Original Article:

Assessment of Health Literacy and Self-care Behaviors among Patients Discharged from COVID-19 Wards

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Abstract

Introduction: The rapid outbreak of the new COVID-19 virus has become an international health challenge. Confronting the prevalence of this pathogenic virus requires, in the first step, health literacy and self-care on people's part.

Materials and Methods: This descriptive cross-sectional study was carried out over three months. A total of 67 patients discharged from a COVID-19 ward were selected randomly. Data were collected using a validated researcher-made questionnaire on health literacy and self-care. The data were then analyzed using SPSS software version 16.

Results: Sixty-seven patients (mean age: 45.32 ± 9.39; age range: 29 - 87) were assessed. The majority were male (64.2%), married (79.1%), illiterate (44.8%), and homemaker or unemployed (37.3%). The overall mean score of health literacy and self-care was moderate. The results of the Pearson correlation test showed a significantly positive association between overall health literacy and its components as well as the total self-care and its components among the patients studied ($p < .001$).

Conclusion: Since self-care increases with health literacy among COVID-19 patients, it demands educational interventions in this area to improve health literacy.

Keywords: COVID-19, Health literacy, Self-care

1. Introduction

Coronaviruses are a large group of viruses belonging to the family of Coronaviridae, ranging from the common cold virus to the pathogens of more serious diseases such as SARS, MERS, and COVID-19. Coronaviruses were discovered in 1965 and were continuously studied until the mid-1980s. As of today, seven human-transmitted coronaviruses have been identified [1].

On December 31, 2019, China reported the outbreak of an acute pneumonic disease from Wuhan, China, to the World Health Organization (WHO) [2]. Shortly after, the disease caused by the new coronavirus (COVID-19) spread from China to other countries, whereby people worldwide encountered various problems in health, economic, social, and political dimensions [3, 4]. The virus entered Iran in early March 2020 and affected all the provinces and cities. The WHO has recently declared the disease a pandemic [5]. Following the global outbreak of the virus, the WHO released a statement (January 30, 2020) according which the new coronavirus disease is a public health emergency worldwide, posing a threat not only to China but to all countries [6].

With yet many unknown dimensions, the disease has caused a shock to family economies, businesses, and the macro-economy of the globe. Therefore, all nations need to cooperate with their governments to overcome the disease in the shortest time and with minimal losses [5].

Today, the *patient-centric* paradigm of the health system has taken on a serious significance in terms of service enhancement and cost reduction. In this context, patients should be more involved in decisions related to their health [7] so that they can have the skills required to access and acquire health information and adopt appropriate decisions regarding health services. What enables patients and other people to play an active role in health and to use health services more efficiently is a skills kit now called health literacy. The positive outcome of promoting community health literacy is reflected in the proper use of health services. As a consequence, people with high health literacy cooperate better with health care providers and execute health instructions well. In contrast, people with poor health literacy skills have lower levels of health knowledge, receive fewer preventive services, have less control over chronic diseases, enjoy fewer health benefits, have poorer physical and mental health functioning, and use emergency departments and hospital services more often [8].

Self-care is a multidimensional construct that entails other behaviors, which are, in turn, influenced by health beliefs, economic conditions, life events, and other factors [9]. It includes all activities related to self-care, self-treatment, and prevention by the person him/herself [10].

A person with health literacy can distinguish his/her informational needs well, identify and retrieve credible information sources, make effective use of information, and share information with others in case necessary. A health-literate person is always attempting to learn and is ready for lifelong learning. Accordingly, a person with health literacy is expected to outperform others in the search for health-related information, to better identify the reliable sources of health, to distinguish between reliable and unreliable information, and to make more efficient use of his/her knowledge in health.

A re-examination of the definitions of health literacy and self-care also reveals that both terms emphasize the concept of information and the skills needed to access, evaluate, and use information to maintain health. Hence, the two terms seem to be logically interconnected. Given the rapid outbreak and global spread of the new coronavirus (CoV-2019), it seems necessary to measure the health literacy and self-care behaviors of COVID-19 patients discharged from the hospital. As a patient's chances of re-infection with COVID-19 and associated complications are closely related to health literacy and self-care, this study was designed to assess the level of health literacy and self-care behaviors in patients discharged from the COVID-19 ward of 22nd-Bahman Hospital of Khaf.

2. Materials and Methods

This descriptive cross-sectional study was conducted from the beginning of October 2020 to the end of December 2020. All eligible patients, amounting to n = 67, were selected and recruited via convenience sampling method. The sample size was determined as n = 61 using the information in similar studies [11-14] and by considering a 10% attrition rate and the following formula.

$$n = \frac{N \times P(1-P) \times Z^2_{1-\frac{\alpha}{2}}}{(N-1) \times d^2 + P(1-P) \times Z^2_{1-\frac{\alpha}{2}}}$$

where p = .4, d = .15p, α = .05, N = 81, and n = 61.

All participants declared their informed consent for participation. Inclusion criteria were willingness to participate in the study, ability to self-care, and alertness and awareness of time and place (lack of consciousness disorder). The exclusion criterion was unwillingness to continue cooperation.

The data collection instruments comprised demographic characteristics with five items, age,

gender, marital status, education, and occupation. The second tool involved a researcher-made health literacy questionnaire with 17 items in 5 components. The third instrument was a researcher-made self-care questionnaire with 13 items in 5 dimensions. These questionnaires were designed by studying several books and the related articles [15, 16]. Questionnaires were completed one week after the patients' discharge through phone calls.

A researcher-made health literacy questionnaire was used to assess the health literacy of COVID-19 patients. The questionnaire was developed to cover five components in 17 items according to the information needed to assess the health literacy of the COVID-19 patients. The dimensions of this questionnaire included reading (2 items), access (5 items), comprehension (2 items), evaluation (4 items), and decision-making and behavior (4 items). The questionnaire items were answered and scored on a five-point Likert scale (always, mostly, sometimes, rarely, not at all), with 1 and 5 representing the lowest and highest scores, respectively. In this questionnaire, the scores may range from 17 to 85. The scoring categories were as follows: from 17 to 38 were considered as weak, from 39 to 62 as moderate, and from 63 to 85 as good.

To assess the self-care level in COVID-19 patients, a 13-item questionnaire with five components was prepared. The dimensions of this questionnaire included healthy diet (3 items), physical activity (2 items), stress management (3 items), smoking (2 items), responsibility for health status and knowledge of COVID-19 (3 items). Scoring was on a five-point Likert scale (always, mostly, sometimes, rarely, and not at all), with 1 indicating the lowest score and 5 the highest score. In this questionnaire, the scores could range from 13 to 65. A score between 13 and 29 was considered as weak, from 30 to 47 as moderate, and between 48 and 65 as good.

As these tools had not been used to measure the health literacy and self-care behaviors of COVID-19 patients before, they were reviewed by 10 faculty members and experts. Accordingly, modifications were made to ensure the validity of the questionnaires. The validity of the instrument was determined using the quantitative content validity method and by determining the CVI (Content Validity Index) and CVR (Content Validity Ratio). The opinion of 10 faculty members and experts

showed that this questionnaire in the CVR dimension has acceptable content validity in all terms. In the CVI dimension, the scores were between .7 and 1, showing the appropriateness of the expressions in the dimensions of simplicity, relevance and clarity. Moreover, a pilot study was performed to determine the reliability of the health literacy and self-care questionnaires. A research colleague completed the questionnaires for 30 patients discharged from the COVID-19 ward over the phone. After 10 days, the questionnaires were completed by the researcher for the same individuals on the phone. As such, the reliability of the instrument was calculated by computing the test-retest coefficient and Cronbach's alpha coefficient, where the correlation coefficient was .92.

The gathered data were analyzed in SPSS 16 statistical software. First, the normality of data distribution was assessed using skewness and kurtosis coefficients. Given the normal distribution, independent t-test, one-way analysis of variance, Pearson correlation coefficient, and multiple regression were employed. The level of significance was set at $p < .05$.

3. Results

In this study, 67 patients with a mean age of 45.32 ± 9.39 years old and an age range of 29 to 87 were studied. Most of the patients were male (64.2%), married (79.1%), homemaker or unemployed (37.3%), and had elementary education (64.2%). The mean scores of health literacy and self-care were significantly higher in male patients than female ones ($p < .05$). Nonetheless, no significant difference was found in single and married patients ($p > .05$). The mean scores of health literacy and self-care in patients with tertiary and seminary education were significantly higher than patients with high school diplomas and elementary education ($p < .001$). Similarly, the scores were significantly higher in patients with a high school diploma than those with elementary education ($p < .001$). Besides, the mean scores of health literacy and self-care in retired patients and the non-medical staff were significantly higher than those of other patients ($p < .001$). Lastly, the results of the Pearson correlation test showed that age was not significantly associated with health literacy and self-care ($p > .05$) (Table 1).

Table 1. Comparison of the mean scores of health literacy and self-care in the patients according to demographic characteristics

Variable		Frequency	Percent	Health literacy Mean ± SD	Self-care Mean ± SD
Gender	Woman	24	35.8	35.8 ± 17.77	29.12 ± 38.08
	Man	43	64.2	50.24 ± 5.65	39.16 ± 7.61
p-value for independent t-test		-	-	0.006	0.02
Marital status	Single	14	20.9	38.20 ± 50.05	31.14 ± 71.54
	Married	53	79.1	45.23 ± 91.73	36.16 ± 62.04
p-value for independent t-test		-	-	0.29	0.30
Education	Elementary	43	64.2	28.7 ± 9.01	34.4 ± 49.33
	High school	14	20.9	68.5 ± 79.70	52.5 ± 71.36
	Tertiary or clergy school	10	14.9	80.3 ± 10.78	59.4 ± 40.22
p-value for one-way analysis of variance		-	-	<0.001	<0.001
Occupation	Self-employed	18	26.9	39.20 ± 56.65	32.13 ± 11.99
	Retiree	6	.09	76.2 ± 0.76	54.4 ± 83.17
	Employee in a non-medical center	8	11.9	76.5 ± 75.37	59.4 ± 25.10
	Worker	10	14.9	34.18 ± 20.28	27.11 ± 90.43
	Housewife or unemployed	25	37.3	33.15 ± 92.87	29.11 ± 0.34
p-value for one-way analysis of variance		-	-	<0.001	<0.001
Age	Mean ± SD	45.9 ± 32.39		r = 0.15	r = 0.17
Result of Pearson correlation coefficient		-		p = 0.25	p = 0.19

The mean scores of health literacy and total self-care in the studied patients were 44.36 ± 23.07 and 35.60 ± 15.76, respectively. Most patients had low levels of health literacy (58.2%) and self-care (56.7%). Considering that the coefficients of skewness and kurtosis for the mentioned variables are in the range [-2, 2], it is concluded that these variables have a normal distribution. (Table 2).

The results of the Pearson correlation test showed that the overall health literacy and its components are positively and significantly related to total self-care and its components in the studied patients (p <.001) (Table 3).

Table 2. Descriptive analysis indicators related to research variables

Variable	Minimum score	Maximum score	Mean	Standard deviation	quart 25	Quarter 50	skewness	kurtosis	Low Number (%)	Moderate Number (%)	High Number (%)
Health literacy	19	85	44.36	23.08	24	32	0.56	-1.44	39 (58.2)	6 (9)	22 (32.8)
Self-care	17	64	35.60	15.76	23	27	0.61	-1.30	38 (56.7)	8 (11.9)	21 (31.3)

Table 3. Correlation between overall health literacy and its components as well as total self-care and its components

Variable	Diet	Physical activity	Stress management	Smoking	Knowledge and responsibility	Overall self-care
Access	0.94**	0.96**	0.94**	0.97**	0.93**	0.98**
Comprehension	0.97**	0.92**	0.95**	0.93**	0.96**	0.98**
Evaluation	0.89**	0.97**	0.89**	0.98**	0.88**	0.95**
Decision-making and behavior	0.96**	0.94**	0.95**	0.96**	0.95**	0.98**
Reading	0.89**	0.96**	0.89**	0.97**	0.88**	0.94**
Total health literacy	0.94**	0.97**	0.94**	0.98**	0.93**	0.98**

p <0.001**

Table 4. Results of regression coefficients related to the effect of health literacy components on the self-care of patients

Variable	Non-standard coefficient		Standard coefficient	Value t	Significance level	Correlation coefficient	Explanation coefficient
	Value of B	Standard of error	Value of β				
Fixed	0.57	0.83		0.69	0.49		
Decision-making and behavior	1.39	0.26	0.42	5.32	<0.001	0.981	0.96
Comprehension	2.44	0.50	0.39	4.88	<0.001	0.989	0.97
Access	0.45	0.20	0.19	2.25	0.03	0.990	0.98

Stepwise multiple regression was used to determine the extent to which the components of health literacy can explain self-care in the patients studied. In the first step, the *decision-making and behavior* component entered the equation, which could explain 96% of self-care in patients. In the second step, the *comprehension* component was entered into the equation, whereby the explanation coefficient increased from 96% to 97%. In the third and last step, the access component was included in the equation, leading to a 98% explanation coefficient. In other words, the three components of decision-making and behavior, comprehension, and access could together explain 98% of changes in self-care in patients. Other components of health literacy were excluded from the equation due to lack of significance (Table 4).

4. Discussion

The rapid transformation of the COVID-19 disease into an epidemic led people to seek and use medical information and adapt their behavior to the rapid consequent changes. Health communications are widely available to educate people about acute coronavirus syndrome (SARS-CoV-2) and the ways to prevent infection. However, there is also complex, contradictory, and inaccurate information.

Inadequate health literacy is defined as the limited ability of individuals to acquire, interpret, and understand basic information and health services that are necessary to make appropriate health decisions. Low levels of health literacy are associated with an inadequate understanding of health information, medical education and adherence to instructions, less participation in preventative behaviors, late detection of diseases, inability to apply self-care skills, and lack of adherence to healthy lifestyle behaviors. In recent years, there has been a growing emphasis on health literacy in light of increased attention to people's participation in decision-making and disease management [17, 18].

In this study, we examined the level of health literacy and self-care in people inflicted with COVID-19. The results showed that the mean score of health literacy and self-care in patients was at a moderate level, which was higher than the degrees reported in studies on health literacy and self-care [19, 20]. This suggests a rise in the sensitivity of the public and their pursuit of information concerning the widely spread coronavirus. The dissimilar results regarding the levels of health literacy and self-care in different studies can be attributed to the socio-cultural differences and varying education levels in samples from different communities.

In this study, health literacy and self-care scores were not significantly correlated with age. In this regard, studies have reported contradictory findings. In Zolfaghari's study and Mohammadi and Behrooz's study, higher health literacy scores were observed among older people, attributably due to their higher experience in dealing with medical situations, greater sensitivity to health status, and larger information accumulation over time [21-23]. Yet, some studies have found a negative correlation between age and the variables of health literacy and self-care. This negative association has been linked to decreased cognitive function; long time after graduation; decreased ability and sensory function; and physical, social, and physiological changes that increase dependence on health care personnel [24-26].

Although adherence to health-promoting behaviors is the optimal way people can control and maintain their health, the results from Taheri et al.'s study (2014) indicate that adolescents and the youth do not consider health as important in life as adults do. The worldview of the youth is different from that of adults. Adolescents often engage in behaviors that often expose them at risk for life-threatening illnesses. High-risk preventable behaviors such as drug use, unsafe sex, poor diet, inappropriate physical activity patterns, driving without obedience to the law, failure to fasten a seat belt, and violent behaviors are significantly associated with morbidity and mortality

among adolescents [27].

In the present study, the health literacy and self-care scores were significantly different between the two genders, with men scoring higher than women. This contradicts the results of some studies that do not differentiate between the genders. For example, in Zolfaghari et al.'s study, health literacy and self-care scores were higher in women [21]. This discrepancy in results may be due to differences in research samples or more susceptibility of men to COVID-19 disease for reasons such as greater contact owing to working conditions or higher education levels in men.

Also, cultural gender-based differences in societies can be one reason for the difference in the average score of health literacy in men and women. In general, the similarities and differences in the results can be due to socio-cultural differences or differences in measurement instruments [24, 27].

The results of Aghamolaei et al.'s study in 2016 also show that the average scores of health-promoting behaviors and health literacy are significantly higher in men than in women. Additionally, his research indicates that health literacy can explain over half of the changes in health-promoting behaviors [28].

Analysis of the results in our study showed a statistically significant difference between health literacy and self-care scores at different levels of education and in different occupations. The mean score was higher in people with higher levels of education because these individuals have greater knowledge and skills regarding self-care and the necessity of following medical instructions. This finding of the current study is consistent with the results of other studies [29, 30].

Health literacy and self-care scores demonstrated no significant association with marital status in our study. However, other studies with similar topics report a higher health literacy score in married people [21, 31, 32]. It is because married people have a wider network and thus receive more health information. Better decision-making in medical matters and a higher sense of responsibility for health and family in couples are among the reasons raised for higher health literacy rates in married people. The reason for this discrepancy between our findings and those of other studies can be attributed to the pervasive stress caused by COVID-19, which is widespread in the general public, whereby everyone is seeking medical information about the disease.

In line with Zahedi et al.'s findings [33], we found a positive correlation between health literacy and self-care in patients with COVID-19. Patients with lower health literacy observe preventive behaviors to a lower extent and do not take part in treatment decisions. They are not able to accept health-related responsibilities and, thus, have poorer self-care behaviors. The presence of a significant positive correlation between self-care and health literacy underscored the necessity for further attention of hospital managers and nurses to the needs of patients. Given the substantial contribution of health literacy to patient self-care, health officials and policy makers should use educational programs proportionate to the level of patients' health literacy to improve their health and quality of life.

It must be borne in mind that the bulk of strict laws and regulations will go nowhere unless society intends to control the pandemic. Therefore, reasonably enough, one way to control COVID-19 is to improve the health literacy of the people in the community.

In light of the significance of the two categories of health literacy and promotional behavior and the report published by the Health Care Organizations and Health Care Data Quality, as well as the country's special conditions in controlling COVID-19, policymakers need to think twice about promoting the "health literacy" of the society along with establishing health and social rules and regulations. This may be considered as a neglected link in the control of the COVID-19 pandemic [17, 18].

Health literacy is now viewed as a crucial tool in preventing non-communicable diseases and is accompanied by investment in education, communications, and long-term measures that start early in life. However, two aspects came to the fore with the advent of COVID-19. First, health literacy is as important to the prevention of communicable diseases on the global scale as it is to non-communicable diseases. Second, along with system preparedness, individual preparedness is similarly fundamental to solving complex real-life problems. In the course of this epidemic, it is difficult yet possible to devote time to enhance health literacy as an immediate action by governments and citizens is required [34, 35].

Health literacy can help people understand the reasons for the recommendations, protocols, and restrictions imposed and reflect on the outcomes of their own actions.

The development of health literacy is even more critical for situations that require a quick response.

Most importantly, health literacy must be seen vis-à-vis social accountability and solidarity and is needed for both those in need of information and services and those who provide them [36].

People with good health literacy can generally manage their health more effectively than people who do not. Health literacy is a social determinant of health. While poor health literacy is associated with poverty in education, unemployment, and low economic status, people with higher levels of education and income can also have low health literacy when engaged in new experiences [37].

This is especially important in the context of the COVID-19 pandemic because it is a new virus against which the world has still proved unsuccessful. While scientists still do not have sufficient information about the virus and are competing to produce an effective vaccine, the world has been suddenly forced to acquire health literacy on the new disease.

With the outbreak of the new coronavirus, social media and the Internet experienced large volumes of information, a substantial part of which was inaccurate. To tackle this harmful information, the WHO has uploaded downloadable information and posters on its website to strengthen public health information. Despite all the strong and urgent messages from reputable information sources, the fact that some groups do not comply with protocols indicates a lack of health literacy in the general population. Without health literacy, people are unable to make a useful distinction between fact and fiction and can allow unreliable information to influence their behavior. This can be harmful not only for the individual but also for the community in general [37].

5. Conclusion

Since self-care increases with health literacy in COVID-19 patients, it is recommended to make educational interventions in the area to improve the health literacy of these patients.

Ethical Considerations

Compliance with ethical guidelines

The study protocol is registered with the ethics code IR.MUMS.REC.1399.423 by Mashhad University of Medical Sciences, IRAN. The objectives of the study and type of information to be obtained were explained to the participants and their written informed consent was taken. Confidentiality and privacy were also confirmed.

Author's contributions

Each author has made substantial contributions as follows: RR participated in analysis and interpretation of data, drafted the article, KH supervised the teamwork, participated in analysis and interpretation of data, revised the article. MR was responsible for conception and design of the study, and revised the article. ZA, AA and SM was responsible for acquisition of data, drafted the article. AB revised the article critically for important intellectual content, and drafted the article. All authors have read the manuscript and approved the final version to be submitted.

Conflict of interest

The authors declare no competing interests.

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