

The Association between COVID-19 Media Literacy and the Fear of COVID-19 among Students During Coronavirus Pandemic: A Cross-Sectional Study

Majid Barati

Associate Professor of Health Education and Promotion, Department of Public Health, School of Health and Autism Spectrum Disorders Research Center, Hamadan University of Medical Sciences, Hamadan, IR Iran.

Saeed Bashirian

Professor of Health Education and Promotion, Department of Public Health, School of Health and Autism Spectrum Disorders Research Center, Hamadan University of Medical Sciences, Hamadan, IR Iran.

Hanieh Jormand

* Ph.D. of Health Education and Promotion, Autism Spectrum Disorders Research Center, Hamadan University of Medical Sciences, Hamadan, IR Iran. (Corresponding author): jormand69h@gmail.com

Salman Khazaei

Department of Epidemiology, School of Health and Research Center for Health Sciences, Hamadan University of Medical Sciences, Hamadan, IR Iran.

Ensiyeh Jenabi

Assistant Professor of Mother and Child Health, Autism Spectrum Disorders Research Center, Hamadan University of Medical Sciences, Hamadan, Iran.

Sepideh Zareian

Vice-Chancellor for Research and Technology, Hamadan University of Medical Sciences, Hamadan, Iran

Received: 29 October 2021

Accepted: 13 March 2022

Doi: 10.22038/jhl.2022.61047.1228

ABSTRACT

Background and Objectives: The prevalence of the Covid-19 epidemic in Iran is associated with many psychological and social effects. This study aimed to examine the association between COVID-19 media literacy and the fear of COVID-19 among students during the coronavirus crisis.

Materials and Methods: This cross-sectional was conducted on 300 students of Hamadan Universities which were selected with a multistage sampling method. To collect the data, the COVID-19 media literacy scale (C-19MLS) and the fear of COVID-19 scale (FCV-19S) were used. Data were obtained using the SPSS software Version 23 and descriptive statistics, T-test, ANOVA, Chi-square, Pearson Correlation test, and regression analysis test were used.

Results: As the study results, the mean score of the Fear of COVID-19 was 11.88 ± 4.34 ; also, the mean score of COVID-19 media literacy was 71.64 ± 11.36 , respectively. The Fear of COVID-19 had a negative and significant correlation with the dimensions and total COVID-19 media literacy ($P < 0.001$). Based on the simple linear regression analysis results, COVID-19 media literacy ($\beta = -0.23$) and usage of social media apps ($\beta = 0.58$) were identified as predictors of the fear of COVID-19.

Conclusion: The findings of this study showed that the COVID-19 media literacy was inadequate in participants. Also, COVID-19 media literacy was related to the Fear of COVID-19. Therefore, designing and implementing educational interventions to empower students in the field of media literacy related to COVID-19 and media consumption regime seems to be necessary to help reduce anxiety and stress and increase the immune system against COVID-19.

Paper Type: Research Article

Keywords: Health Literacy; anxiety disorder; Media Literacy; Youth

► **Citation:** Barati M, Bashirian S, Jormand H, Khazaei S, Jenabi E, Zareian S. The Association between COVID-19 Media Literacy and the Fear of COVID-19 among Students During Coronavirus Pandemic: A Cross-Sectional Study. *Journal of Health Literacy*. Summer 2022; 7(2): 46-58.

Introduction

The Covid-19 pandemic has alarming implications for mental health and emotional and social functioning (1). A finding of the study shows that adverse mental health effects especially in pre-existing mental health disorders and increased the risk of mental health problems during the unpredictability of the COVID-19 pandemic (2, 3).

The number of cyberspace users will reach about 70% of the world's population by 2020, and this is even higher than the total number of people in the world who have access to safe drinking water (4). Iranians' access to the Internet is also increasing, as is the world; As 70% of Iran's population has access to the Internet (4). Media literacy, meanwhile, refers to the ability of individuals to consume a media product, and the goal of it is to enable individuals to control media consumption and be conscious about media exposure (5, 6). Media literacy skills for critical analysis of media messages are the most essential requirements which can prevent problematic events (7). Also, the results of meta-analysis studies indicated the effectiveness of media literacy educational interventions on the prevention of high-risk behaviors (8, 9). Also, other results of the study proved a clear picture of media's role and how a medium platform influences the intention of smoking among adolescents(10). These facts highlighted the need for health interventions to promote media literacy. On the other hand, Coronavirus (COVID-19) was a hot topic of global discussion and was declared an international public health concern; This disease with a source of zoonotic release; The commonality between humans and animals spread throughout the world (8); Now many countries are involved in an increased level of public health, contact control, social intelligent and physical distance law and vaccination for

transmission chain interruption to minimize the spread of Covid-19 (11). On the other hand, in this period, media exposure in individuals especially social media apps were increased (12); furthermore, there is alarming Covid-19 fake news in cyberspace that contains incorrect information and is published to mislead the audience (13). Evidence showed that the variety of information disseminated in electronic and social media, caused a significant potential to harm users (14, 15). Besides, it is necessary to mention that despite the insufficient skills of media literacy, in the individuals, especially students as high users of electronic and social media; (7, 16), especially during covid-19 pandemic which are faced with a lot of news and media messages about this disease, the limited study was evaluated media literacy related to COVID-19.

Besides, the evidence demonstrated anxiety caused by COVID-19 is a common symptom during the COVID-19 crisis that weakens the immune system (17, 18). Therefore, to obtain more up-to-date information and investigate the factors related to fear of COVID-19, this study aims to determine the association between COVID-19 media literacy and the fear of COVID-19 among students during the Coronavirus pandemic.

Materials and Method

The present study was a cross-sectional observational study based on the formula for calculating the sample size in previous studies (with a standard deviation of 44%). Considering the 95% confidence level, 80% test power, and 0.05 accuracy and considering a 10% probability of non-response, this study was conducted among 300 students in 2020 (7).

It is worth mentioning that the data collection tools consisted of three parts: the first part

included demographic information such as age, sex, job, residence status, usage of social media apps status and the second part included the COVID-19 media literacy (C-19MLS) questionnaire (19) and the third part included the fear of COVID-19 Scale (20).

The sampling method in this study was a multi-stage sampling, (stratified-cluster-simple random sampling) process, so that after coordination with the officials of the universities of Hamadan and receiving the number of students in each faculty by gender of students through the proportional

assignment of samples from faculties (i.e. to faculties With more students, more samples were allocated) research units were rationed and in the next step the samples were collected randomly. (Figure 1) Then, in coordination with the officials of the universities and colleges and obtaining their consent, they referred to the students and if they wished to be interviewed, they obtained informed written consent from them and gained trust and assurance in the field of confidentiality of information.

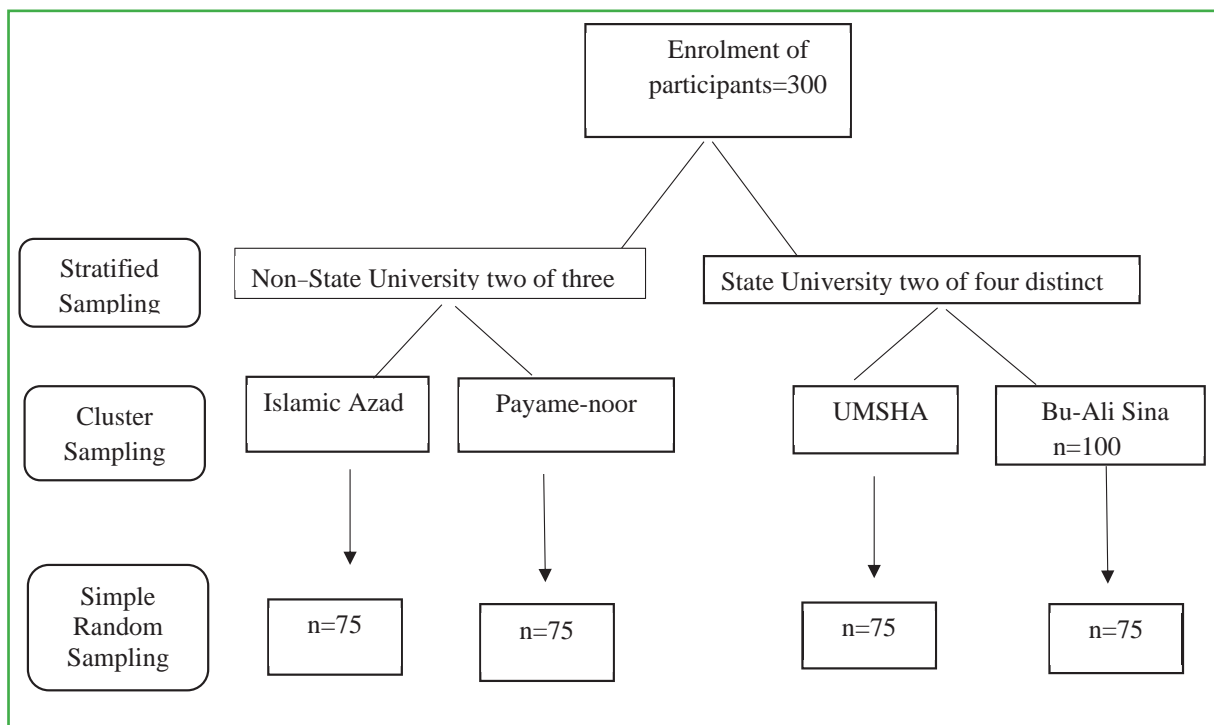


Figure 1: Flow chart of the multi-stage sampling method used to select students participants in Hamadan, Iran

The data collection method was the self-reporting method from Hamadan universities. Hamadan City is located in the west of Iran. It has 4 state universities, including Bu-Ali Sina University, Hamadan University of Medical Sciences (UMSHA), Hamadan University of Applied Sciences & Technology, and the Hamadan University of Technology. Moreover, it has some nongovernmental universities such as Islamic Azad

University Hamadan Branch and Hamadan Payam Noor University (21). Data collection were done in four university in Hamadan which the samples were collected randomly from two of four state university and two of three non-state university of Hamadan. In present study included 17 non-response data (Figure 1). Inclusion criteria in this study are being at least 18 years old, studying in the universities of Hamadan and willingness

to participate in the study (completing written consent, interview, completing a questionnaire) and, accessibility to internet ; also, exclusion criteria including lack of hearing and vision health and the mental and perceptual disorder was a reluctance to cooperate.

COVID-19 media literacy Scale

Based on previous experience, we developed a scale survey process by typical procedures. This measurement instrument's framework was defined in terms of the Media Literacy Training Center of the American CML (22). The items of C-19MLS were then extracted utilizing the findings of a qualitative study in this regard such as the interviews with students in the groups and subgroups. The predictor or independent variables included 5 factors of (a): Objective, (b) Contractedness, (c) audience, (d), Format, and (e): Filter and omit. C-19MLS was the essential dependent variable in the current assessment (19). According to the factor analysis, the GOF (goodness-of-fit) indices, the studied model had an appropriate fitting to the data ($\chi^2/df = 2.706 < 3$, $RMSEA = 0.093 \leq 0.1$; $CFI = 0.893 \geq 0.9$; $TLI = 0.874 \geq 0.9$; $GFI = 0.816 \geq 0.9$; and $SRMR = 0.06 \leq 0.08$). Also, the mean scores of CVI and CVR were 0.94 and 0.77, respectively. The reliability of this tool was obtained using Cronbach's alpha method $\alpha = 0.86$. So, the COVID-19 Media Literacy Scale (C-19MLS) consists of 21 questions (Supplementary File 1) which have dimensions and items including:

Contractedness of credible Covid-19 media messages with 3 questions, which has a Likert scale of 5 completely disagree to strongly agree (score 5), the score range of this item is between 3 to 15 points.

Contractedness of fake media Covid-19 messages creator item 3 questions, which has a Likert scale of 5 completely disagree to strongly

agree (score 5), the range of scores of this item is between 3 to 15 points.

Fake media Covid-19 messages audience item that has 3 questions, which has a Likert scale of 5 completely disagree to strongly agree (score 5), the range of scores of this item is between 3 to 15 points.

The format and technique of 6 questions, which has a Likert scale of 5 completely disagree to strongly agree (score 5), the range of scores of this item is between 6 and 30 points.

Lifestyles are represented in Covid-19 fake media messages with 6 questions which has a Likert scale of (score 1) completely disagree to strongly agree (score 5), the range of scores of this item is between 6 to 30 points.

Eventually, a total score is calculated by adding up each item score (ranging from 21 to 105). The higher score indicating good COVID-19 media literacy (19) (Supplementary File 2).

Notably, according to the qualitative analysis of exploring the experience of people's Covid-19 media literacy, the last 21 items recognized that the scale was accomplished by the C-19MLS measurement (19). Base this results , contractedness of credible media coronavirus messages dimension means "Who product credible Covid-19 media messages?" contractedness of fake media coronavirus messages dimension means "Who creates fake Covid-19 media messages?" fake media coronavirus messages audience dimension means "Who may deal with fake Covid-19 media messages?" format dimension means "What creative techniques are used to attract individual's attention?" represented lifestyle dimension means that media have embedded value and point of view; "What lifestyle, value and point of view are presented in or omit from this message?"

Based on the European health literacy survey (23), and a previous study(6) in health-oriented

media literacy category rank and level of COVID-19 media literacy in such a way that 0 to 50 COVID-19 media literacy is Inadequate, 50.01 to 66 COVID-19 media literacy is somewhat inadequate, 66.01 to 84 COVID-19 media literacy is sufficient and 84.01 to 100 is excellent COVID-19 media literacy was considered.

To measure the fear of COVID-19, we use the Fear of COVID-19 Scale (FCV-19S) (20, 24). The Persian-version FCV-19S has a high internal consistency and good validity and it can be used as a scientific and valid tool for measuring the fear of COVID-19 with a five-item Likert type scale "strongly disagree," to "strongly agree". The minimum score possible for each question is 1, and the maximum is 5. A total score is calculated by adding up each item score

(ranging from 7 to 35). The higher the score, the greater the fear of coronavirus (20).

Results

According to the findings, the mean age of participants was 26.04 ± 6.9 years with the age range of study participants was between 18 and 47 years and, 68.7% women and 62% at the B.S level and 57.3% of the study participants lived in dormitories. 90.3% of the participants in the study were moderate users and 9.7% of them were heavy users of social networks. As a result, the mean COVID-19 media literacy score was 71.64 ± 11.36 and about 25% of students had an adequate and high level of COVID-19 media literacy. (Table 1).

Table1. COVID-19 Media Literacy category levels

Categories of the C-19MLS Minimum		The C-19MLS scores		Frequency	Percentage (%)
		Maximum			
Inadequate	Limited	0	50	67	22.3
Somewhat inadequate		50.01	66	158	52.7
Sufficient	Adequate	66.01	84	71	23.7
Excellent		84	100	4	1.3
Total		-	-	300	100

The technique and format dimension had the best situation among other dimensions with 66% and the fake media coronavirus messages audience had the worst situation with 51.42% of the average of the maximum achievable score of the total COVID-19 media literacy. (Table 2). It is necessary to explain that this percentage is a kind of correct judgment and the mean alone cannot be judged and how to calculate it as: The ratio of the difference between the mean of the minimum score on the range of scores is expressed as a percentage.

Also, according to the findings, there is a significant relationship between COVID-19 media literacy and the variables of age ($p < 0.001$), marital status ($p < 0.001$), job ($p < 0.001$), and usage of social media apps ($p < 0.001$). Also, the results of the post hoc test indicate that students over the age of 30 who are married, employed, and low users of social media apps have higher COVID-19 media literacy.

Furthermore, based on the findings, the mean score of Fear of COVID-19 was 11.88 ± 4.34 and, there is a significant relationship between

Table 2. Mean, SD, range of scores, and percentage of the mean from the maximum obtainable score for dimensions of COVID-19 Media Literacy

COVID-19 Media Literacy dimensions	Mean	SD	Range	Percentage (%)
Contractedness of credible Covid-19 media messages	10.46	2.37	3-15	62.17
contractedness of fake media coronavirus Messages	9.73	1.99	3-15	56.08
Fake media Coronavirus Messages audience	9.17	2.29	3-15	51.42
Format	21.84	4.19	6-30	66
lifestyles are represented in fake media coronavirus Messages	20.44	4.26	6-30	60.17
Total COVID-19 Media Literacy	71.64	11.36	21--108	58.21

Fear of COVID-19 and age ($P < 0.001$), gender ($P = 0.03$), marital status (0.04), and usage of social network apps status ($P < 0.001$). In other words, the fear of COVID-19 was higher among

female students. Also, students over the age of 30 experienced, divorce students and high user of social network apps more than the fear of COVID-19 (Table 3).

Table 3. Association between COVID-19 Media Literacy and Fear of COVID-19 with demographic variables in study participants

variables	COVID-19 Media Literacy	The significance level	Fear of COVID-19	The significance level
	Mean (SD)		Mean (SD)	
Age				
<20	68.36 (8.52)	F=35.60 $p < 0.001^{**}$	11.39 (3.14)	F=4.80 $p < 0.001^{**}$
21-25	67.63 (9.82)		11.89 (4.67)	
26-30	68.38 (7.33)		10.96 (2.88)	
>30	80.76 (10.93)		25.0 (14.14)	
Sex				
Men	71.83 (8.52)	t=0.199 $p=0.84$	11.15 (3.89)	t=-1.98 $P=0.048^*$
Woman	71.55 (10.87)		12.21 (4.49)	
Marital Status				
Single	67.79 (9.4)	F=45.14 $p < 0.001^{**}$	11.66 (3.78)	F=5.01 $P=0.007^{**}$
Married	79.17 (10.82)		12.48 (5.49)	
Divorced	62.0 (17.35)		19.0 (13.86)	
Job				
Jobless	67.92 (8.87)	t=-7.9 $p < 0.001^{**}$	11.80 (4.12)	t=-0.58 $P=0.57$
Employed	77.72 (12.36)		12.15 (5.03)	
Grade				
Ph.D.	71.62 (10.96)	F=0.796 $P=0.45$	11.53 (4.42)	F=0.39 $P=0.68$
M.S	74.22 (11.56)		12.0 (3.15)	
B.S	71.27 (11.51)		12.02 (4.45)	
Living Condition				
Dormitory	70.37 (10.86)	F=2.10 $P=0.10$	12.13 (4.64)	F=0.53 $p=0.66$
With Parent	73.55 (10.44)		11.58 (3.82)	
Suite Student	70.71 (12.27)		11.06 (3.72)	
Other	74.52(13.11)		11.78 (4.34)	
Usage of social media apps status				
Somewhat	73.07 (9.45)	t=7.23 $p < 0.001^{**}$	10.94 (2.46)	t=-15.4 $p < 0.001^{**}$
Ever	58.24 (1.61)		20.69 (7.32)	

Bold font indicates P-value is significantly different ($p < 0.05$) than Obtained by the independent t-test.

Also, according to the Pearson correlation coefficient test, the fear of COVID-19 had a negative and significant correlation with the

dimensions and total COVID-19 media literacy ($P < 0.001$). In other words, with the increase of fake media COVID-19 messages, the level of Fear of COVID-19 also increased in individuals with poor COVID-19 media literacy and critical thinking skills. (Table 4).

Table 4. Correlation with Fear of COVID-19 and COVID-19 Media Literacy Dimensions

Variables	1	2	3	4	5	6	7
1- Fear of COVID-19	1						
2- contractedness of credible Covid-19 media messages	-0.287**	1					
3- contractedness of fake media coronavirus Messages	-0.277**	**0.418	1				
4- Fake media Coronavirus messages audience	-0.205**	**0.321	**0.362	1			
5- Format	-0.444**	**0.569	**0.506	**0.307	1		
6- lifestyles are represented in fake media coronavirus Messages	-0.357**	0.347**	0.484**	0.375**	0.553**	1	
7- Total COVID-19 Media Literacy	-0.454**	0.686**	0.703**	0.585**	0.845**	**0.811	1

Based on the simple linear regression analysis results, COVID-19 media literacy ($\beta = -0.23$) usage of social network apps status ($\beta = 0.58$) were identified as predictors of the fear of COVID-19 of the students who participated in the study

(Table 5). In other words, with the higher social media apps use, the level of fear of COVID-19 also increased and COVID-19 media literacy skill has a protector role of the fear of COVID-19 in individuals.

Table 5. Linear regression analysis to predict the Fear of COVID-19

Independent Variables	B	S.E.	β	95% CI		P-value
				Lower	Upper	
Covid-19 Media Literacy	-0.088	0.017	-0.23	-0.12	-0.06	0.001
Usage of social media apps status	0.844	0.659	0.58	7.14	9.73	0.001

β : Standardized regression coefficient, S.E.: Standard error, CI: Confidence Interval.

Discussion

This study aimed to determine the relationship between media literacy related to coronavirus disease and Fear of COVID-19 in students of

Hamadan universities. According to the findings, 75% of students had insufficient COVID-19 media literacy. In Solhi et al.'s study, the media

literacy related to self-medication of slimming supplements in female students of Iran University of Medical Sciences was moderate. Also, in the study of the estimation media literacy of Isfahan medical students, their media literacy was above average (25). Also, in the research of Soleiman et al., the level of media literacy in Tehran students was assessed as poor (24). In explaining these inconsistencies, we can point to the differences between the topics and populations studied in different studies, as well as focusing on the current study and access to newer information. Therefore, access to more up-to-date information in the field of media literacy, especially in the field of health and health-oriented issues is recommended.

Besides, according to the findings, the level of fear of COVID-19 in students was low. In line with the present study, in the study of Liu et al., About 85% of health care workers had normal and low fear of COVID-19 (26). In the study of Jani et al., The fear of COVID-19 score in urban health care workers before the educational intervention was high (16). Due to the implementation of monitoring and prevention systems in the field of coronavirus disease and continuous information of the Ministry of Health and medical universities to prevent anxiety in society and also the lack of direct contact of most students with patients can reduce the fear of COVID-19 score (27). Besides, because this pandemic is an emerging issue in the world, so it is necessary to plan educational intervention studies on fear of COVID-19 in medical students to reduce it.

Another finding of the present study; there was a positive and significant correlation between fear of COVID-19 score and the dimensions of COVID-19 media literacy. The Moghanibashi-Mansourieh study found an increase in fear of COVID-19 in people who followed the news

of COVID-19 (28). Also, in line with this result, Vismara et al. Noted the development of cyberchondria (CYB) online medical information syndrome in individuals, which leads to anxiety and psychological consequences (29). In this regard, it should be noted that coronavirus disease as an unknown stressor has intensified anxiety in people and all people to reduce this anxiety seek to increase awareness and knowledge of this unknown fear and seek to increase interest. Virtually the lack of media literacy skills related to the COVID-19 in individuals may increase this fear. On the other hand, creating and improving the COVID-19 media literacy skills in individuals can help reduce fear and vulnerability to this disease. Therefore, designing and implementing the educational and promotional intervention in the field of media literacy related to COVID-19 in all people, especially students, seems to be necessary.

According to the results, there was a significant association between fear of COVID-19 with age and gender. In other words, fear of COVID-19 among female students over the age of 30 experienced more fear of COVID-19. The findings of the Moghanibashi-Mansourie study showed that anxiety due to COVID-19 was higher in women than men, which is consistent with the present study (28). Also, Bruine de Bruin's study noted an increase in the perception of COVID-19 death anxiety in the elderly, and age was one of the risk factors associated with increased COVID-19 fear, which is similar to the findings of the present study(7). Therefore, it is necessary to design and implement the educational and promotional intervention in the field of Fear of COVID-19 in higher age and female students.

According to the findings, there was a significant association between COVID-19 media literacy with age and marital status. Older and married students had higher COVID-19 media

literacy. Consistent with this result, Akbarinejad's research noted the relationship between age and media literacy (17). Besides, Chang et al.'s study noted an increase in parents' search for medical information and an increase in e-health literacy (30) which can be consistent with the findings of the present study. Whereas media literacy related to COVID-19 is health-oriented media literacy; therefore, in married people, due to creating a sense of responsibility towards family and children, who naturally need to receive reliable information, leads to an increase in the search for reliable medical information, which leads to increased media literacy in married individuals. Therefore, it is necessary to design and implement educational and promotional interventions in the field of COVID-19 media literacy in single students.

In the present study, COVID-19 media literacy and usage of social network apps status were identified as predictors of students' fear of COVID-19. However, Santini et al.'s study of renowned high social network usage of apps is strongly tangled with anxiety and depression symptoms in adults (31). Moreover, Nguyen's study illustrious the amplification of Coronavirus risk on social media as civil forces generate a huge public pressure, forcing it to be unusually transparent in responding to public concerns (32). Therefore, it is necessary to design and implement educational and promotional interventions in the field of COVID-19 media literacy skills in students(19).

One of the limitations of this study was applying self-report methods for data gathering, which may not provide generalization information to the other context. Another limitation of this study was some factors such as environmental, family and cultural conditions seem to be related to the dimensions of COVID-19 media literacy which we did not consider in this study. So, for future study is recommended.

Conclusion: Overall, the findings of the present study showed that students' COVID-19 media literacy was related to their level of Fear of COVID-19. Also, the level of media literacy associated with COVID-19 was inadequate in most study participants. Therefore, designing and implementing educational interventions to empower students in the field of media literacy-related COVID-19 and media consumption regime seems to be necessary to help reduce anxiety and stress caused by this disease and increase the immune system against this disease.

Abbreviations:FCV-19S: Fear of COVID-19 Scale; C-19MLS: COVID-19 Media Literacy Scale; CML: the Media Literacy Training Center of the American; GOF: goodness-of-fit

Acknowledgments: This article is the result of a research project approved by the Vice-Chancellor for Technology Research of Hamadan University of Medical Sciences, number 9904102236, and ethics code IR.UMSHA.REC.1399.229. The authors of the article appreciate the financial support of this deputy, the cooperation of the officials of the universities of Hamadan, and the students participating in the study.

Funding: This study was funded by the Hamadan University of Medical Sciences (No, 9904102236) that participated in this study's financial support. This funding source had no role in the analysis and interpretation of data, in the writing of the article, nor in the decision to submit it for publication.

Ethics approval and consent to participate: The word informed consent was obtained from all students; all students were informed about the confidentiality of the information and the project's purpose, and only if they would like, they were enrolled in the study. The Ethics Committee approved this study with all consent process at Hamadan University of Medical Sciences (No: IR.UMSHA.REC.1399.229).

Competing of Interest: The authors declare that they have no competing interests.

References

- Pfefferbaum B, North CS. Mental health and the Covid-19 pandemic. *New England Journal of Medicine*. 2020;383(6):510-2. <https://doi.org/10.1056/NEJMp2008017> PMID:32283003
- Moreno C, Wykes T, Galderisi S, Nordentoft M, Crossley N, Jones N, et al. How mental health care should change as a consequence of the COVID-19 pandemic. *The Lancet Psychiatry*. 2020;7(9):813-24. [https://doi.org/10.1016/S2215-0366\(20\)30307-2](https://doi.org/10.1016/S2215-0366(20)30307-2)
- Jafari A, Nejatian M, Momeniyan V, Barsalani FR, Tehrani H. Mental health literacy and quality of life in Iran: a cross-sectional study. *BMC psychiatry*. 2021;21(1):1-11. <https://doi.org/10.1186/s12888-021-03507-5> PMID:34641793 PMID:PMC8507341
- Internet User And Penetration Worldwide 2014-2020 [Internet]. 2016, April 1. Available from: Retrieved from: <https://www.emarketer.com/chart/187880/internet-users-penetration-worldwide-2014-2020-billions-of-population-change>.
- Guess AM, Lerner M, Lyons B, Montgomery JM, Nyhan B, Reifler J, et al. A digital media literacy intervention increases discernment between mainstream and false news in the United States and India. *Proceedings of the National Academy of Sciences*. 2020;117(27):15536-45.
- Nejatian M, Tehrani H, Momeniyan V, Jafari A. A modified version of the mental health literacy scale (MHLS) in Iranian people. *BMC psychiatry*. 2021;21(1):1-11. <https://doi.org/10.1186/s12888-021-03050-3> PMID:33485306 PMID:PMC7824912
- Kesler T, Tinio PP, Nolan BT. What's our position? A critical media literacy study of popular culture websites with eighth-grade special education students. *Reading & Writing Quarterly*. 2016;32(1):1-26. <https://doi.org/10.1080/10573569.2013.857976>
- WHO; novel-coronavirus-2019 [Internet]. 2020. Available from: [cited 2020 July 29]. Available from: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>.
- Xie X, Gai X, Zhou Y. A meta-analysis of media literacy interventions for deviant behaviors. *Computers & Education*. 2019;139:146-56. <https://doi.org/10.1016/j.compedu.2019.05.008>
- Barati M, Jormand H, Bashirian S, Doosti-Irani A, Rezapur-Shahkolai F. The Role of Media on the Intention of Adolescents Smoking: A Systematic Review and Meta-Analysis. *Journal of Education and Community Health*. 2020;7(4):311-23. <https://doi.org/10.29252/jech.7.4.311>
- Khazaei S, Bashirian S, Jenabi E, Barati M, Karimi-Shahanjarini A, Moeini B, et al. COVID-19 Preventive Behaviors and its Related Beliefs among Health Workers: The Role of Threat and Coping Appraisals. *J Educ Community Health*. 2020;7(3):221-7. <https://doi.org/10.29252/jech.7.3.221>
- Hossain MT, Ahammed B, Chanda SK, Jahan N, Ela MZ, Islam MN. Social and electronic media exposure and generalized anxiety disorder among people during COVID-19 outbreak in Bangladesh: a preliminary observation. *Plos one*. 2020;15(9):e0238974. <https://doi.org/10.1371/journal.pone.0238974> PMID:32916691 PMID:PMC7486135
- Apuke OD, Omar B. Fake news and COVID-19: modelling the predictors of fake news sharing among social media users. *Telematics and Informatics*. 2021;56:101475. <https://doi.org/10.1016/j.tele.2020.101475> PMID:34887612 PMID:PMC7390799
- Cinelli M, Quattrocioni W, Galeazzi A, Valensise CM, Brugnoli E, Schmidt AL, et al. The COVID-19 social media infodemic. *Scientific reports*. 2020;10(1):1-10. <https://doi.org/10.1038/s41598-020-73510-5> PMID:33024152 PMID:PMC7538912
- Pennycook G, McPhetres J, Zhang Y, Lu JG, Rand DG. Fighting COVID-19 misinformation on social media: Experimental evidence for a scalable accuracy-nudge intervention. *Psychological science*. 2020;31(7):770-80. <https://doi.org/10.1177/0956797620939054> PMID:32603243 PMID:PMC7366427
- Jani S, Mikaeili N, Rahimi P. The Effectiveness of Internet-Delivered Cognitive Behaviour Therapy on Reducing Corona-Related Anxiety in Parsabad Health Care Workers. *Information and Communication Technology in Educational Sciences*. 2020;10(40):129-45.
- Akbarinejad F, Soleymani MR, Shahrzadi L. The relationship between media literacy and health literacy among pregnant women in health centers of Isfahan. *J Edu Health Promot* 2017;6:17 <https://doi.org/10.4103/2277-9531.204749> PMID:28546982 PMID:PMC5433646
- Vismara M, Caricasole V, Starcevic V, Cinosi E, Dell'Osso B, Martinotti G, et al. Is cyberchondria a new transdiagnostic digital compulsive syndrome? A systematic review of the evidence. *Comprehensive Psychiatry*. 2020;99:152167. <https://doi.org/10.1016/j.comppsy.2020.152167> PMID:32146315
- Jormand H, Bashirian S, Barati M, Khazaei S, Jenabi E, Zareian S. A Qualitative Study On People's Experiences Of Covid-19 Media Literacy. *Media Literacy and Academic Research*. 2021;4(1):38-52.
- Ahorsu DK, Lin C-Y, Imani V, Saffari M, Griffiths MD, Pakpour AH. The fear of COVID-19 scale: development and initial validation. *International journal of mental health and addiction*. 2020:1-9. <https://doi.org/10.1007/s11469-020-00270-8>
- Wikipedia. List of universities in Iran; 2019 2022 [Available from: Available at: https://en.wikipedia.org/w/index.php?title=List_of_universities_in_Iran&oldid=967665031.
- Chang F-C, Chiu C-H, Chen P-H, Miao N-F, Lee C-M, Chiang J-T, et al. Relationship between parental and adolescent eHealth literacy and online health information seeking in Taiwan. *Cyberpsychology, Behavior, and Social Networking*. 2015;18(10):618-24. <https://doi.org/10.1089/cyber.2015.0110> PMID:26375050

23. Sørensen K, Pelikan JM, Röthlin F, Ganahl K, Slonska Z, Doyle G, et al. Health literacy in Europe: comparative results of the European health literacy survey (HLS-EU). *European journal of public health*. 2015;25(6):1053-8. <https://doi.org/10.1093/eurpub/ckv043> PMID:25843827 PMCID:PMC4668324
24. Masuyama A, Shinkawa H, Kubo T. Validation and psychometric properties of the Japanese version of the fear of COVID-19 scale among adolescents. *International Journal of Mental Health and Addiction*. 2020;1-11. <https://doi.org/10.31234/osf.io/jkmut>
25. Ashrafi-Rizi H, Khorasgani ZG, Zarmehr F, Kazempour Z. A survey on rate of media literacy among Isfahan University of Medical Sciences' students using Iranian media literacy questionnaire. *J Educ Health Promot*. 2014;3:49-. <https://doi.org/10.5455/aim.2014.22.393-397> PMID:25684848 PMCID:PMC4315646
26. Soleiman S, Khosravi F, Haddad Z. Assessing Media Literacy between university and pre-university Student of Tehran. *Global Media Journal-Persian Edition*. 2013;8(2):52-74
27. Shirahmadi S, Bashirian S, Barati M, Jenabi E, Haghighi M, Shamsaei F, et al. Fear and COVID-19 Protective Behaviors among High School Students in Hamadan, Iran; Application of an Extended Parallel Process Model. *J Educ Community Health*. 2021;8(3):165-72. <https://doi.org/10.52547/jech.8.3.165>
28. Moghanibashi-Mansourieh A. Assessing the anxiety level of Iranian general population during COVID-19 outbreak. *Asian journal of psychiatry*. 2020;51:102076. <https://doi.org/10.1016/j.ajp.2020.102076> PMID:32334409 PMCID:PMC7165107
29. Bruine de Bruin W. Age differences in COVID-19 risk perceptions and mental health: Evidence from a national US survey conducted in March 2020. *The Journals of Gerontology: Series B*. 2021;76(2):e24-e9. <https://doi.org/10.1093/geronb/gbaa074> PMID:32470120 PMCID:PMC7542924
30. Solhi M, Jormand H, Gohari MR. Application of media literacy education for changing attitudes about self-medication of slimming supplements. *Medical journal of the Islamic Republic of Iran*. 2017;31:119. <https://doi.org/10.14196/mjiri.31.119> PMID:29951420 PMCID:PMC6014786
31. Santini ZI, Jose PE, Cornwell EY, Koyanagi A, Nielsen L, Hinrichsen C, et al. Social disconnectedness, perceived isolation, and symptoms of depression and anxiety among older Americans (NSHAP): a longitudinal mediation analysis. *The Lancet Public Health*. 2020;5(1):e62-e70. [https://doi.org/10.1016/S2468-2667\(19\)30230-0](https://doi.org/10.1016/S2468-2667(19)30230-0)
32. Nguyen H, Nguyen A. Covid-19 misinformation and the social (media) amplification of risk: A Vietnamese perspective. *Media and Communication*. 2020;8(2):444-7. <https://doi.org/10.17645/mac.v8i2.3227>

Appendix

supplementarily 1: Covid-19 Media Literacy Scale (C-19MLS) in Students

How much do you agree with the following statements?	completely disagree 1	Disagree 2	no idea 3	Agree 4	completely agree 5
Contractedness of credible Covid-19 media messages					
1. The WHO, (World Health Organization) is among the contractedness of credible messages about Covid-19.					
2. Organization and administration of health community services, ministry of health and medical universities are among the contractedness of credible messages about Covid-19.					
3. Experienced specialists in the field of infectious diseases and active health associations are among the contractedness of credible messages about Covid-19.					
Contractedness of fake media coronavirus Messages					
4. Sanitary ware producers, industrial and domestic disinfectants makers are among the contractedness of fake media coronavirus Messages.					
5. Profiteering advertising companies are among the Contractedness of fake media coronavirus Messages.					
6. Beneficiary politicians are among the Contractedness of fake media coronavirus Messages.					

Fake media Coronavirus Messages audience					
7. Curious people are among the audience of fake media coronavirus Messages.					
8. The audiences of fake media coronavirus Messages are individuals with obsessive-compulsive disorder personality.					
9. Unproductive people are among the audience of fake media coronavirus Messages.					
Format					
10. The individuals with any level of awareness, information and income are the audience of Covid-19 media messages.					
11. Highlighted the consequences of the coronavirus disease such as daily number of deaths, illness and improvement across country is used to attract the audience's attention in Covid-19 media messages.					
12. To attract the audience's attention of Covid-19 media messages, frequently repeated in a variety of media and social media is used.					
13. To attract the audience's attention of Covid-19 media messages, represented in form of video clips, animations and visual charts.					
14. In credible messages about Covid-19 often Teach simple preventive instructions for public health "Such as using frequent hands washed with ordinary soap and water, wearing a mask.					
15. To attract the audience's attention in credible messages about Covid-19 often use available, popular and easy-to-use social network media such as Instagram or Telegram, WhatsApp or TV and Radio					
Lifestyles are represented in fake media coronavirus Messages					
16. In fake media coronavirus Messages often represent beliefs such as COVID-19 vaccines developed have become less effective.					
17. In fake media coronavirus Messages often represent beliefs such as alcohol consumption to prevent the disease.					
18. In fake media coronavirus Messages often represent beliefs such as claiming traditional and herbs ingredients to be useful for disease prevention such as drinking ginger and cinnamon tea					
19. In fake media coronavirus Messages often represent beliefs such as the weakening of the virus and achieve herd immunity.					
20. In fake media coronavirus Messages often represent beliefs such as the presence of the virus in the ambient and transmission food or bites.					
21. In fake media coronavirus Messages often represent beliefs such as the effectiveness of Anti-viral and anti-inflammatory drugs for disease prevention.					

supplementarily 2: Dimensions C-19MLs Scoring

To calculate each subscale or total score for the COVID-19 Media Literacy, first, add item scores to achieve raw scores and then linearly transfer it to a score from 0 to 100 using the

specific formula, which includes: the difference of the raw score obtained from the minimum possible raw score divided by the difference between the maximum possible score and the minimum possible score.

To calculate the total score, the scores of the sub-measures are added based on the range from 0 to 100 and divided by the number of sub-measures (5 dimensions).

COVID-19 Media Literacy dimensions	Number of items	Range	
		Min	Max
Contractedness of credible Covid-19 media messages	3	3	15
Contractedness of fake media coronavirus Messages	3	3	15
Fake media Coronavirus Messages audience	3	3	15
Format	6	6	30
lifestyles are represented in fake media coronavirus Messages	6	6	30
Total COVID-19 Media Literacy	28	21	108

Score= (achieve raw scores- Min score)/ Min score-Max score*100

COVID-19 Media Literacy category levels

The C-19MLS scores		Categories	Level
Minimum	Maximum		
0	50	Inadequate	Limited
50.01	66	Somewhat inadequate	
66.01	84	Sufficient	Adequate
84	100	Excellent	
Total	-	-	-