic among graduate students of Shahid Chamran University of Ahvaz is 3.476, which is higher than the average, and the graduate students of this University have a good status in health literacy. Health literacy has attracted growing research attention. Emerging research has recognized health literacy as a vital factor in promoting health, quality of life, and well-being. If students are competent in health literacy, they can deal with health issues properly and efficiently and become useful in society by removing health barriers. Therefore, examining the level of health literacy of students should be an important issue in various research.

Concerning the level of health literacy of students, Roberts et al. (2022), and Kaboudi et al. (2017) from the mentioned studies (Roberts et al., 2022; Kaboudi et al., 2017) were consistent with the results of the present study. Some studies are also not in line with the results of the present research (Ying et al., 2022; Patil et al., 2021; Dadaczynski et al., 2021). In the present research, since a questionnaire was used, the participants in the research made a kind of self-declaration, which can be proof of the high level of health literacy of students in the era. It was the COVID-19 pandemic.

According to the findings of the present study, the level of e-health literacy during the COVID-19 pandemic among graduate students of the Shahid Chamran University of Ahvaz is 3.294 and above the average. The studies of Patil et al., Dadaczynski et al., and Zakar et al. show that students have high e-health literacy, which is in line with the results of the present research (Patil et al., 2021; Dadaczynski et al., 2021; Zakar et al., 2021). One of the remarkable aspects of the COVID-19 pandemic is that it is associated with the phenomenon of the “infodemic”, which is characterized by the rapid expansion and amplification of a large amount of valid and invalid information on the Internet or through other communication technologies (Hua & Rajib, 2020). Identifying which information is accurate and useful requires e-health literacy, which was one of the reasons for measuring the level of people's e-health literacy in this research. Norman and Skinner (2006) believe that e-health literacy is influenced by various factors such as age, gender, educational status, internet access, and personal income. Therefore, the level of electronic health literacy of students may be one of the stated factors.

According to the findings of the present research, the obtained results indicate that the rate of conspiracy beliefs in the face of COVID during the COVID-19 disease among students is equal to 3.490 and above the average. Important world events are usually associated with conspiracy beliefs. Because people consider trivial explanations for important events to be insufficient and unsatisfactory and they look for news, rumors, and information that is spread about them, and sometimes they turn to false and misleading information. Imhoff and Lamberty (2020) stated that



belief in beliefs and conspiracy theories about Corona is an important predictor of non-adherence to measures to reduce the impact of the COVID-19 pandemic. The findings of this research about conspiracy beliefs among students were logical and predictable. Because the pandemic was accompanied by the widespread spread of fake news and conspiracy theories about COVID-19. In line with the results of the current research, similar studies have also been conducted (Naveed et al., 2021; Sallam et al., 2021; Sallam et al., 2022). Bruder et al. (2013) stated in their research that belief in conspiracy theories is less in Western countries (Germany, Great Britain/Ireland, United States), which is not in line with the present research.

According to the World Health Organization (WHO) in 2021, the COVID-19 pandemic as an information disease has been accompanied by an abundance of information, which makes it difficult for the public to find relevant and correct information, because according to Khademizadeh et al. (2022) since the beginning of the pandemic crisis, we have been faced with a wide range of news, information, and correct and incorrect medical-health solutions at individual and social levels. When there is an abundance of information about a crisis, fake and incorrect information are also seen among the information, after that, fake information can start a wave of conspiracy beliefs among people. This can be the reason that in the present study, the conspiracy belief among students during the pandemic crisis is higher than the average. To reduce the conspiracy belief in the current research community, awareness tools through different media should be considered by health policymakers and universities, and as mentioned, the promotion of health literacy and e-health literacy of people, despite its appropriate level, is more be noted in advance.

## **Conclusion**

The results of the present study showed that the level of health literacy and e-health literacy among students was higher than average. However, since at the time of the health crisis in society, people need awareness more than ever to face the information and news related to the crisis, policymakers in this field must increase the awareness of students through different media, and pay attention to improving their health literacy and e-health literacy more than before. In addition, due to the higher acceptance of conspiracy beliefs among students than the average level, the need to inform to recognize the phenomenon of infodemic and improve the level of health literacy and e-health literacy among them is felt. Furthermore, the university can have appropriate educational programs and services to improve the level of health literacy and e-health literacy among students to enable them to evaluate and use information related to the crisis that is published in various media. Although the level of health literacy and e-health literacy is higher than the average level, a high level of health literacy is needed to distinguish correct from incorrect health information, and people should be strengthened in this field and the Ministry of



Health should cooperate with the universities in this field and a useful step should be taken to increase the health literacy of the society.

### **Author Contributions**

All authors contributed equally to the present research.

### **Data Availability Statement**

Data available on request from the authors.

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### **Ethical considerations**

The authors avoided from data fabrication and falsification.

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### **Conflict of interest**

The authors declare no conflict of interest.

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