

Health Literacy and “COVID-19 Anxiety” in Iranian Adults: A Cross-Sectional Study

Fatemeh Alsadat Hossaini

Research Center for Social Determinants of Health, Jahrom University of Medical Sciences, Jahrom, Iran.

Fatemeh Darya

Research Center for Social Determinants of Health, Jahrom University of Medical Sciences, Jahrom, Iran

Vahid Rahmanian

Research Center for Social Determinants of Health, Jahrom University of Medical Sciences, Jahrom, Iran.

Nader Sharifi

* Department of Public Health, Khomein University of Medical Sciences, Khomein, Iran. (corresponding): nadersharifi81@yahoo.com

Received: 15 August 2022

Accepted: 28 November 2022

Doi: 10.22038/jhl.2022.67387.1342

ABSTRACT

Background and Objectives: Covid-19 pandemic has led to a wide range of psychological disorders, including anxiety. Inadequate health literacy is associated with poor mental health. People with higher health literacy are more likely involve preventive behaviors. This study aimed to determine the correlation between health literacy and anxiety caused by covid-19 in adults.

Materials and Methods: This cross-sectional study was conducted on adults over 18 years old in Jahrom city, Fars province, Iran, in 2021. A total of 197 participants were selected using multistage cluster random sampling. Demographic information and two standard questionnaires included Corona Disease Anxiety Scale (CDAS) and Health Literacy for Iranian Adults (HELIA) was used to collect data. The data was analyzed by SPSS 17.0 based descriptive statistics, independent t-tests, and Pearson’s correlation

Results: The mean raw score of total health literacy was 131.62 ± 0.33 , and the mean score converted to 100 was 74.72 ± 15.46 , which indicates that the health literacy of participating in the study was favorable. The results of Pearson’s correlation coefficient showed that with the promotion of health literacy, the anxiety caused by covid-19 ($r = -0.351$, $p < 0.001$), the psychological ($r = -0.339$, $p < 0.001$) and physical ($r = -0.323$, $p < 0.001$) dimensions, significantly decreased and improved. There was also a significant correlation between the reading ($r = -0.200$, $p = 0.005$), understanding ($r = -0.202$, $p = 0.004$), appraisal ($r = -0.275$, $p < 0.001$), and decision ($r = -0.383$, $p < 0.001$) dimensions with anxiety that caused by covid-19.

Conclusion: The community’s health literacy level can be an important factor in reducing anxiety caused by health problems such as the Covid-19 pandemic.

Paper Type: Research Article

Keywords: Health literacy, COVID-19, Anxiety

► **Citation:** Hossaini F, Darya F, Rahmanian V, Sharifi N. Health Literacy and “COVID-19 Anxiety” in Iranian Adults: A Cross-Sectional Study. *Journal of Health Literacy*. Spring 2023; 8(1): 52-61.

Introduction

Since 2019, Covid-19 has become a significant health threat to the world's public health (1,2) and has quickly endangered people's mental health (3). Depression, anxiety, and insomnia are psychological problems caused by this disease (4). The experts in the health system emphasized that the current pandemic is not only a physiological problem and will lead to a wide range of psychological disorders, including panic and anxiety in people (5). Also Roy (6) and Li (7) studies showed that people's anxiety increases during the covid-19; and the results of other studies confirm the adverse psychological effects of the COVID-19 pandemic on the mental health status of people in several countries (8–10). Considering that anxiety is the body's unconscious reaction when there are health risks, health concerns are the common cause of many anxiety disorders (11). Anxiety varies from a mild level that includes minor concerns related to physical feelings to severe fears related to health. This disorder can confuse people's regulating and managing emotions (12). On the other hand, stress and anxiety can weaken the body's immune system and make them vulnerable to diseases, including Covid-19 (13). Anxiety can make people unable to distinguish between true and false information, so they may accept incorrect information and act according to it; Also, those with higher anxiety do fewer studies in the health field (14,15).

In this century, health literacy is a global issue and debate (16). Health literacy is the ability to obtain, process, and understand the information and services needed to make appropriate health decisions in health promotion (17). The World Health Organization has introduced health literacy as one of the most significant determinants of health (18); health literacy is a very influential factor in controlling and preventing infectious

diseases (19). People with higher health literacy are more likely to practice preventive behaviors (18). Inadequate health literacy is associated with poor physical and mental health (20). Reavley showed a positive and significant relationship between health literacy and people's mental health, and people with better health literacy will take more preventive measures regarding psychological and physical diseases (21). Most studies focusing on the psychological consequences of COVID-19 in Iran have not paid attention to the role of community health literacy in the psychological consequences of this pandemic (22–24). Considering the increased risk of psychological problems, including anxiety during the covid-19 pandemic, examining the anxiety of people in the community during this pandemic, taking into account their level of health literacy, can help to identify a solution to deal with this problem. This study aimed to determine the correlation between health literacy and anxiety caused by covid-19 in Jahrom adults in 2021.

Materials and Method

Study Design and Data Collection

This analytical cross-sectional study was conducted among adults over 18 years old in Jahrom city in Fars province (south of Iran) in 2021. According to the population and housing censuses, the population aged 18-65 years of Jahrom city is reported to be 111086. The sample size was calculated according to Duplaga's study (22), considering $r = -.21$, type 1 error (α) 5%, power 80%, and the non-response rate of 10%, 190 people.

$$n = \left[\frac{Z_{\alpha} + Z_{\beta}}{c} \right]^2$$

$$c = 0.5 * Ln[(1+r)/(1-r)]$$

We performed power analysis based on information from the previous study (24) using the G*Power software by type of a priori method (25), and actual power ($1-\beta$ err prob) was calculated" as 0.8006473.

A multistage cluster random sampling method was used to select the participants. The municipal plan divided urban areas into four regions (North, South, East, and West) to collect data. One Comprehensive Health Service Center was randomly selected from each region. In each health center, individuals were assigned based on the data in the SIB system (An online integrated health system that records and keeps all information about households and the type of health services and programs required and implemented in health centers) by simple random sampling. Inclusion criteria included all people aged 18 to 65 with electronic health records in Comprehensive Health Service Centers in Jahrom city. Exclusion criteria included patients with depression, pregnant women, people with immune system defects, patients with covid-19, not completing the written consent form, and immigrants and non-Iranian nationals. The residence address of the selected people was extracted from their files to collect data. After coordinating with the people by phone and ensuring they were at home, the researchers went to their homes. The participants were assured of the confidentiality of the information, and a written consent form was obtained from them for voluntary participation in the study. Completing the questionnaires was done by following health protocols and maintaining social distancing. People completed the questionnaire under the researcher's supervision and illiterate people with the help of the researcher.

The data collection tool included three questionnaires: demographic information questionnaire including age, gender, marital

status, level of education, and place of residence. In this study, the valid and reliable Corona Disease Anxiety Scale (CDAS), which was prepared by Alipour et al. was used. This tool has 2-factor components and 18 items. Psychological symptoms are measured by items 1 to 9, and physical symptoms by items 10 to 18. This questionnaire's minimum and maximum scores are ranged from 0 to 44, and it is scored on a 4-point Likert scale (never=0, sometimes=1, most of the time=2, and always=3). Higher scores indicate a higher level of anxiety in individuals. In this tool, a score of 0 to 16 is defined as no anxiety or mild anxiety, a score of 17 to 29 as moderate anxiety, and a score of 30 to 54 as severe anxiety. In the subgroup of psychological symptoms, scores 0 to 5, 6 to 19, and 20 to 27 indicate no anxiety or mild anxiety, moderate anxiety, and severe anxiety, respectively. Also, in the subgroup of physical symptoms, the scores 0 to 1, 2 to 9, and 10 to 27 indicate no anxiety or mild anxiety, moderate anxiety, and severe anxiety, respectively. To check content validity, the questionnaire was presented to 5 experienced psychologists. Among the 23 items of the questionnaire, 18 items were approved. Cronbach's alpha method was used to assess the reliability of the tool, which was 0.87, 0.86, and 0.91 for the psychological factor, physical factor, and the entire questionnaire, respectively (13).

In this study, we used the Health Literacy for Iranian Adults (HELIA), which was designed by Montazeri et al. for the general population of Iran aged 18 to 65. This tool has 33 items. The minimum and maximum scores of this questionnaire are ranged from 1 and 165, and it is scored on a 5-point Likert scale (Always=1, Most of the time=2, Sometimes=3, Rarely=4, and Not at all=5) and a higher score means higher health literacy. This questionnaire has five dimensions: access (6 items), reading (4

Table 1: Frequency distribution of demographic variables and their relationship with health literacy and anxiety

Variables		N%	Health literacy		Anxiety	
			M±SD	P-value	M±SD	P-value
Gender	Male	84(42.6)	128.54±19.18	0.06*	16.92±12.28	0.58*
	Female	113(57.4)	133.92±16.34		15.99±12.18	
Age	18-30	97(49.2)	130.59±17.88	0.17**	16.45±12.69	0.51**
	31-40	56(28.4)	134.32±17.18		15.59±12.36	
	41-50	28(14.2)	133.61±18.40		16.14±11.91	
	>50	16(8.1)	125.00±17.20		19.19±9.34	
Marital status	Single	83(42.1)	129.42±19.99	0.34*	17.39±12.88	0.18*
	Married	114(57.9)	133.23±15.84		15.66±11.68	
Education	Diploma and below	77(39.1)	128.16±19.26	0.01**	20.00±12.76	0.006**
	Associate degree	19(9.6)	128.68±17.59		17.05±12.23	
	Bachelor's degree	82(41.6)	133.11±16.16		13.33±11.06	
	Master's degree and higher	19(9.6)	142.21±13.99		14.26±11.39	
Employment status	Unemployed	14(7.1)	127.64±15.97	0.18**	25.57±14.77	0.42**
	Housekeeper	35(17.8)	132.14±18.34		17.43±14.01	
	Student	48(24.4)	128.65±18.70		15.73±11.63	
	Employed	87(44.2)	133.64±17.37		14.77±11.08	
	Retired	10(5.1)	128.80±18.23		17.90±11.05	
	Other	3(1.5)	142.67±11.59		13.67±7.77	
Sources of health information	Internet	124(62.9)	134.60±17.23	0.008**	14.99±12.32	0.11**
	Radio/TV	38(19.3)	125.21±18.58		19.34±11.06	
	Physicians and health care workers	28(14.2)	130.46±14.13		16.64±10.26	
	Asking friends and acquaintances	5(2.5)	110.40±21.17		27.60±20.28	
	Booklets, pamphlets, brochures	2(1.0)	138.50±17.68		15.00±16.97	

*independent t-test, ** one-way ANOVA, Significant level>0.05

items), understanding (7 items), appraisal (4 items), and decision (12 items). One hundred Tehran citizens checked the tool's face validity, and expert groups applied their opinions. In this study 15 expert reviewed the content validity in various health fields, including management of healthcare services, social medicine, maternal and child health, mental health, health education, general medicine, and public health, and their corrective comments were applied to the

questionnaire. Cronbach's alpha coefficient was used to measure reliability. The results showed that Cronbach's alpha values of the target dimensions were between 0.72 and 0.89, and its reliability was confirmed (26).

Statistical Analysis

The data was entered into SPSS 17.0. (SPSS Inc., Chicago, IL, USA) and analyzed with descriptive statistics, including frequency, mean, standard deviation, independent t-tests, one-way ANOVA,

and Pearson's correlation. Then, multivariable linear regression by the Backward technique was also used to investigate the association between the demographic variables and health literacy dimensions on the anxiety caused by Covid-19. A significance level of 0.05 was considered.

Results

The participants in the study were 197 adults between 18 and 65 years old in Jahrom city. A higher proportion of participants were female (57.4) and married (57.9). Also, more than half of them were in the age range of 18-30. Bachelor's degree (41.6%) and being employed (44.2%) were the most frequent among the study participants. Also, among the sources of health information, the Internet (62.9%) had the highest frequency. The results showed a significant relationship between education ($p=0.01$) and sources of health information ($p=0.008$) with health literacy. The highest health literacy score was observed in people with a master's degree or higher.

Our results showed that people whose sources of health information were through asking friends and acquaintances had higher health literacy. There was no significant relationship between anxiety caused by Covid-19 and demographic characteristics (table 1). The total level of anxiety caused by Covid-19 in most adults was mild (57.9%). However, the moderate level of anxiety was the most frequent in the physical factor (44.7%) and the psychological factor (56.9%).

The mean raw score of total health literacy was 131.62 ± 0.33 , and the mean score converted to 100 was 74.72 ± 15.46 , which indicates that the health literacy of participating in the study was favorable. Among the health literacy dimensions, the understanding dimension has the highest mean, and the appraisal dimension has the lowest mean (Considering the different number of questions in each dimension of health literacy,

the raw score of health literacy, and its dimensions were also calculated out of 100) (table 2).

Table 2: Frequency distribution of health literacy and its dimensions (mean raw score and mean score converted to 100)

Dimensions of health literacy	Raw score	Score out of 100
	M±SD	M±SD
Access	23.96±6.00	74.83±8.37
Reading	16.14±4.00	75.89±7.61
Understanding	29.89±7.00	81.74±7.99
Appraisal	11.56±3.00	71.32±7.50
Decision	50.08±12.00	79.33±12.58
Total health literacy	131.62±33.00	74.72±15.46

The results of Pearson's correlation coefficient showed that with the promotion of health literacy, the anxiety caused by covid-19 ($r=-0.351$, $p<0.001$), the psychological ($r=-0.339$, $p<0.001$) and physical ($r=-0.323$, $p<0.001$) dimensions, significantly decreased and improved. There was also a significant correlation between the reading ($r=-0.200$, $p=0.005$), understanding ($r=-0.202$, $p=0.004$), appraisal ($r=-0.275$, $p<0.001$), and decision ($r=-0.383$, $p<0.001$) dimensions with anxiety caused by covid-19 so that with the increase of these dimensions, anxiety caused by covid-19 decreased (Table 3).

Pearson correlation test, Significant level>0.05

To predict the anxiety caused by covid 19 based on demographic variables and health literacy dimensions, multivariable linear regression was used in the Backward method. The variables of gender, age, marital status, education, employment status, sources of health information, and health literacy dimensions were included in the model, and the best model was selected. The results showed that 19.3% of the changes in the anxiety of covid-19 are influenced by the variables of education and health literacy dimensions, and they were predictors of anxiety

Table 3: Correlation of health literacy and its dimensions with anxiety caused by Covid-19 and its dimensions

Dimensions of health literacy	physical Psychological	physical	Anxiety
Access	(r=-0.204, p=0.004)	(r=-0.135, p=0.065)	(r=-0.176, p<0.013)
Reading	(r=-0.197, p=0.005)	(r=-0.180, p<0.011)	(r=-0.200, p<0.005)
Understanding	(r=-0.195, p=0.005)	(r=-0.186, p=0.009)	(r=-0.202, p<0.004)
Appraisal	(r=-0.273, p<0.001)	(r=-0.246, p<0.001)	(r=-0.275, p<0.001)
Decision	(r=-0.350, p<0.001)	(r=-0.369, p<0.001)	(r=-0.383, p<0.001)
Total health literacy	(r=-0.339, p<0.001)	(r=-0.323, p<0.001)	(r=-0.351, p<0.001)

caused by covid-19. Beta coefficients showed that the effect of education and decision dimension was indirect. Therefore, with the increase in the

education and decision dimension, the score of anxiety caused by Covid-19 has decreased (Table 4).

Table 4: Regression coefficients of the effect of demographic variables and health literacy dimensions on the anxiety caused by Covid-19

independent variable	B-coefficient	SE	standardized coefficients Beta	*P-value
Constant	47.749	4.782	-	<0.001
Education	-2.443	0.735	-0.215	0.001
Decision	-0.518	0.090	-0.370	<0.001

*Multivariable linear regression (Backward method), Significant level>0.05

Discussion

Based on the study's results, the participants had relatively good health literacy. In Joveini's study, Iranian adults had adequate health literacy (27). While the studies of Naghibi (28), Ghanbari (29), Reisi (30), and Ansari (31) in the past years showed the insufficient level of health literacy of Iranians. It seems that with the passage of time and more people's access to sources of information through various media, including cyberspace, the level of general health literacy among people has improved compared to the past. As in the present study, the most important source of obtaining health information among participants was the Internet.

The highest level of health literacy was related to people with a bachelor's degree or higher, and other studies confirm these results (31–34). Logically, the higher education level of people is

associated with the better understanding and evaluating health information. Also, these people can better use different sources of information. Therefore, special attention should be paid to low-educated people in the programs to improve the health literacy level of society.

Despite the lack of significant differences, women's health literacy was somewhat higher than men's. No significant difference was observed between the two genders in terms of health literacy in Protheroe(32), Mollakhalili (35), Naghibi (28), and Joveini (27) studies, while the study of Tavousi (33) showed that the level of health literacy in men was significantly lower than that of women. On the other hand, Raisi (36) found that women's health literacy level is lower than that of men. Perhaps the reasons for these contradictory results can be related to

the different social environments of the studies.

According to the results, most participants had a low level of anxiety, and no relationship was observed between anxiety caused by Covid-19 and demographic variables. A meta-analysis showed that the overall Prevalence of anxiety during the covid-19 pandemic was 25% (37). The results of Moghanibashi-Mansourieh's study on the general population of Iran showed that the majority of people did not have anxiety or experienced a low level of anxiety; also, the level of anxiety during the covid-19 pandemic was higher among women, people who mostly follow the news related to the disease, and the age group of 21 to 40 years (38). According to Banna's study, 33.7% of Bangladeshi adults had symptoms of anxiety caused by Covid-19. Also, the prevalence of anxiety symptoms induced by Covid-19 was significantly higher among women, low-educated people, people over 40 years old, and homemakers (39). It seems that the experience of anxiety caused by Covid-19 can be related to several factors that differ in different times and places. It can be said that with the passage of time and the normalization of the pandemic in society, the level of anxiety caused by Covid-19 has decreased. Also, according to the socio-economic and cultural characteristics of the people of Iran, especially the city of Jahrom, the pandemic could not cause a high level of anxiety in the long term.

The current study showed that anxiety caused by covid-19 relates to health literacy, and improving health literacy can help reduce physical and psychological anxiety. Tran's study showed that participants with the lowest level of health literacy experienced the highest anxiety related to Covid-19 (40). In Duplaga's study, people with higher health literacy participated with a lower level of future anxiety associated with the perception of the Covid-19 pandemic

(22). Also, Hermans's study showed that people with sufficient health literacy suffered less from depression, anxiety, or sleep disorders (41). Therefore, health literacy is critical in people's response to the Covid-19 pandemic. Health literacy should be given more attention as a tool to deal with the pressures people suffer during such pandemics.

Holman found a significant association between acute stress and exposure to media related to COVID-19 and conflicting information about the disease by the media among individuals in the United States (42). The news stories published about COVID-19 often accompany disturbing rumors, which is why anxiety levels increase when a person is constantly exposed to these news stories. Misinformation and fabricated reports from unreliable sources about COVID-19 can exacerbate anxiety in the general population (23,38).

Limitation: One of the limitations of this study was a large number of questions in the questionnaires, which could reduce the accuracy of people's answers. In addition, most of the study participants were literate, so the results cannot be generalized to the whole society. Also, due to the existence of the Covid-19 pandemic, the face-to-face meeting of the participants was accompanied by problems.

Conclusion

The level of health literacy of the community can be an important factor in reducing anxiety caused by health problems such as the Covid-19 pandemic; Of course, the cultural characteristics and other social conditions in the society affect this issue. To maintain people's psychological health in the face of health issues that cause anxiety and fear in the community, It is necessary to implement health education and health promotion interventions to improve the level

of health literacy in society, and taking into account the influential social factors.

Acknowledgments: Researchers would like to appreciate all people who have helped in this research project.

Consent for publication: Not applicable

Availability of data and materials: Data will be available upon request from the corresponding author

Conflicts of interest: The authors declare no conflicts of interest.

Ethical considerations: This article is derived from the research with code 400000185 that the Ethics Committee approved of Jahrom University of Medical Sciences, Code IR.JUMS.REC.1400.074. The study also complied with the Declaration of Helsinki. Informed consent was obtained from all participants. They had the right not to participate in the research and were assured that their names would not be used in any part of the research.

Funding: No financial support was received for this study.

Authors' contributions: Nader Sharifi conceptualized the study and led the project and writing. All authors contributed to the development of the coding scheme. Fatemeh Alsadat Hossaini conducted the coding and analyses and drafted the methods. Fatemeh Darya and Vahid Rahmanian reviewed the codes and results. All authors contributed to the writing and revision and approved the final version of the manuscript

References

- Kim DKD, Kreps GL. An Analysis of Government Communication in the United States During the COVID-19 Pandemic: Recommendations for Effective Government Health Risk Communication. *World Med Heal policy*. 2020 Dec;12(4):398-412. <https://doi.org/10.1002/wmh3.363> PMID:32904935 PMCID:PMC7461274
- Peeri NC, Shrestha N, Rahman MS, Zaki R, Tan Z, Bibi S, et al. The SARS, MERS and novel coronavirus (COVID-19) epidemics, the newest and biggest global health threats: what lessons have we learned? *Int J Epidemiol*. 2020 Jun;49(3):717-26. <https://doi.org/10.1093/ije/dyaa033> PMID:32086938 PMCID:PMC7197734
- Lo Coco G, Gentile A, Bosnar K, Milovanović I, Bianco A, Drid P, et al. A Cross-Country Examination on the Fear of COVID-19 and the Sense of Loneliness during the First Wave of COVID-19 Outbreak. *Int J Environ Res Public Health*. 2021 Mar;18(5). <https://doi.org/10.3390/ijerph18052586> PMID:33807549 PMCID:PMC7967533
- Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N, et al. Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019. *JAMA Netw open*. 2020 Mar;3(3):e203976. <https://doi.org/10.1001/jamanetworkopen.2020.3976> PMID:32202646 PMCID:PMC7090843
- McBride O, Murphy J, Shevlin M, Gibson Miller J, Hartman TK, Hyland P, et al. Monitoring the psychological impact of the COVID-19 pandemic in the general population: an overview of the context, design and conduct of the COVID-19 Psychological Research Consortium (C19PRC) Study. *PsyArXiv*. 2020; <https://doi.org/10.31234/osf.io/wxe2n>
- Roy D, Tripathy S, Kar SK, Sharma N, Verma SK, Kaushal V. Study of knowledge, attitude, anxiety & perceived mental healthcare need in Indian population during COVID-19 pandemic. *Asian J Psychiatr*. 2020 Jun;51:102083. <https://doi.org/10.1016/j.ajp.2020.102083> PMID:32283510 PMCID:PMC7139237
- Li S, Wang Y, Xue J, Zhao N, Zhu T. The Impact of COVID-19 Epidemic Declaration on Psychological Consequences: A Study on Active Weibo Users. *Int J Environ Res Public Health*. 2020 Mar;17(6). <https://doi.org/10.3390/ijerph17062032> PMID:32204411 PMCID:PMC7143846
- Zacher H, Rudolph CW. Individual differences and changes in subjective wellbeing during the early stages of the COVID-19 pandemic. *Am Psychol*. 2021 Jan;76(1):50-62. <https://doi.org/10.1037/amp0000702> PMID:32700938
- Tull MT, Edmonds KA, Scamaldo KM, Richmond JR, Rose JP, Gratz KL. Psychological Outcomes Associated with Stay-at-Home Orders and the Perceived Impact of COVID-19 on Daily Life. *Psychiatry Res*. 2020 Jul;289:113098. <https://doi.org/10.1016/j.psychres.2020.113098> PMID:32434092 PMCID:PMC7252159
- Newby JM, O'Moore K, Tang S, Christensen H, Faasse K. Acute mental health responses during the COVID-19 pandemic in Australia. *PLoS One*. 2020;15(7):e0236562. <https://doi.org/10.1371/journal.pone.0236562> PMID:32722711 PMCID:PMC7386645
- Ma Y-J, Wang D-F, Yuan M, Long J, Chen S-B, Wu Q-X, et al. The mediating effect of health anxiety in the relationship between functional somatic symptoms and illness behavior in Chinese inpatients with depression. *BMC Psychiatry*. 2019 Aug;19(1):260. <https://doi.org/10.1186/s12888-019-2246-9>

- PMid:31455294 PMCID:PMC6712795
12. Ghadampour A, Radmehr P, Yousefvand L. The effectiveness of acceptance based therapy and group commitment therapy on health anxiety in women with epilepsy with three-month follow-up. *Islam Azad Univ J*. 2017;27(4):15-20.
 13. Alipour A, Ghadami A, Alipour Z, Abdollahzadeh H. Preliminary validation of the Corona Disease Anxiety Scale (CDAS) in the Iranian sample. *Q J Heal Psychol*. 2020;8(32):163-75.
 14. Baumgartner SE, Hartmann T. The role of health anxiety in online health information search. *Cyberpsychol Behav Soc Netw*. 2011 Oct;14(10):613-8. <https://doi.org/10.1089/cyber.2010.0425> PMid:21548797
 15. To KK-W, Tsang OT-Y, Leung W-S, Tam AR, Wu T-C, Lung DC, et al. Temporal profiles of viral load in posterior oropharyngeal saliva samples and serum antibody responses during infection by SARS-CoV-2: an observational cohort study. *Lancet Infect Dis*. 2020 May;20(5):565-74.
 16. Izadi Rad H, Gorban I. Health literacy relationship with general health status, preventive behaviors and utilization of health services in Balochistan region. *J Heal Educ*. 2015;2(3):43-50. <https://doi.org/10.20286/jech-02036>
 17. Shiri-Mohammadabad H, Afshani S-A. Does Health Literacy cause better women's self-care performance? A Cross-Sectional Study in Iran. *J Heal Lit*. 2022;7(1):56-66.
 18. Tugut N, Yesildag Celik B, YÄ±lmaz A. Health Literacy and Its Association with Health Perception in Pregnant Women. *J Heal Lit*. 2021;6(2):9-20.
 19. Tehrani FJ, Nikpour S. Effect of health on knowledge, self-efficacy and health behaviours of women with urinary tract infection. *Int J Urol Nurs*. 2014;8(1):3-14. <https://doi.org/10.1111/ijun.12026>
 20. Wolf MS, Gazmararian JA, Baker DW. Health literacy and functional health status among older adults. *Arch Intern Med*. 2005 Sep;165(17):1946-52. <https://doi.org/10.1001/archinte.165.17.1946> PMid:16186463
 21. Reavley NJ, Morgan AJ, Jorm AF. Development of scales to assess mental health literacy relating to recognition of and interventions for depression, anxiety disorders and schizophrenia/psychosis. *Aust N Z J Psychiatry*. 2014 Jan;48(1):61-9. <https://doi.org/10.1177/0004867413491157> PMid:23744982
 22. Duplaga M, Grysztar M. The Association between Future Anxiety, Health Literacy and the Perception of the COVID-19 Pandemic: A Cross-Sectional Study. *Healthc (Basel, Switzerland)*. 2021 Jan;9(1). <https://doi.org/10.3390/healthcare9010043> PMid:33466487 PMCID:PMC7824811
 23. Salari N, Hosseini-Far A, Jalali R, Vaisi-Raygani A, Rasoulpoor S, Mohammadi M, et al. Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: a systematic review and meta-analysis. *Global Health*. 2020 Jul;16(1):57. <https://doi.org/10.1186/s12992-020-00589-w> PMid:32631403 PMCID:PMC7338126
 24. Mohammadpour M, Ghorbani V, Khoramnia S, Ahmadi SM, Ghvami M, Maleki M. Anxiety, self-compassion, gender differences and COVID-19: Predicting self-care behaviors and fear of COVID-19 based on anxiety and self-compassion with an emphasis on gender differences. *Iran J Psychiatry*. 2020;15(3):213. <https://doi.org/10.18502/ijps.v15i3.3813> PMid:33193769 PMCID:PMC7603590
 25. Kang H. Sample size determination and power analysis using the G*Power software. *J Educ Eval Health Prof*. 2021;18:17. <https://doi.org/10.3352/jeehp.2021.18.17> PMid:34325496 PMCID:PMC8441096
 26. Montazeri ALI, Tavousi M, Rakhshani F, Azin SA, Jahangiri K, Ebadi M, et al. Health Literacy for Iranian Adults (HELIA): development and psychometric properties. 2014;
 27. Joveini H, Rohban A, Askarian P, Maheri M, Hashemian M. Health literacy and its associated demographic factors in 18-65-year-old, literate adults in Bardaskan, Iran. *J Educ Health Promot*. 2019;8:244.
 28. Naghibi A, Chaleshgar M, Kazemi A, Hosseini M. Evaluation of health literacy level among 18-65 year-old adults in Shahriar, Iran. *J Heal Res community*. 2017;3(2):17-25.
 29. Ghanbari S, Majlessi F, Ghaffari M, Mahmoodi Majdabadi M. Evaluation of health literacy of pregnant women in urban health centers of Shahid Beheshti Medical University. *Daneshvar Med*. 2020;19(6):1-12.
 30. Reisi M, Javadzade SH, Heydarabadi AB, Mostafavi F, Tavassoli E, Sharifirad G. The relationship between functional health literacy and health promoting behaviors among older adults. *J Educ Health Promot*. 2014;3:119. <https://doi.org/10.4103/2277-9531.145925> PMid:25540792 PMCID:PMC4275619
 31. Ansari H, Almasi Z, Ansari-Moghaddam A, Mohammadi M, Peyvand M, Hajmohammadi M, et al. Health literacy in older adults and its related factors: a cross-sectional study in Southeast Iran. *Heal Scope*. 2016;5(4). <https://doi.org/10.17795/jhealthscope-37453>
 32. Protheroe J, Whittle R, Bartlam B, Estacio EV, Clark L, Kurth J. Health literacy, associated lifestyle and demographic factors in adult population of an English city: a cross-sectional survey. *Heal Expect an Int J public Particip Heal care Heal policy*. 2017 Feb;20(1):112-9. <https://doi.org/10.1111/hex.12440> PMid:26774107 PMCID:PMC5217902
 33. Mahmoud Tavousi, AliasgharHaeri Mehrizi, shahram Rafiefar, Atoosa Solimanian, Fateme Sarbandi, Mona Ardestani, Akram Hashemi AM. Health literacy in Iran: findings from a national study. *Payesh*. 2016;15(1):95-102.
 34. Haerian A, Moghaddam MHB, Ehrampoush MH, Bazm S, Bahsoun MH. Health literacy among adults in Yazd, Iran. *J Educ Health Promot*. 2015;4:91.
 35. Mollakhalili H, Papi A, Zare-Farashbandi F, Sharifirad G, HasanZadeh A. A survey on health literacy of inpatient's educational hospitals of Isfahan University of Medical Sciences

- in 2012. *J Educ Health Promot.* 2014;3:66.
36. Javadzade SH, Sharifirad G, Radjati F, Mostafavi F, Reisi M, Hasanzade A. Relationship between health literacy, health status, and healthy behaviors among older adults in Isfahan, Iran. *J Educ Health Promot.* 2012;1:31. <https://doi.org/10.4103/2277-9531.100160> PMID:23555134 PMCID:PMC3577376
37. Santabárbara J, Lasheras I, Lipnicki DM, Bueno-Notivol J, Pérez-Moreno M, López-Antón R, et al. Prevalence of anxiety in the COVID-19 pandemic: An updated meta-analysis of community-based studies. *Prog Neuropsychopharmacol Biol Psychiatry.* 2021 Jul;109:110207. <https://doi.org/10.1016/j.pnpbp.2020.110207> PMID:33338558 PMCID:PMC7834650
38. Moghanibashi-Mansourieh A. Assessing the anxiety level of Iranian general population during COVID-19 outbreak. *Asian J Psychiatr.* 2020 Jun;51:102076. <https://doi.org/10.1016/j.ajp.2020.102076> PMID:32334409 PMCID:PMC7165107
39. Banna MH Al, Sayeed A, Kundu S, Christopher E, Hasan MT, Begum MR, et al. The impact of the COVID-19 pandemic on the mental health of the adult population in Bangladesh: a nationwide cross-sectional study. *Int J Environ Health Res.* 2022 Apr;32(4):850-61. <https://doi.org/10.1080/09603123.2020.1802409> PMID:32741205
40. Tran TV, Nguyen HC, Pham LV, Nguyen MH, Nguyen HC, Ha TH, et al. Impacts and interactions of COVID-19 response involvement, health-related behaviours, health literacy on anxiety, depression and health-related quality of life among healthcare workers: a cross-sectional study. *BMJ Open.* 2020 Dec;10(12):e041394. <https://doi.org/10.1136/bmjopen-2020-041394> PMID:33293320 PMCID:PMC7722826
41. Hermans L, Van den Broucke S, Gisle L, Demarest S, Charafeddine R. Mental health, compliance with measures and health prospects during the COVID-19 epidemic: the role of health literacy. *BMC Public Health.* 2021 Jul;21(1):1365. <https://doi.org/10.1186/s12889-021-11437-w> PMID:34243741 PMCID:PMC8270766
42. Holman EA, Thompson RR, Garfin DR, Silver RC. The unfolding COVID-19 pandemic: A probability-based, nationally representative study of mental health in the United States. *Sci Adv.* 2020 Oct;6(42). <https://doi.org/10.1126/sciadv.abd5390> PMID:32948511 PMCID:PMC7556755