Correlation between health literacy and self-care behaviors in patients with COVID-19

Fatemeh Amin
Non-Communicable Diseases Research Center, Rafsanjan University of Medical Sciences, Rafsanjan, Iran, Department of Physiology and Pharmacology, School of Medicine, Rafsanjan University of Medical Sciences, Rafsanjan,

Hamid Ostadebrahimi
Department of Pediatrics, School of Medicine, Non-Communicable Diseases Research Center Ali Ibn Abitaleb Educational and Treatment Hospital, Rafsanjan University of Medical Sciences, Rafsanjan, Iran.

Zahra Kamiab
Department of Family Medicine, School of Medicine, Ali Ibn Abitaleb Educational and Treatment Hospital, Rafsanjan University of Medical Sciences, Rafsanjan, Iran.

Gholamreza Bazmandegan
Physiology-Pharmacology Clinical Research Development, Unit Ali Ibn Abitaleb Educational and Treatment Hospital, Rafsanjan University of Medical Sciences, Rafsanjan, Iran.

Saeideh Saadat
Department of Physiology, School of Medicine, Zahedan University of Medical Sciences, Zahedan, Iran.

Elham Shakiba
* PhD Student in Higher Education, Faculty of Dentistry, Rafsanjan University of Medical Sciences, Rafsanjan, Iran. (Corresponding author):
shakiba@rums.ac.ir; shakibae7@gmail.com

Received: 02 March 2022
Accepted: 28 May 2022
Doi: 10.22038/jhl.2022.64166.1276

ABSTRACT

Background and Objectives: Due to the prevalence of corona disease worldwide and the lack of definitive and known treatment for it, the ability of patients to take care of themselves and adherence to maintaining health is the best known way to prevent. Therefore, this study aims to investigate the correlation between health literacy and self-care behaviors among patients with COVID-19 in Rafsanjan, Iran.

Materials and methods: This descriptive study was performed in the form Jan 2020 to Jun 2020 on patients with COVID-19 infection who referred to health centers in Rafsanjan. Samples were selected by census method. The Health Literacy Questionnaire (HELIA) and the researcher-made self-care questionnaire were electronically used and completed.

Results: One hundred and one eligible COVID-19 patients were enrolled; total health literacy was (THL) was lower than 132 in 44.6% of participations. Self-care behaviors was a significantly weak, and it positively correlated just with Understand skill.

Conclusion: The results showed that health literacy had a significant weak correlation with self-care behaviors n patients with COVID-19, therefore patients need proper knowledge and attitude to successfully develop self-care ability in order to successfully control their disease and prevent transmission to others.

Paper Type: Research Article
Keywords: COVID-19; Health literacy; Self-care behaviors

▶ **Citation:** Amin F, Ostadebrahimi H, Kamiab Z, Bazmandegan Gh, Saadat S, Shakiba E. Correlation between health literacy and self-care behaviors in patients with COVID-19. *Journal of Health Literacy*. Autumn 2022; 3(7): 82-90.

Introduction

The outbreak of Coronavirus disease (COVID-19) was first reported in December 2019 in Wuhan, China, and has become increasingly prevalent in other countries, becoming a global health concern. The World Health Organization (WHO) declared COVID-19 the sixth public health emergency in terms of international worry (1). The rapid development of COVID-19 into a pandemic has caused people get out health information and adapt their behavior to it quickly. How to prevent the spread of this disease is available and the information is easy to understand (2). COVID-19 infection is not only harmful to health but also has devastating effects on economic, social, and political (3). Treatments for COVID-19 are under investigation. Therefore, prevention and care are recommended, especially in countries that are weaker in terms of health care (1).

Self-care involves the acquired, conscious, and purposeful actions that individuals perform for themselves and their families to stay healthy and well (4). The WHO defines self-care as the ability of communities and individuals to engage in activities to promote and maintain health, prevent disease, and adapt health to illness. These activities are based on professional and non-professional knowledge and skills that are performed by individuals or in collaboration with professionals (5). Self-care is influenced by individual opinions, beliefs and attitudes as well as the culture of the community in which one lives. Improving self-care is possible through education (6). Today, due to the lack of health facilities and its high costs, experts have drawn attention to the concept of self-care (7). Approximately 65 to 85% of health care is provided by individuals and their families without the intervention of medical staff. The effect of self-care in improving health and lessen costs has been proven in numerous studies (8).

In addition to the role of self-care, health literacy and its relationship with the health and quality of life of patients is quite evident. There is a direct relationship between health literacy and following medical advice. Therefore, measuring health literacy and its relationship with factors affecting self-care, promotes health literacy and improves self-care in patients (4). Studies examining the relationship between health literacy and self-care behaviors, show that physicians' attention to people's literacy levels, training classes, and the use of audio-visual media to convey information about illness have been effective in improving self-care behaviors (6). Health is one of the most important and fundamental pillars of developing and improving the quality of life. In other words, maintaining and promoting health is a prerequisite for economic and social planning. Community health requires the physical, mental and social health of all individuals (9).

The WHO defines health literacy as: "Cognitive and social skills that determine the motivation and ability of individuals to obtain, understand and use health information to promote and maintain good health." Benefiting from health literacy leads to improve behavior and health care (10). The importance of health literacy is well known on patients' health outcomes, and plays a fundamental role in making decisions about their health needs. To educate people, their level of general literacy (ability to read and write) is usually considered, not all health literacy skills. However, there are obvious differences between general literacy and health literacy. Studies have shown that low health literacy has several side effects, including lack of access to health services, less inclination to follow up treatment, increased duration of treatment, low drug adherence, negative economic impact on the

patient and the health system, increased referrals to emergencies, and increases mortality (11). Health literacy applies in many areas throughout life. Health literacy is essential in the face of the COVID-19 emergency situation (3).

Due to the prevalence of corona disease worldwide and the lack of definitive and known treatment for it, the ability of patients to take care of themselves and adherence to maintaining health is the best known way to prevent. The aim of this study was to investigate the effect of health literacy on self-care against COVID-19 among Rafsanjani citizens.

Materials and Methods

Study design and participants

This descriptive study was performed in the first 6 months of 2020 on patients with COVID-19 infection referred to health centers in Rafsanjan, Iran.

Inclusion criteria included a positive reverse transcription polymerase chain reaction (RT-PCR) test from a sample of nasopharyngeal swabs, age over 15 years, having a minimum literacy of reading and writing, complete mental health, and willingness to participate in the study. After taking the code of the ethics committee, information were collected from the main health center of Rafsanjan city, where the evaluation of COVID-19 patients was done in these centers. After contacting these people and providing the necessary explanations about the study and its purpose, people who were willing to participate in the study (with emphasis on maintaining the confidentiality of information and no need to enter a name and national code) entered the study. The Health Literacy Questionnaire (HELIA: Health Literacy for Iranian Adults) was used to assess health literacy in patients with COVID-19. Likewise, the self-care questionnaire designed by researchers to assess the status of self-care behaviors in these patients and completed by interview or electronically.

Measurements

The Health Literacy Questionnaire was localized by Montazeri et al. (HELIA: Health Literacy for Iranian Adults). Its validity and reliability have been confirmed (KMO, Kaiser-Meyer-Olkin= 0.919, Exploratory Function Analysis, $\chi 2$= 4101/779 $p<0.001$, Cronbach's alpha of items in different ranges between 0.72 to 0.89) (12). This questionnaire consists of two parts: part "a" is the demographic characteristics of the respondents which contains 6 questions (age, sex, level of education, marital status, place of residence and occupation) and part "b" contains 33 items in five areas. Accessibility (6 items), reading skills (4 items), comprehension (7 items), evaluation (4 items), and decision making (12 items). Questions are rated on the basis of quite easy (5), easy (4), neither easy nor hard (3), hard (2), and quite hard (1). The maximum score of this questionnaire is 165 and the minimum is 33. A high score indicates higher health literacy.

Researcher designed self-care questionnaire by studying various texts and instructions of the country's Corona headquarters. This questionnaire consists of 12 questions that were scored in a 5-point Likert scale (by no means = 1, rarely = 2, sometimes = 3, most of the time = 4, always = 5). The final score is obtained from the total score of 12 questions. A higher score indicates better self-care behavior. In order to assess the content validity and face validity, a self-care questionnaire was provided to 15 specialists in various fields of medicine, including behavior, infectious diseases, social medicine and health education, and their opinions were asked about the appropriateness of the questions. A comprehensive review done after adding up the views of these individuals. To evaluate the reliability of this questionnaire, the internal correlation of questions in each

dimension and also the whole questionnaire was measured using Cronbach's alpha coefficient. In addition, at the beginning of the research, a questionnaire was given to 20 participants two weeks interval and the reliability coefficient of the questions was calculated using the ICC (Intra-class correlation coefficient). Cronbach's alpha of the Health Literacy Questionnaire was generally estimated to be 0.93. In the reading dimension it was 0.88, the access dimension was 0.87, the comprehension dimension was 0.9, the evaluation dimension was 0.8 and the decision dimension was 0.87.

Statistical Analysis

Mean and standard deviation for quantitative variables and frequency and percentage for qualitative variables were reported. the normality of the distribution of data was tested using normal probability plots (skewness and kurtosis index) and Smirnov-Kohmogrov test. The chi-square test was used to analyze categorical variables across score based on health literacy classification and independent t -test was used to compare continuous variables among the groups.

Also, Pearson's correlation coefficient test was conducted to assess the correlation between health literacy and patient self-care. All analyses were performed through using SPSS software version 20. All P values are two-sided, and P values <0.05 were considered statistically significant.

Results

One hundred and one eligible COVID-19 patients were enrolled, and they completed the study. Total of 61.3% were women (38 people), 56.2% were married (50 people), 60% were employees (27 people) and 57.1% were residents of the city (48 people). Moreover, in terms of education, 63.2% had university education (48 people) (Table 1). By chi-square test, demographic information was compared between literacy groups and the results are presented in Table 1.

Table 1. Frequency distribution of demographic characteristics of patients

Variables Frequency (%)		Total (n=101)	THL<132 (n=45)	THL≥133 (n=56)	χ^2	P value Chi-square
		Frequency (%)	Frequency (%)			
Gender	Men	39 (100)	21 (53.8)	18 (46.2)	2.22	0.136
	Women	62 (100)	24 (38.7)	38 (61.3)		
Marital status	Never married	12 (100)	6 (50)	6 (50)	0.16	0.686
	Ever married	89 (100)	39 (43.8)	50 (56.2)		
Education	Diploma and lower	25 (100)	17 (68)	8 (32)	7.39	0.007
	University	76 (100)	28 (36.8)	48 (63.2)		
Occupation	Self-employment	14 (100)	9 (64.3)	5 (35.7)	2.63	0.268
	Government	45 (100)	1 8(40)	27 (60)		
	Unemployed	42 (100)	18 (42.9)	24 (57.1)		
Place of residence	City	84 (100)	36 (42.9)	48 (57.1)	0.58	0.446
	Village	17 (100)	9 (52.9)	8 (47.1)		

In total, the average total score of health literacy was 132.12 ± 19.203. One hundred and one eligible COVID-19 patients were enrolled, total health literacy was (THL) was lower than 132 in 44.6% of participations. It should be noted which the highest and lowest scores of health

literacy dimensions were related to decision making (48.12 ± 7.71) and evaluation (15.32 ± 3.51), respectively (Table 2). The mean score of patients' self-care was 80.15±8.108.

Table 2. Mean scores of health literacy dimensions in participating patients.

Variables	Mean score	Score range
Read	15.41±3.86	4-20
access	23.33±4.47	6-30
Understand	29.95±5.42	7-35
Evaluation	15.32±3.51	4-20
Decision making	48.12±7.71	12-60

All results were described as mean ± SEM.

In Table 3 compares the mean self-care score in the two groups of health literacy by indented t-test, showed that self-care score was positively associated with health literacy. Also the results of Pearson correlation test showed, while self-care had a significant weak and positive correlation only with Understand (one of the components of health literacy). The degree of self-care correlation with different dimensions of health literacy is shown in Table 4.

Table 3. Mean self-care score based on health literacy classification

Health care	Mean	Number	P value
THL<132	78.36±8.386	45	0.046
THL≥133	81.59±7.651	56	
Total	80.15±8.108	101	

All results were described as mean ± SEM.

Table 4. Pearson coefficients between health literacy and patient self-care

Variables	Read	Access	Understand	Evaluation	Decision making	Health literacy	self-care
Read	1						
Access	0.512**	1					
Understand	0.702**	0.634**	1				
Evaluation	0.618**	0.583**	0.641**	1			
Decision making	0.362**	0.353**	0.379**	0.320**	1		
Health literacy	0.777**	0.764**	0.841**	0.753**	0.722**	1	0.177
self-care	0.093	0.123	0.223*	0.098	0.119	0.177	1

* and **: Correlation is significant at the 0.05 and 0.01 level, respectively.

Discussion

The present study aimed to investigate correlation of health literacy on self-care against COVID-19 among Rafsanjani citizens. The mean score of health literacy was 132.12 ± 19.20, with 44.6% of participants having THL below 132 and 55.4% having THL greater than or equal to 133. The highest and lowest scores of health literacy dimensions were related to decision making and evaluation, respectively. In addition, the mean score of patient's self-care was 80.15±8.108. The results showed that health literacy had a weak positive correlation with self-care in patients with COVID-19.

Health literacy is an important predictor of COVID-19 preventive behavior and adherence to pharmacological management (13). In the present study, it is observed that health literacy was a significant predictor of COVID-19 awareness and preventive behavior, previously re-ported by Barati et al. (14), Tamizkar et al. (15), and Alizadeh Aghdam et al. (16) in hypertensive patients, elderlies and mental health state, respectively. The results of a study revealed no significant relationship between health literacy and self-care behavior in patients with type 2 diabetes. However, health literacy was

significantly correlated with gender, age, marital status, educational level, occupational status, socioeconomic status, and disease duration (17).

Examination of various dimensions of health literacy showed that the highest score was related to the decision dimension. In Barati et al. (14) and Zahedi et al. (18) studies, the highest score belonged to decided dimension which was agree with present results. While, in the study of Tamizkar et al (15), understanding dimension had the highest score. This difference may be due to differences in the age and education of the participants in the study. Health literacy is recognized as an important skill that patients need to make appropriate health decisions in difficult situations in advance .Improving people's health literacy leads to consequences such as increasing patients' potential ability to make informed decisions, reducing health threats, Improving disease prevention, improving security, improving quality of life, and increasing the quality of care.

According to the results of this study, most participants had moderate to high health literacy. The findings of Tamizkar et al. (15) and Alizadeh Aghdam et al. (16) were agree with the results of the present study, whiles the studies of Challenger et al. (17), Barati et al. (13) Zahedi et al. (18) and Gautam et al. (19) were not align with the present study. An acceptable level of health literacy makes people aware of issues related to their health and they can better take care of themselves and those around them against pathogens. This acceptable level of literacy seems to cause the government to spend the money on prevention and public health, rather than on treatment.

There was not a statistically significant relationship between different dimensions of health literacy and self-care. Lack of health literacy prevents people from understanding their illness and ways to prevent transfer with it (20).

In this context, this study was inconsistent with previous studies that have examined health literacy and self-care in various diseases (14, 15, 18) and COVID-19 (13, 20-22). The studies of Bains and Egede (23) and Chaleshgar-kordasiabi et al. (17) showed that there is no significant relationship between health literacy and self-care in patients with type 2 diabetes, which was consistent with the present study. On this point, health literacy appears to exert its influence through diabetes knowledge and is not directly related to self-care or medication adherence.

The difference between the results of this study and other studies on self-care of Covid 19 could be due to the diversity of participants. In the present study, people with the disease were studied, but in other acute studies, they were members of the community.

Today, most developed countries in the world focus on self-care. A clear example of this is quite evident in the current outbreak of Covid 19 disease. All the advice that can be given to people to follow the distance Put on a mask and get vaccinated, all of this is self-care, and people take care of themselves with these actions.

In terms of self-care, the average score was about 80, which was high. This result was consistent with the study of Salehzadeh et al. (24) and Alizadeh Aghdam et al. (16), and was inconsistent with the finding of Tamizkar et al. (15), Zahedi et al. (18) and Sang-e Sefidi et al. (25). People with Covid 19 do not seem to be properly aware of self-care for the disease. Since the participation of all people in this matter is necessary and not observing others has caused the illness of others. One of the reasons for this difference can be due to differences in the characteristics of the people studied. Another reason is the type of disease. Corona is a new and contagious disease that requires its own self-care.

In the present study, education was an impact factor on health literacy. In this regard, the study of Saatchi and et al (26) showed that education is one of the main variables affecting health literacy. Some studies (14, 16, 17, 23, 24) emphasized the effect of education on health literacy. Another study showed that low health literacy is more common in people with low education (27). People with higher education can read the brochures and educational materials related to their disease and are more able to apply the instructions. As a result, they have higher health literacy in terms of self-care. Health system for people with lower education, through educational methods with images, examples and cultural examples through the media, establishing communication with simple language and simple instructions will increase the health literacy of these people (28).

Using different tools to assess health literacy and self-care and cultural and social differences in different communities, makes the results of this study different or similar to other studies. One of the strengths of the study is that it has been performed on patients with COVID-19. According to the results of research on the relationship between health literacy and self-care, the need for health education programs with an emphasis on self-care and the role of health literacy is essential.

The most important limitation of this study is The collection of information on health literacy and self-care through self-report that may result in the evaluation of biased results. Another limitation is lack of control group and lack of consideration of health literacy and self-care of all family members.

Conclusion: The results of correlation test in patients with Covid-19 in Rafsanjan showed that health literacy has a significant weak correlation with self-care, which may be due to the limitations of this study. Therefore, patients should pay attention to the level of self-care and health literacy of other family members who are in contact with the patient.

As a result, patients with COVID-19 need proper better knowledge and attitude to successfully develop self-care ability in order to successfully control their disease and prevent transmission to others. In this regard, it is suggested that more attention be paid to the design of patient health promotion programs and their families, that information and training be provided to all family members inin an understandable and simple manner. Focusing on health literacy could thus be an essential strategic intervention yielding long term benefits.

Acknowledgments: This study was supported financially by the Deputy for Research and Technology of Rafsanjan University of Medical Sciences with the moral code IR.RUMS.REC.1399.079.

Declarations of interest: No conflict of interest has been declared by the authors.

Author Contributions: F.A. (First author), Introduction author/Original researcher (20%); H.O. (Second Author), Methodologist/Assistant Researcher (15%); Z.K. (Third Author), Methodologist/Assistant Researcher (15%); G.B. (Fourth Author), Methodologist/Assistant Researcher (15%); S.S. (Fifth Author), Discussion author/Assistant Researcher (15%), E.S. (Corresponding Author), Results author/Original researcher (20%).

Reference

1. Nguyen HC, Nguyen MH, Do BN, Tran CQ, Nguyen TT, Pham KM, et al. People with suspected COVID-19 symptoms were more likely depressed and had lower health-related quality of life: the potential benefit of health literacy. Journal of clinical medicine. 2020;9(4):965. https://doi.org/10.3390/jcm9040965 PMid:32244415 PMCid:PMC7231234

2. Paakkari L, Okan O. COVID-19: health literacy is an underestimated

problem. The Lancet Public Health. 2020;5(5):e249-e50. https://doi.org/10.1016/S2468-2667(20)30086-4
3. Lazcano-Ponce E, Alpuche-Aranda C. Public Health Literacy in the Face of the Covid-19 Pandemic Emergency. Salud publica de Mexico. 2020;62(3):331-40. https://doi.org/10.21149/11408 PMid:32304371
4. Khakzadi H, Morshedi H. Association between Health Literacy and Theory of Planned Behavior with Self-Care Behaviors in Type 2 Diabetic Patients. Journal of Torbat Heydariyeh University of Medical Sciences. 2019;6(4):33-46.
5. Peyman N, Abdollahi M. The relationship between health literacy and self-efficacy physical activity in postpartum women. Journal of Health Literacy. 2016;1(1):5-12.
6. Tavakoly Sany SB, Esmaeily A, Lael-Monfared E, Tehrani H, Ferns G, Jafari A. Organizing framework to investigate associations between diabetes knowledge, health literacy, and self-care behaviors in patients with type 2 diabetes based on the extended parallel process model. Journal of Diabetes & Metabolic Disorders. 2020;19(2):1283-92. https://doi.org/10.1007/s40200-020-00642-w PMid:33520836 PMCid:PMC7843697
7. Schwarzer R, Antoniuk A, Gholami M. A brief intervention changing oral self-care, self-efficacy, and self-monitoring. British journal of health psychology. 2015;20(1):56-67. https://doi.org/10.1111/bjhp.12091 PMid:24471473
8. Khodabandeh M, Maleki Avarasin S, Nikniaz L. The Relationship between Health Literacy, Perceived Self-efficacy and Self-care Performance of Female Senior High School Students in Health Promoting Schools of Miyaneh, 2016-2017. Journal of Health Literacy. 2017;2(3):164-76. https://doi.org/10.29252/jhl.2.3.164
9. 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 PMCid:PMC8507341
10. Kickbusch IS. Health literacy: addressing the health and education divide. Health promotion international. 2001;16(3):289-97. https://doi.org/10.1093/heapro/16.3.289 PMid:11509466
11. Delavar F, Pashaeypoor S, Negarandeh R. Health literacy index: A new tool for health literacy assessment. Journal of hayat. 2018;24(1):1-6.
12. Montazeri A, Tavousi M, Rakhshani F, Azin SA, Jahangiri K, Ebadi M, et al. Health Literacy for Iranian Adults (HELIA): development and psychometric properties. Payesh (Health Monitor). 2014;13(5):589-99.
13. Gautam V, Dileepan S, Rustagi N, Mittal A, Patel M, Shafi S, et al. Health literacy, preventive COVID 19 behaviour and adherence to chronic disease treatment during lockdown among patients registered at primary health facility in urban Jodhpur, Rajasthan. Diabetes & Metabolic Syndrome: Clinical Research & Reviews. 2021;15(1):205-11. https://doi.org/10.1016/j.dsx.2020.12.023 PMid:33387854 PMCid:PMC7833282
14. Barati M, Bayat F, Asadi ZA, Afshari Moshir F, Afshari M. Relationship between health literacy and self-care behaviors in hypertensive patients. J Educ Community Health. 2020:89-96. https://doi.org/10.29252/jech.7.2.89
15. Tamizkar P, Mohammadi M, Fathnezhad-Kazemi A, Marami S. The relationship between health literacy level and self-care ability in the elderly. Journal of Gerontology. 2019;4(3):54-62. https://doi.org/10.29252/joge.4.2.54
16. Alizadeh Aghdam MB, Koohi K, Gholizadeh M. The relationship of Self-care and Health Literacy with Mental Health among Citizens of Tabriz City. Journal of Health Based Research. 2017;2(4):381-94.
17. Chaleshgar-kordasiabi M, Ramezani A, Bakhshavand A. Relationship between Health Literacy and Self-care Behaviors in Patients with Type 2 Diabetes. J Health Syst Res. 2020;15(4):262-71.
18. Zahedi S, Darvishpoor Kakhaki A, Hosseini M, Razzaghi Z. The Correlation Between Self-Care And Health Literacy In Patients Undergoing Hemodialysis. Iranian Journal of Diabetes and Metabolism. 2018;17(4):180-8.
19. Kripalani S, Henderson LE, Chiu EY, Robertson R, Kolm P, Jacobson TA. Predictors of medication self-management skill in a low-literacy population. Journal of general internal medicine. 2006;21(8):852-6. https://doi.org/10.1111/j.1525-1497.2006.00536.x PMid:16881946 PMCid:PMC1831567
20. Do BN, Nguyen P-A, Pham KM, Nguyen HC, Nguyen MH, Tran CQ, et al. Determinants of health literacy and its associations with health-related behaviors, depression among the older people with and without suspected COVID-19 symptoms: A multi-institutional study. Frontiers in public health. 2020;8:694. https://doi.org/10.3389/fpubh.2020.581746 PMid:33313037 PMCid:PMC7703185
21. Nguyen HT, Do BN, Pham KM, Kim GB, Dam HT, Nguyen TT, et al. Fear of COVID-19 scale-associations of its scores with health literacy and health-related behaviors among medical students. International Journal of Environmental Research and Public Health. 2020;17(11):4164. https://doi.org/10.3390/ijerph17114164 PMid:32545240 PMCid:PMC7311979
22. 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;10(12):e041394. https://doi.org/10.1136/bmjopen-2020-041394 PMid:33293320 PMCid:PMC7722826
23. Bains SS, Egede LE. Associations between health literacy, diabetes knowledge, self-care behaviors, and glycemic control in a low income population with type 2 diabetes. Diabetes technology & therapeutics. 2011;13(3):335-41.

https://doi.org/10.1089/dia.2010.0160 PMid:21299402 PMCid:PMC3690006

24. Salehzadeh A, Rahmatpour P. Self-care behaviors and related factors in patients with heart failure reffering to medical & educational center of heart in Rasht.. Journal of Holistic Nursing And Midwifery. 2013;23(1):22-9.
25. SangSefidi S, Ghanbari Moghaddam A, Mohamadzadeh M, Karbalaee Z, Mohammadi M. Self-care and its predictive role in the quality of life of the elderly living in the community. Journal of Gerontology. 2018;2(4):64-70. https://doi.org/10.29252/joge.2.4.64
26. Saatchi M, Panahi M, Ashraf Mozafari A, Sahebkar M, Azarpakan A, Baigi V, et al. Health literacy and its associated factors: A population-based study, Hormuz Island. Iranian Journal of Epidemiology. 2017;13(2):136-44.
27. Farghadani Z, Taheri-Kharameh Z, Amiri-Mehra A, Ghajari H, Barati M. The relationship between health literacy and self-care behaviors among patients with heart failure. Journal of hayat. 2018;24(2):186-96.
28. Fallah Taher pazir E, Zeighami Mohammadi S, Fahidy F. Perception of patients with cardiovascular disease about barriers and benefits of health promotion behaviors. Cardiovascular Nursing Journal. 2012;1(2):16-23.