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Students' health literacy in the face of the corona crisis

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***Abstract*--**Today, the spread of the corona virus has become a major global crisis and has involved many countries, including Iran. One of the consequences of the spread of coronavirus news is the spread of false information, fake news, and terror among the members of society. The present study was conducted to study the level of health literacy of Allameh Tabatabai University students in the face of the Corona crisis. The current research is of an applied type and it is a survey-analytical type in terms of the method of implementation, data collection, and analysis. The research population is the Allameh Tabatabai University students of all levels (bachelor, master, and doctorate) studying in the academic year 2021-2022. The sample size of 288 people was selected with the formula (8M + 50≤N) suggested by Tabachnick and Fidel (2007). A researcher-made questionnaire was used to collect data. Content validity and reliability were evaluated using Cronbach's alpha with a value of 0.941. To analyze the data, independent t-tests, analysis of variance, and Pearson's correlation coefficient were used using SPSS26 and AMOS26 software. The findings show that there was no significant relationship between the demographic variables of gender, age, marital status, and education level with health literacy variables (P>0.05) in the face of the corona. No significant relationship was observed between the variables of students' information about the corona disease and the variables of the students' level of health literacy (P>0.05). The results of the Pearson correlation test showed that there is a positive and significant relationship between the level of health literacy of students in the face of corona disease (P<0.001, r=0.449). Based on the one-sample t-test, this difference from the average was significant at the 95% level. The results showed that individual status, access, reading, comprehension, evaluation and decision-making, and Allameh Tabatabai University students' behavior are effective in improving the level of health literacy in the face of corona disease.

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Keywords---*Health Literacy, Information Retrieval, Students, Allameh Tabatabai University, Coronavirus.*

Introduction

Presently, the corona virus spread has become a major global crisis and has involved many countries, including Iran (Alanazi, M. F., et. al., 2021; Alghamdi, A., et. al., 2021). The rapid spread of the disease to other countries and continents caused the World Health Organization to declare the Covid-19 pandemic. The spread was such that sometimes a hundred thousand people were infected within 12 days (Mousavi and Firooz, 2019). Currently, the pathogenic nature of this virus, the speed of its spread, as well as the percentage of deaths caused by it, have threatened the mental health of people at different levels of society (Bao and et al., 2020; Ryu and et al., 2020; Chen et al., 2020). The coronavirus spread shows that society is at risk, people suffer from a traumatic experience due to themselves, their neighbors, or other members of the society contracting this disease and it leads to a vulnerable society.

An interesting feature of this epidemic crisis is the coincidence of virology and the spread of news which led to the provision of extensive coverage of unpleasant events surrounding the corona pandemic and warning to adopt preventive self-protection measures (Ho et al., 2020). In addition to the spread of the disease, false information and fake news about the disease outbreak affected the physical and psychological reactions of the public to the threat of the infectious disease and created panic among the people. In a way that the fear of the spread of information on the Internet and social media moved faster than the spread of the coronavirus (Moradi and Mohammadi Far, 2019).

Acquiring information about the corona disease had a great impact on various aspects of the personal and social life of people at the national and international level, one of the most important aspects of which was the health literacy of the people in the society. Health literacy is a broad concept that has been defined in various ways. Health literacy includes people's capacity, skills, and motivation to access, comprehend, assess, and apply health information. Access includes the ability to search, find and obtain health information. Comprehension includes the ability to understand health information. Assessment includes the ability to interpret, refine, judge, and evaluate health information, and Application includes the ability to communicate and use the information to improve and maintain health (Sorensen and et al., 2012).

Each of these four concepts shows an essential aspect of health literacy that requires cognitive quality and depends on the quality of health information provided: Access and acquisition of health information depend on its understanding, up-to-datedness and validity. Comprehension of information is related to expectations, receiving benefits, personal results, and interpretation of causes. The assessing and processing of information depend on the complexity, language of idiomatic words, and understanding of a piece of information; and effective application and communication are related to perception. These four concepts are easily related to the levels of applied, interactive, and critical health

literacy. In his research, Montazeri added the component of reading skills to the elements of health literacy (Saleh Rahimi and et al., 2018 quoted in Montazeri and et al., 2013). However, according to the statistics announced by the Ministry of Health, the average health literacy in Iran is 68%, which is still far from the ideal situation.

When there is a concern in society, people seek to answer and solve the crisis by being on social media and the Internet. In this way, they encounter a large amount of true and false information about that crisis. Due to the vastness of the Internet, usually, there is no information control and we are faced with a large amount of accurate and fake information. On the other hand, the high treatment cost and society expansion require more use of electronic health information and we need to know to what extent people use the internet and social media for health literacy so that they can empower themselves against social and psychological harm through awareness. Therefore, it is necessary to examine the wide dimensions of health literacy in the face of the corona crisis. Accordingly, the current research aims to determine the health literacy status of students in the face of the corona disease in terms of demographic variables (age, gender, education level, and occupation) as well as the components of health literacy (capacity and ability to access, comprehension and understanding, process and assessment and decisionmaking, and behavior regarding information) as well as answering the following questions:

1. What is the level of health literacy of students in terms of demographic-social characteristics in the face of the corona crisis?

2. What is the level of health literacy of students in terms of capacity and ability to access information in the face of the corona crisis?

3. What is the level of health literacy of students in terms of understanding information in the face of the Corona crisis?

4. What is the level of health literacy of students in terms of processing and assessing information in the face of the corona crisis?

5. What is the level of health literacy of students in terms of decision-making and behavior regarding information in the face of the corona crisis?

Hypothesis- The level of students' health literacy is effective in facing corona disease.

Research literature

To access the research background, external databases and sites, including Google Scholar, Web of Science, Scopus, Emerald, Science Direct, Springer, ProQuest, etc., as well as, internal databases including the National Library of Iran, Noormagz, MagIran, Humanities Portal, Irandoc, Allameh Tabataba'i University Digital Library, etc. were searched.

The search results showed that few studies have been done on the topic of the current research and there is an obvious research gap in the field of measuring the students' health literacy level in the face of the corona crisis. Some related studies are mentioned below:

Safari and et al. (2021) in their research entitled "Factors related to health literacy in the field of prevention and control of the disease of Covid-19: a cross-sectional study" concluded that factors such as age, gender, education, the field of study, and economic status have a significant relationship with the health literacy score of the participants. Bagheri Shikhangfesheh and et al. (2019) in their study entitled "The role of health literacy and media literacy in predicting the fear of the 2019 coronavirus" concluded that health literacy and media literacy significantly predict the variance of fear of Covid-19. As much as the level of health literacy and media literacy decreases, the fear of Covid-19 among students increases significantly. Dadaczynski and et al. (2021) in their research entitled "Investigation of digital health literacy and web-based information seeking of university students in Germany during the Covid-19 pandemic" concluded that in terms of digital health literacy, the biggest challenges include assessing the reliability of health-related information and being able to determine whether or not this information is written with a commercial interest. Female students use the "information search" and "reliability assessment" dimensions of the digital health literacy tool lower. Search engines, news portals, and websites of public institutions were frequently used by respondents as sources to search for information about Covid-19 and related issues. In their research, Li and et al. (2020) investigated the relationship between health literacy, e-health literacy, and health behaviors related to Covid-19 among Chinese college students and concluded that health literacy and e-health literacy are positively related to specific preventive behaviors of Covid-19 and conventional health behaviors.

Do and et al. (2020) in their research entitled "Studying the determinants of health literacy and its relationship with health-related behaviors and depression in the elderly", concluded that elderly people with higher health literacy were less prone to depression and they had healthier behaviors in the group with symptoms of covid-19. Okan and et al. (2020) reached this conclusion in their research entitled "Health literacy related to the coronavirus: a cross-sectional study in adults during the infection of the Covid-19 disease in Germany", while 49.9% of the samples have an adequate level of health literacy related to the coronavirus, 50.1 percent had a "problematic" level (15.2 percent) or "insufficient" level (34.9 percent). Participants felt good about the coronavirus, but 47.8% reported having difficulty judging whether they could trust media information about Covid-19, and confusion about coronavirus information was significantly higher among those with less health literacy. Riiser and et al. (2020) in their study titled "Adolescent Health Literacy, Health Protective Measures, and Health-Related Quality of Life During the Covid-19 Pandemic" concluded that television and family were identified as the main sources of health information related to the epidemic. Hand washing, physical distancing, and limiting the number of social contacts were the most commonly reported measures. Hand washing knowledge and health literacy and hand washing behavior had a significant relationship. For each unit increase on the health literacy scale, participants were 5% more likely to socialize with friends compared to the general population. The average health-

related quality of life was very poor compared to European norms. Being in quarantine or isolation and being confirmed or suspected of having Covid-19 were significantly negatively associated with health-related quality of life.

McCaffery and et al. (2020) in their study entitled "Health literacy and differences in knowledge, attitudes, behaviors, and beliefs related to Covid-19 in Australia", concluded that people with insufficient health literacy had a much lower understanding of Covid-19 and were less able to identify preventive behaviors. They also had difficulty finding information and understanding messages about Covid-19 compared to people with adequate health literacy. People with low health literacy considered social distancing issues less important and had more problems with access to medicines and how to use them. Also, compared to the groups who had sufficient health literacy, these people had wrong ideas about this disease and vaccination. According to the conducted studies, and studies done on health literacy, and on the other hand, due to the situation caused by the Covid-19 disease in the world, this issue has been addressed from different perspectives. However, in the field of communication and the impact of health literacy to obtain correct information in the face of the Covid-19, it has not been paid attention to by researchers.

Method

Since this study aims to study the level of health literacy of students in retrieving and obtaining information in the face of the Corona crisis, it is considered practical. Furthermore, in terms of performance method, data collection and analysis are survey-analytical. The research population was all students of Allameh Tabataba'i University of all levels (bachelor's, master's, and doctorate) studying in the academic year 2021-2022. 288 people participated in the research. In order to determine the sample size, the formula (8M + 50≤N) proposed by TTabakhnick & Fidell (2007) was used. Based on this formula, the number of predictive variables is used to calculate the sample size in multiple regression. In this formula, N is the sample size and M is the number of predictor variables. According to the above formula, 15 multiplied by 8 plus 50 becomes 170, which according to the formula, the research sample should be more than 170 people. Therefore, to ensure accuracy in choosing the sample size and increase the external validity of the research in order to generalize the results, and due to the coronavirus outbreak and holding of classes virtually, 288 people* were selected using the available sampling method. A researcher-made questionnaire was used to collect data. For this purpose, the library study method (Persian and English sources, including the study of books, articles, magazines, theses, and internet databases) was used to compile the questionnaire. After reading the literature and previous studies, the questionnaire was designed. The scoring method was based on a five-point Likert scale (1 very little, 2 little, 3 somewhat, 4 a lot, and 5 a lot). In order to measure the validity of the questionnaire, content validity was used. For this purpose, the questionnaire was first sent to a group of expert professors of the Information and Science Department through e-mail. The questionnaire was modified after using the

* Due to the spread of Corona and compliance with health protocols, including staying at home and observing social distance, information was collected through email and WhatsApp.

experts' opinions and after applying the necessary corrections, it was finally designed in three sections and 60 questions. The reliability of the quantitative part of the mentioned questionnaire was calculated based on the responses of the participants in this research (30 people) using the Cronbach's alpha method, and the Cronbach's alpha coefficient was calculated using SPSS version 24 software with a value of 0.941.

Table 1. Cronbach's alpha value table at the questionnaire level

Components	**Number of questions**	**Cronbach's alpha**
Information acquisition	5	0.886
Reading	3	0.802
Understanding and comprehension	6	0.837
Information processing and assessment	8	0.925
Decision making and behavior	10	0.880
Total	32	0.941

In the descriptive part of the analysis of the findings, indicators (mean, standard deviation, frequency, and relative frequency) and in the inferential part (independent t-tests, analysis of variance, and Pearson's correlation coefficient) have been used. Data processing was done using SPSS26 and AMOS26 software, and the significance level of the tests was considered less than 0.05.

Research findings

Question 1- What is the health literacy level of students in terms of demographic and social characteristics in the face of the Corona crisis?

The socio-demographic characteristics (gender, age, marital status, education) of Allameh Tabataba'i University students and their relationship with the students' health literacy level in facing the corona disease, which was analyzed through independent t-test, analysis of variance, are shown in Table 2.

Table 2. Demographic-social characteristics of students

The level of health literacy					
Individual characteristics		Frequency	Percent	Mean ± SD	Test result
Gender*	Female	232	80.6	29.62 ± 7.59	t = 0.085
	Man	56	19.4	29.73 ± 9.91	P = 0.932
Age (years)**	18-23	156	54.2	29.31 ± 7.64	F=0.215 P=0.930
	24-29	80	27.8	30.26 ± 8.85	
	35-30	25	8.7	29.28 ± 8.45	
	41-36	17	5.9	30.11 ± 7.54	
	<42	10	3.5	30.10 ± 9.35	
Marital status*	Single	227	78.8	29.66 ± 8.17	t = 0.046
	married	61	21.2	29.60 ± 7.76	P=0.963

Level of Education**	BA	159	55.2	29.27 ± 7.67	F=0.946 P=0.390
	MA	113	39.2	29.82 ± 8.46	
	P.H.D	16	5.6	32.12 ± 9.24	

The findings show that in terms of gender, 232 people (80.6 percent) are female, in terms of age, 156 people (54.2 percent) are less than 23 years old, and in terms of marital status, 227 people (78.8 percent) were single and in terms of education level, 159 people (55.2 percent) were bachelors. No significant relationship was observed between the demographic variables of gender, age, marital status, and education level with the variables of students' health literacy level in the face of corona disease (P>0.05).

- The students' information about the corona in terms of the health literacy level, which was analyzed through the independent t-test, and analysis of variance test, is shown in Table 3:

Table 3. The students' information about the corona

The level of health literacy					
Corona disease information		Frequency	Percent	Mean ± SD	Test result
Infected with corona*	Yes	17	5.9	32.01 ± 11.25	t = 1.238 P=0.217
	No	271	94.1	29.50 ± 7.84	
family members infected with corona*	Yes	47	16.3	29.65 ± 8.80	t = 0.010 P = 0.992
	No	241	83.7	29.64 ± 7.95	
Involving friends and acquaintances to treat family members*	Yes	41	14.2	31.17 ± 8.41	t = 1.304 P = 0.193
	No	247	58.8	29.39 ± 8.01	

The findings show that 17 people (5.9 percent) were infected with coronavirus, 47 people (16.3 percent) from the students' family members were infected, and only 41 people (14.2 percent) had accompanied friends and acquaintances in the treatment of family members. No significant relationship was observed between the variables of students' information about the corona disease and the variables of the students' health literacy level in the face of the corona disease (P>0.05).

Question 2- What is the level of health literacy of students in terms of capacity and ability to access information in the face of the corona crisis?

The students' health literacy level was examined in terms of the capacity and ability to access information in the face of the corona disease, and the results are shown in Table 4:

Table 4. Students' health literacy level in terms of access to information

Component	Questions	Very few (%) number	Few (%) number	Quite (%) number	Much (%) number	very much (%) number	Standard deviation ± mean
Access	1. I can get my health and treatment information from different sources.	13(4.5)	26(9)	110(38.2)	95(33)	44(15.3)	3.45 ± 1.01
	2. I can get information about healthy eating to prevent the disease of Covid-19.	9(3.1)	26(9)	114(39.6)	96(33.3)	43(14.9)	3.47 ± 0.95
	3. I can obtain information related to mental health such as depression and stress during quarantine and when suffering from Covid-19.	20(6.9)	30(10.4)	113(39.2)	84(29.2)	41(14.2)	3.33 ± 1.06
	4. I can get information about Covid-19.	16(5.6)	38(13.2)	110(38.2)	81(28.1)	43(14.9)	3.33 ± 1.05

	5. I can obtain the required information regarding some health problems and diseases such as high blood pressure and high blood sugar and lipids and their relationship to the person's infection with Covid-19.	14(4.9)	46(16)	114(39.6)	80(27.8)	34(11.8)	3.25 ± 1.02
	6. I can get information about the harms and risks of smoking in contracting Covid-19.	18(6.2)	41(14.2)	108(37.5)	78(27.1)	43(14.9)	3.30 ± 1.08

The level of health literacy of students in the face of the corona disease is shown separately for each question in Table 4. According to the students, the results show that students gave the highest point to the question "I can obtain information about healthy eating in the prevention of Covid-19." The lowest score and ratio are for questions "I can get information about mental health such as depression and stress during quarantine and when suffering from Covid-19" and "I can get information about the Covid-19".

Question 3. What is the level of health literacy of students in terms of understanding information in the face of the Corona crisis?

The students' health literacy level of the reading and understanding the information in the face of the corona disease was checked and the results are shown in Table 5:

Table 5. Level of students' health literacy in terms of reading and comprehension

	Questions	Very few (%) number	Few (%) number	Quite (%) number	Much (%) number	very much (%) number	Standard deviation ± mean
Reading	1. It is easy for me to read educational materials regarding the health and health of Covid-19 (booklets, pamphlets, educational and promotional brochures).	20(6.9)	31(10.8)	92(31.9)	96(33.3)	49(17)	3.42 ± 1.10
	2. It is easy for me to read specific written instructions given to me by doctors, dentists, and health workers about covid-19	20(6.9)	34(11.8)	86(29.9)	95(33)	53(18.4)	3.44 ± 1.12
	3. It is easy for me to read medical and dental forms (such as admission forms, consent forms, file filing, etc. in hospitals and medical centers).	25(8.7)	45(15.6)	90(31.2)	81(28.1)	47(16.3)	3.27 ± 1.16
	4. It is easy for me to read the instructions and preparation sheet before the test, ultrasound, or radiology	28(9.7)	45(15.6)	87(30.2)	81(28.1)	47(16.3)	3.25 ± 1.19
Comprehension	5. I understand the recommendations related to healthy eating during the outbreak of Covid-19.	7(2.4)	20(6.9)	81(28.1)	107(37.2)	73(25.3)	3.76 ± 0.98
	6. I understand the explanations given by the doctor regarding Covid-19 at the time of infection.	15(5.2)	24(8.3)	80(27.8)	93(32.3)	76(26.4)	3.66 ± 1.11

	7. I understand the meaning and concept of the contents written in medical and dental forms (such as admission forms, consent forms, file filing, etc. in hospitals and medical centers).	11(3.8)	22(7.6)	86(29.9)	91(31.6)	78(27.1)	3.70 ± 1.06
	8. I understand the meaning and intent of the signs and contents written on the signboards in hospitals, clinics, and health centers regarding Covid-19.	7(2.4)	25(8.7)	85(29.5)	91(31.6)	80(27.8)	3.73 ± 1.03
	9. I understand how to take the medicine that is written on the package of the medicine prescribed for Covid-19.	147(51)	11(3.8)	57(19.8)	43(14.9)	16(5.6)	2.32 ± 1.49
	10. I understand the advantages and disadvantages of the current treatment methods prescribed by the doctor for Covid-19.	161(55.9)	11(3.8)	57(19.8)	43(14.9)	16(5.6)	2.10 ± 1.36

The students' health literacy level in the face of the corona disease is shown in table 5 separately for each question. According to the students, the results show that the question "I understand the meaning and meaning of the signs and contents written on the signboards in hospitals, clinics, and health centers regarding Covid-19." has the highest score. The question "I understand the advantages and disadvantages of the current treatment methods prescribed for the disease of Covid-19 by the doctor." has the lowest score.

Question 4. What is the level of health literacy of students in terms of processing and assessing information in the face of the corona crisis?

The students' health literacy level regarding the processing and evaluation of information in the face of the corona disease was examined, and the results are shown in Table 6:

Table 6. Level of students' health literacy from information processing and evaluation

Component	Questions	Very few (%) number	Few (%) number	Quite (%) number	Much (%) number	very much (%) number	Standard deviation ± mean
Assessment	1. I can evaluate the correctness of the information provided related to Covid-19 on the Internet.	20(6.9)	29(10.1)	112(38.9)	81(28.1)	46(16)	3.36 ± 1.08
	2. I can evaluate the correctness of the information provided by the national radio and television about Covid-19.	23(8)	34(11.8)	96(33.3)	80(27.8)	55(19.1)	3.38 ± 1.15
	3. I can evaluate the correctness of the information provided by the international radio and television about Covid-19.	15(5.2)	33(11.5)	106(36.8)	85(29.5)	49(17)	3.41 ± 1.06
	4. I can evaluate the correctness of the information provided about Covid-19 by virtual media.	16(5.6)	39(13.5)	99(34.4)	85(29.5)	49(17)	3.38 ± 1.08

	5. I can evaluate the correctness of the health advice given to me by friends and relatives regarding Covid-19.	11(3.8)	37(12.8)	102 (35.4)	88(30.6)	50(17.4)	3.44 ± 1.04
	6. I can pass on the health information I have learned about ways to prevent covid-19 to others.	6(2.1)	22(7.6	84(29.2)	98(34)	78(27.1)	3.76 ± 1.01
	7. I can pass on the health information that I have learned about the ways of the spread of covid-19 to others.	5(1.7)	18(6.2)	81(28.1)	96(33.3)	88(30.6)	3.84 ± 0.98
	8. I know the symptoms of covid-19 and can diagnose them.	4(1.4)	24(8.3)	90(31.2)	102(35.4)	68(23.6)	3.71 ± 0.96

The students' health literacy level in the face of covid-19 is shown in table 6 separately for each question. According to the students, the results show that, the question "I can transfer the health information that I have learned about the ways of the spread of covid-19 to others." has the highest score and ratio. The question "I can evaluate the correctness of the information provided related to Covid-19 on the Internet." has the lowest score.

Question 5. What is the level of health literacy of students in terms of decision-making and behavior regarding information in the face of the corona crisis?

The students' health literacy level was examined in terms of decision-making and behavior regarding information in the face of covid-19, and the results are shown in Table 7.

Table 7. The level of students' health literacy in terms of decision-making and behavior regarding information

Component	Questions	Very few (%) number	Few (%) number	Quite (%) number	Much (%) number	very much (%) number	Standard deviation ± mean
decision-making and behavior	1. By seeing the symptoms of covid-19, I know which treatment center to go to and how to register on the health website of the Ministry of Health.	17(5.6)	39(13.5)	85(29.5)	81(28.1)	66(22.9)	3.48 ± 1.15
	2. I follow my doctor's recommendations regarding 2-week quarantine at home and social distancing from family members.	4(1.4)	13(4.5)	52(18.1)	83(28.8)	136(47.2)	4.15 ± 0.96
	3. I follow the recommendations of the Ministry of Health and Medical Education regarding the unnecessary movement in the city and staying at home.	6(2.1)	9(3.1)	61(21.2)	90(31.2)	122(42.4)	4.08 ± 0.97
	4. I will not stop taking the medicines prescribed by the doctor for my illness without his permission,	162(56.2)	11(3.8)	32(11.1)	42(14.6)	41(14.2)	2.26 ± 1.57

	even if the symptoms of the illness have disappeared.						
	5. If a person or people from my first-degree relatives have been infected by Covid-19, I will go to the doctor for an examination and check-up.	16(5.6)	23(8)	70 (24.3)	91(31.6)	88(30.6)	3.73 ± 1.14
	6. If a person or people from my first-degree relatives are infected with Covid-19, even if I have no symptoms, I will quarantine myself at home for 2 weeks.	11(3.8)	22(7.6)	67(23.3)	85(29.5)	103(35.8)	3.85 ± 1.10
	7. I take care of my health at work.	1(0.3)	11(3.8)	49(17)	107(37.2)	120(41.7)	4.15 ± 0.86
	8. If I have any questions regarding the disease of Covid-19, I will refer to reliable national social media sites and media, including the Ministry of Health and Medical Education.	7(2.4)	18(6.2)	61(21.2)	99(34.4)	103(35.8)	3.94 ± 1.01
	9. If I have a question about Covid-19, I refer to the sites and social media of the world, including the World Health Organization.	7(2.4)	19(6.6)	70(34.3)	92(31.9)	100(34.7)	3.89 ± 1.03

	10. I avoid doing things or consuming substances that are effective in infecting Covid-19.	6(2.1)	17(5.9)	92(31.9)	102(35.4)	103(35.8)	3.92 ± 1.01
	11. When buying food, in addition to paying attention to nutritional value, I also consider health points.	2(0.7)	14(4.9)	46(16)	96(33.3)	130(45.1)	4.17 ± 0.91

The students' health literacy level in the face of the corona disease is shown in table 7 separately for each question. According to the students, the results show that the question "When buying food, in addition to paying attention to the nutritional value, I also consider health points." has the highest score. The question "I do not stop taking the medicines prescribed by the doctor for my disease without his permission, even if the symptoms of the disease have disappeared." has the lowest score.

The results of the Pearson correlation test showed that there is a positive and significant relationship between the students' health literacy level in the face of corona disease ($P<0.001$, $r=0.449$).

Hypothesis- The students' health literacy level is effective in facing corona disease.

One-sample t-test was used to determine the response status of students to the level of health literacy and its components in facing the corona disease. Using this test, the status of each component is determined relative to the average level. The average of each of these indicators in the face of the corona disease according to the students' viewpoints is shown in Table 7:

Table 8. Single sample t-test to compare the average of a population

Variable	**mean difference**	**t**	**Degrees of freedom**	**Significance level**	**95% confidence interval**	
					upper limit	lower limit
access	0.3605	7.089	287	<0.001	0.4606	0.2604
Read	0.3506	6.093	287	<0.001	0.4640	0.2374
understanding	0.2164	4.941	287	<0.001	0.3027	0.1302
Assessment	0.5403	10.784	287	<0.001	0.6390	0.4417
Decision making and	0.7910	20.149	287	<0.001	0.8683	0.7138

behavior						
health literacy (general)	0.4518	11.917	287	<0.001	0.5264	0.3772

The results of Table 8 showed that, based on the students' viewpoints, the variable of health literacy and its components in facing the corona disease was higher than the average level.

Based on the one-sample t-test, this difference from the average was significant at the 95% level. Since the lower and upper limits for the variable of health literacy and its components are positive, it means that this variable and its components are greater than the number 3, so the null hypothesis is rejected. In other words, it can be said that from the perspective of students, the variable of health literacy and the components of individual status, access, reading, comprehension, assessment and decision-making, and students' behavior are effective in facing the corona disease. In the following, in order to examine the level of health literacy and its components in the face of corona disease, the questions have been discussed separately.

Table 9. One-sample t-test to compare the average of a population in health literacy questionnaire questions

Component	Questions	**mean difference**	**t**	**Degrees of freedom**	**Significance level**	**95% confidence interval**	
						upper limit	lower limit
access	1. I can get my health and treatment information from different sources.	0.454	7.687	287	<0.001	0.571	0.338
	2. I can get information about healthy eating to prevent the disease of Covid-19.	0.479	8.481	287	<0.001	0.590	0.368
	3. I can obtain information related to mental health such as depression and stress during quarantine and	0.333	5.308	287	<0.001	0.456	0.209

	when suffering from Covid-19.						
	4. I can get information about Covid-19.	0.336	5.393	287	<0.001	0.459	0.213
	5. I can obtain the required information regarding some health problems and diseases such as high blood pressure and high blood sugar and lipids and their relationship to the person's infection with Covid-19.	0.256	4.272	287	<0.001	0.375	0.138
	6. I can get information about the harms and risks of smoking in contracting Covid-19.	0.302	4.733	287	<0.001	0.427	0.176
Reading	7. It is easy for me to read educational materials regarding the health and health of Covid-19 (booklets, pamphlets, educational and promotional brochures).	0.427	6.559	287	<0.001	0.555	0.298
	8. It is easy for me to read specific written instructions given to me by doctors, dentists, and health workers about covid-19	0.440	6.636	287	<0.001	0.571	0.310
	9. It is easy for	0.277	4.035	287	<0.001	0.413	0.142

	me to read medical and dental forms (such as admission forms, consent forms, file filing, etc. in hospitals and medical centers).						
	10. It is easy for me to read the instructions and preparation sheet before the test, ultrasound, or radiology	0.256	3.662	287	<0.001	0.395	0.118
Understanding and comprehension	11. I understand the recommendations related to healthy eating during the outbreak of Covid-19.	0.760	13.054	287	<0.001	0.875	0.645
	12. I understand the explanations given by the doctor regarding Covid-19 at the time of infection.	0.663	10.129	287	<0.001	0.792	0.534
	13. I understand the meaning and concept of the contents written in medical and dental forms (such as admission forms, consent forms, file filing, etc. in hospitals and medical centers).	0.704	11.225	287	<0.001	0.828	0.581
	14. I	0.736	12.06	287	<0.001	0.856	0.616

	understand the meaning and intent of the signs and contents written on the signboards in hospitals, clinics, and health centers regarding Covid-19.		0				
	15. I understand how to take the medicine that is written on the package of the medicine prescribed for Covid-19.	-0.670	-7.606	287	<0.001	-0.496	0.843-
	16. I understand the advantages and disadvantages of the current treatment methods prescribed by the doctor for Covid-19.	-0.895	-11.178	287	<0.001	-0.738	1/053
Assessment	17. I can evaluate the correctness of the information provided related to Covid-19 on the Internet.	0.361	5.660	287	<0.001	0.486	0.235
	18. I can evaluate the correctness of the information provided by the national radio and television about Covid-19.	0.381	5.604	287	<0.001	0.516	0.247
	19. I can evaluate the correctness of the information	0.416	6.655	287	<0.001	0.539	0.293

	provided by the international radio and television about Covid-19.						
	20. I can evaluate the correctness of the information provided about Covid-19 by virtual media.	0.388	6.060	287	<0.001	0.515	0.262
	21. I can evaluate the correctness of the health advice given to me by friends and relatives regarding Covid-19.	0.447	7.300	287	<0.001	0.568	0.327
	22. I can pass on the health information I have learned about ways to prevent covid-19 to others.	0.763	12.942	287	<0.001	0.880	0.647
	23. I can pass on the health information that I have learned about the ways of the spread of covid-19 to others.	0.847	14.575	287	<0.001	0.961	0.732
	24. I know the symptoms of covid-19 and can diagnose them.	0.715	12.593	287	<0.001	0.827	0.603
Decision making and behavior	25. By seeing the symptoms of covid-19, I know which treatment center to go to and how to register on the health website	0.486	7.132	287	<0.001	0.620	0.352

	of the Ministry of Health.						
	26. I follow my doctor's recommendations regarding 2-week quarantine at home and social distancing from family members.	159/1	20.342	287	<0.001	271/1	047/1
	27. I follow the recommendations of the Ministry of Health and Medical Education regarding the unnecessary movement in the city and staying at home.	088/1	18.986	287	<0.001	199/1	0.974
	28. I will not stop taking the medicines prescribed by the doctor for my illness without his permission, even if the symptoms of the illness have disappeared.	0.732	-7.903	287	<0.001	-0.550	-0.915
	29. If a person or people from my first-degree relatives have been infected by Covid-19, I will go to the doctor for an examination and check-up.	0.736	10.944	287	<0.001	0.868	0.603
	30. If a person or people from my first-degree	0.857	13.158	287	<0.001	0.985	0.729

	relatives are infected with Covid-19, even if I have no symptoms, I will quarantine myself at home for 2 weeks.						
	31. I take care of my health at work.	159/1	22.757	287	<0.001	260/1	059/1
	32. If I have any questions regarding the disease of Covid-19, I will refer to reliable national social media sites and media, including the Ministry of Health and Medical Education.	0.947	15.781	287	<0.001	066/1	0.829
	33. If I have a question about Covid-19, I refer to the sites and social media of the world, including the World Health Organization.	0.899	14.778	287	<0.001	1/019	0.779
	24. I avoid doing things or consuming substances that are effective in infecting Covid-19.	0.927	15.559	287	<0.001	044/1	0.809
	35. When buying food, in addition to paying attention to nutritional value, I also consider health points.	1.173	21.720	287	<0.001	280/1	067/1

The results of Table 9 showed that, based on the students' views on the health literacy questionnaire, all questions except questions 15, 16, and 28 were above the average level. Based on the one-sample t-test, this difference from the average is significant at the 95% level. Since the lower and upper limits for all questions except questions 15, 16, and 28 are positive, it means that these questions are greater than 3, so the null hypothesis is rejected. In other words, it can be said from the students' viewpoints, that all the questions of the health literacy questionnaire have been effective in facing the corona disease, apart from the way of taking medicine from the packaging of medicines, the advantages, and disadvantages of current treatment methods, and not stopping the medicine arbitrarily

Discussion and conclusion

In relation to examining the health literacy level of students, the moderating role of demographic variables such as gender, age, marital status, education level, and corona infection in students has been studied. According to the obtained results, the level of health literacy among male students was significant (β=0.362), and moderated the relationship in a positive and direct way. Therefore, it can be said that increasing the level of health literacy among male students causes an increase in searching and retrieving information on the Internet in the face of the corona disease. But the results showed that this relationship had no significant effect on female students. In the study of Safari et al. (2021), who studied the factors related to information retrieval in the field of prevention and control of Covad-19, it was found that the factor of gender (being male) has a significant relationship with more use of social media. In the study by Dadaczynski et al. (2021), they investigated the digital information literacy and web-based information search of university students in Germany during the Covid-19 pandemic. It was also found that male students have a greater tendency to use social media compared to female students; the results of these studies are consistent with the results obtained in the present study.

The level of health literacy of students in the face of corona disease was significant in students who were not infected by corona(β=0.216) and moderated the relationship in a positive and direct way. Therefore, it can be said that increasing the health literacy of students who are not infected with Corona causes an increase in searching and retrieving appropriate information from suitable databases in the face of Corona disease. But the results showed that this relationship did not have a significant effect on students suffering from the corona.

Based on the obtained results, the level of health literacy among students in terms of obtaining information (access) was effective in facing the Corona crisis. The results are consistent with Dadakzisenki and et al. (2021) and Li and et al. (2020) who mentioned the component of access to health information and increasing health literacy.

Based on the obtained results, the level of health literacy among students in terms of reading and comprehension is effective in facing the Corona crisis. In this regard, the research results of Hayaokan and et al. (2020), and McCaffery

and et al. (2020) indicated a positive and significant relationship between the component of reading, understanding, and increasing health literacy, which confirms our research result.
Based on the obtained results, the level of health literacy among students was effective in terms of evaluation in facing the corona crisis. In this regard, in the study by Okan and et al. (2020) and Riiser and et al. (2020), it was found that there is a significant relationship between users' use of social media and virtual space with the evaluation component; with the increase in the use of these media, the ability to evaluate people's information and their health literacy increases, and it is in line with the current research. Furthermore, in the study by Dadakzisenki and et al. (2021), it was found that almost half of the students had problems in evaluating online health information, which is not in line with the results obtained in the present study.

Based on the results, the level of health literacy among students was effective in terms of decision-making in the face of the Corona crisis. In this regard, in the study of Do and et al. (2020) and Bagheri Shikhangfesheh and et al. (2019), health literacy and media literacy predict a significant amount of the variance of the fear of covid-19. It was found that there is a significant relationship between media literacy and health literacy with the decision-making component; with the increase in health literacy, the level of ability to make decisions about the health information in people increases and it is in line with the results of the present study.

During the Covid-19 outbreak, the dissemination of incomplete, incorrect, and even counter-information and rumors through social media, not only did not help to inform the people, but also caused them to be misled and misinterpreted, resulting in injuries and It caused irreparable damage to the people. Also, if the students achieve the ability to identify and understand the information in order to evaluate and apply it in their daily life, they can better and more accurately retrieve and obtain medical and health information and improves their health literacy. It is necessary to improve students' information literacy to navigate effective information, identify false and fake information, and make decisions based on reliable information. As the coronavirus has placed an unprecedented burden on the health care system and service providers, addressing these research topics and evaluating them in different groups of society is necessary as an effort to promote health and preventive activities in the face of infectious diseases. The provision of accurate information and the use of this information as a public health intervention should be considered in the context of emergency and non-emergency responses in the future to help expand the understanding of how people seek and use information in their daily lives.

Therefore, it is suggested to design and hold educational courses about health literacy for students in the effective and appropriate use of the Internet and social media in raising a better understanding and comprehension of appropriate information in the field of health issues, dealing with infectious diseases, and how to deal with diseases during the pandemic. Also, we should continuously measure the level of health literacy of different groups of society, including students, determine their health needs and suggest it in the macro plans of health officials and policymakers.

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