Research Paper
The Role of General Health and Health Literacy in Self-care Behaviors of Patients With COVID-19

Fatemeh Asgari[1] , Zahra Rahemi[2] , Zohreh Sadat[1] , Neda Mirbagher Ajorpaz[3]

1. Department of Nursing and Midwifery, Trauma Nursing Research Center, Kashan University of Medical Sciences, Kashan, Iran.
2. Department of Nursing, School of Nursing, Clemson University, South Carolina, United States.
3. Department of Nursing and Midwifery, Autoimmune Diseases Research Center, Kashan University of Medical Sciences, Kashan, Iran.

A B S T R A C T

Background: Self-care is an important concept in controlling COVID-19 disease and a simple and effective way to maintain and improve health. This study aimed to examine the role of general health and health literacy in predicting the self-care behaviors of patients with COVID-19.

Methods: This research was a cross-sectional study with a predictive correlational design. The sample consisted of 385 patients with mild to moderate COVID-19 infection referring to the COVID-19 diagnosis and treatment center in Shahid Beheshti Hospital in Kashan City, Iran, from June to September 2021. The subjects were under quarantine at home and were recruited by convenience sampling. The data were collected by the general health questionnaire (GHQ-28), the Iranian health literacy questionnaire (IHLQ), and a researcher-made questionnaire on self-care behaviors in patients with COVID-19 (SCB-COVID-19). The Pearson correlation coefficient, t-test, and logistic regression were used for data analysis in SPSS software, version 19. The significance level was set at $P<0.05$.

Results: The Mean±SD scores of self-care behaviors, health literacy, and general health of the subjects were 224.89±21.49, 63.78±21.28, and 50.99±12.81, respectively. There were significant relationships between self-care behaviors and health literacy ($r=0.567$, $P=0.001$) and self-care behaviors and general health ($r=235$, $P=0.001$). Logistic regression showed that about 42% of self-care behaviors score changes are explained by health literacy and general health variables ($R^2=0.42$)

Conclusion: The results showed that self-care behaviors score changes are explained by health literacy and general health in COVID-19 patients. Our results can integrate into the body of knowledge to help improve the health and well-being of populations in the COVID-19 outbreak.

* **Corresponding Author:**
Neda Mirbagher Ajorpaz, PhD.
Address: Department of Nursing and Midwifery, Autoimmune Diseases Research Center, Kashan University of Medical Sciences, Kashan, Iran.
Tel: +98 (91)32130397
E-mail: mirbagher_n@kaums.ac.ir

Highlights

• Self-care behaviors can help individuals improve their health, energy, emotions, perceived physical health, self-confidence, and enthusiasm.

• Significant relationships existed between self-care behaviors, health literacy, and the self-care behaviors and general health of COVID-19 patients quarantined at home.

• Self-care behaviors can be predicted by health literacy and general health in COVID-19 patients quarantined at home.

Plain Language Summary

There is a need to improve the knowledge base for enhancing populations' health and well-being in pandemics and infectious disease outbreaks. The study results showed that the higher the general health and health literacy, the better the self-care behaviors. In other words, the general health and health literacy level predict self-care behaviors in home-quarantined COVID-19 patients.

1. Introduction

The coronavirus disease (COVID-19) pandemic, caused by SARS-CoV-2, has affected people around the globe (Jakhar et al., 2020). On August 9, 2021, the World Health Organization (WHO) reported 202 million confirmed COVID-19 cases, approximately 4300 million deaths, and four billion doses of administered vaccine (Sotoodeh Ghorbani et al., 2022). Statistics in Iran showed that about three million people had been infected with this virus by February 2021, which has increased rapidly (Pourmalek et al., 2021).

The transmission of SARS-CoV-2 is challenging. This virus can be transmitted directly from the infected individuals' respiratory droplets and indirectly from contaminated surfaces (Bai et al., 2020; Zhai et al., 2020). The spread of disease by asymptomatic patients has made pandemic containment more challenging (Yu and Yang, 2020). Therefore, to limit SARS-CoV-2 transmission, improving knowledge and changing behavior in populations is essential (Dykgraaf et al., 2021).

The COVID-19 outbreak has led to significant lifestyle changes, such as activity limitations, poor social interactions, psychological distress, and increased dependence, all of which can decrease the quality of life and health status. The disease affects life's physical, psychological, social, and economic aspects, especially in infected patients (Aghajani et al., 2021). Concerns related to COVID-19 lockdowns, such as job loss and duration of lockdown (Brooks et al., 2020), boredom, inadequate information, fear of the unknown and infection, and un-

certainty about the future, have significant psychological effects leading to frequent psychiatric problems (Mazza et al., 2020). Considering the symptoms and complications of COVID-19, health literacy in these patients can play an important role in controlling the disease (Brooks et al., 2020).

Health literacy relates to individuals' ability to acquire, process, and understand health data necessary for health decisions (Horowitz et al., 2008). The (WHO) stated that "health literacy includes cognitive and social skills that increase the motivation and ability of people to access and use health information in the way of improving self-care" (WHO, 2013).

Studies have shown that health literacy effectively improves individuals' self-care behaviors and general health and reduces disease complications (Torkan et al., 2022; Martínez-Riera & Gras-Nieto, 2021; Arani et al., 2017). These studies suggested considering the significance of health literacy in patient education, treatment, and care plans. Higher awareness about communicable diseases can help improve self-care behaviors and related outcomes (Holden et al. 2017). Some studies also suggested that health literacy could improve health outcomes, such as self-care behaviors and quality of life (Reisi et al., 2016; Al Sayah et al., 2016).

Self-care behaviors are decisions and actions that help individuals cope with their health issues or enhance their overall health and well-being (Jo et al., 2020; Rahemi et al., 2018). In patients with COVID-19, self-care behaviors include various activities, such as adherence to medication and diet, adequate rest, drinking enough flu-

ids, changing clothes, daily baths, good sleep, personal hygiene, social distancing, hand hygiene, surface and equipment disinfecting, using masks, home quarantine, and controlling emotions (Martínez-Riera & Gras-Nieto, 2021). Self-care behaviors can help individuals improve their level of health, energy, and emotions, perceived physical health, self-confidence, and enthusiasm (Moein et al., 2017), and also manage their stress and anxiety, decrease the risk of illness, and increase energy (Martínez-Riera & Gras-Nieto, 2021).

Self-care behaviors play a significant role in managing COVID-19 and its complications. The patient's knowledge and skills, emotional factors, and self-efficacy affect self-care behavior (Vindegaard et al., 2020).

Self-care behaviors can affect general health (Martínez-Riera & Gras-Nieto, 2021; Yosefi et al., 2021). General health problems associated with COVID-19 reported in these patients included low energy, fatigue, stress, anxiety, depressive symptoms, insomnia, and dyspnea (Safa et al., 2022). Poor physical health conditions (such as breathing problems, headache, cough, fear, and anxiety) are the most common symptoms reported among COVID-19 patients (Karaye et al., 2019).

Momenabadi et al. (2021) reported that self-efficacy constructs; perceived benefits, barriers, intensity; and the importance of health and knowledge are the main predictors of self-care behaviors related to COVID-19 (Momenabadi et al., 2021). Other study results showed that the constructs of the health belief model refer to the role of e-health literacy and some cognitive factors in creating caring behaviors during COVID-19. Individuals with higher socioeconomic status performed better during the COVID-19 pandemic regarding e-health literacy and COVID-19 care behaviors (Rezakhani Moghaddam et al., 2022). Health literacy has been reported to increase self-care in COVID-19 patients (Raesi et al., 2022). Although the relationship of self-care with the desired variables in this study has been partly investigated, the predictive role of these variables in the self-care of patients with COVID-19 has received little care. Therefore, this study was designed to determine the part of general health and health literacy in predicting the self-care behaviors of patients with COVID-19.

2. Materials and Methods

This cross-sectional study with the predictive correlational design was conducted in a COVID-19 diagnosis and treatment center in Shahid Beheshti Hospital in Kashan City, Iran, from June to September 2021. Potential subjects were referred to this center for the COVID-19 test. Those with positive polymerase chain reaction were assessed in terms of the criteria for inclusion in our study. The inclusion criteria were age over 18 years, being quarantined at home, and non-diagnosis of cognitive problems based on mini-mental status questionnaire scores ≥20. The exclusion criteria included in this study were hospitalized patients, healthcare providers, and pregnant women.

The subjects were selected using convenience sampling. The sample size was calculated based on the following formula (Equation 1) with the assumptions of α=0.05, Z=95%, and d=0.1σ.

1. $$n= \frac{Z^2_{1-\alpha/2}\sigma^2}{d^2}$$

Accordingly, the sample size was estimated to be 385 subjects. After the approval of the Kashan University of Medical Science Ethics Committee, the hospital provided the telephone numbers of potential subjects.

The first author contacted the potential subjects in the first week of their quarantine and assessed them based on the inclusion criteria. The study information and consent forms were read to the potential subjects via phone, and their oral consent was obtained. Those who agreed to participate answered the study questions during the phone calls. The first author marked their answers in the questionnaires. The data were gathered during the day, between 9 AM and 8 PM, according to the desired time of the subjects. The study instruments consisted of a demographic questionnaire, the general health questionnaire-28 (GHQ-28), the Iranian health literacy questionnaire (IHLQ), and self-care behaviors in COVID-19 (SCB-COVID-19). The demographic questionnaire included age, gender, marital status, income, employment status, number of children, education, history of underlying disease, and residence (urban/rural).

Goldberg and Hillier developed the GHQ-28 (Goldberg & Hillier, 1979). Different versions of the instrument have been developed with varying numbers of questions to assess general health. The GHQ-28 includes 4 subscales: Somatic symptoms (questions 1-7), anxiety/insomnia (questions 8-14), social dysfunction (questions 15-21), and severe depression (questions 22-28). Each subscale is scored on a Likert scale from 0=never to 3=always. The instrument's total score ranges from 0 to 84; a lower score indicates a higher level of general health (Werneke et al., 2000). The reported Cronbach α coefficient for the Persian version of GHQ-28

ranged from 0.82 to 0.86 (Taghavi, 2008). The Cronbach α in the present study was calculated to be 0.83 to 0.90. The Iranian Health Literacy Questionnaire (IHLQ) was developed by Haghdoost et al. (2015) in Iran to assess adults' health literacy (Haghdoost et al., 2015). It has 36 questions and five factors: reading and understanding skills, improving people's empowerment, communication and decision-making skills, social empowerment, and health information. The questionnaire has been assessed for content validity, construct validity, and reliability. The scale's internal consistency and test-retest reliability range from 0.71 to 0.96 and 0.73 to 0.86, respectively. It is scored on a 5-point Likert scale ranging from 1 to 5 (1=completely difficult, 5=completely easy). The total score ranges from 36 to 180 and higher scores indicate more health literacy (Haghdoost et al., 2015). The Cronbach α value in the present study ranged from 0.83 to 0.90.

Self-care behaviors in patients with COVID-19 (SCB-COVID-19) as a researcher-made questionnaire was developed based on a review of 20 studies on self-care behaviors in infectious diseases. A total of 71 questions about self-care behaviors during the COVID-19 pandemic were extracted from the literature. In this questionnaire, 11 questions were removed during the content validity ratio (CVR) calculation and 6 questions during the content validity index (CVI) calculation. The instrument's validity was verified using face and content validity and based on the assessment by 10 experts in the content domain. The instrument's CVI and CVR were 0.93 and 0.98, respectively. Finally, this tool was approved with 54 questions. A sample question is, "I frequently wash my hands with water and soap for at least 20 seconds." The questions address different self-care behaviors related to COVID-19, including handwashing, hygiene, disinfection, home care, quarantine, proper nutrition, physical distancing, home air conditioning, and travel and gatherings during quarantine. The questions are scored on a 5-point Likert-type scale (from always=5 to not at all=1). The total scores ranged from 54 to 270. Higher scores indicate better self-care behaviors. The distribution of self-care behaviors scores was analyzed to define three cut-off points using the receiver operating characteristic curve. Accordingly, three cut-off scores were identified: low (<150), moderate (150–250), and high (>250). The instrument's content validity was verified by 10 experts in nursing and infectious diseases. The instrument's CVI was 0.93, and its CVR was 0.98. Face validity was also confirmed. The reliability of this instrument was calculated by Cronbach α as 0.86.

Data analysis

The Kolmogorov-Smirnov test calculated the normal distribution of the data. Descriptive statistics estimated Mean±SD, frequencies, and percentages. To determine the relationships between health literacy, demographic information, and general health, t-test, the Pearson correlation coefficient, and the logistic regression model were used. SPSS software, version 19 (SPSS, Chicago, IL, USA) was used for data analysis. A significance level of 0.05 was considered.

3. Results

The results showed that most subjects were female (57.1%), with an academic level of education (57.8%). The Mean±SD age of the subjects was 35.93±11.96 years. There was no significant relationship between the mean score of self-care behaviors and demographic characteristics (gender, education, marital status, income level, place of residence, history of underlying disease, job status, and the number of children) (Table 1). The Mean±SD scores of self-care behaviors, general health, and health literacy were 224.89±21.49, 50.99±12.81, and 63.78±21.28, respectively. The mean score of self-care behaviors was moderate (Table 2).

The Pearson correlation coefficient showed significant relationships between self-care behaviors with health literacy (r=0.567, P=0.001) and general health (r=0.235, P=0.001) (Table 3). The logistic regression analysis showed that self-care behaviors had a positive and significant relationship with health literacy and general health (P<0.05). About 42% of changes in self-care behaviors score are explained by health literacy and general health variables (R^2=0.42) (Table 4).

4. Discussion

This study examined the role of general health and health literacy in predicting the self-care behaviors of patients with COVID-19. The results indicated no significant relationship between the mean scores of self-care behaviors and demographic information (age, number of children, gender, education, marital status, income level, place of residence, history of underlying disease, and job status). In a study on self-care behaviors during the COVID-19 outbreak, young women had better self-care behaviors (Bermejo-Martins et al., 2021). Clark et al. (2020) and Galasso et al. (2020) found a significant relationship between gender and self-care behaviors in COVID-19. Galasso et al. showed that self-care is more significantly observed in women than men. Their study

Table 1. Mean±SD score of self-care behaviors and its relationship with demographic characteristics in patients with CO-VID-19 (n=385)

Variables		Self-care Behaviors		P
		No. (%)	Mean±SD	
Sex	Female	220(57.1)	226.60±19.75	0.07**
	Male	165(42.9)	222.64±23.46	
Education	Less than a high school diploma	52(13.5)	220.46±28.81	0.27*
	High-school diploma	107(27.8)	225.37±19.68	
	Academic	226(57.8)	225.70±20.29	
Marital status	Single	118(30.6)	225.55±21.99	0.15**
	Married	276(69.4)	225.92±21.23	
Income level	Low	99(25.7)	221.77±22.79	0.21*
	Moderate	267(69.4)	225.78±20.54	
	High	19(4.9)	228.57±26.61	
Place of residence	Urban	335(87)	225.62±21.11	0.08**
	Rural	50(13)	220.08±23.55	
History of underlying disease	Yes	153(39.7)	223.10±23.63	0.18**
	No	232(60.3)	226.09±19.90	
Employment status	Employed	269(69.9)	224.95±21.50	0.94*
	Unemployed	116(30.1)	224.77±21.56	

	Min	Max	Mean±SD	-
Age (y)	18	77	35.93±11.96	0.10
Number of children	0	8	1.25±1.37	0.65

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*Analysis of variance (ANOVA), **The independent samples t-test.

showed no significant relationship between age, marital status, occupation, and education with self-care behaviors in COVID-19 patients (Galasso et al., 2020). However, some other studies reported that women are more likely to observe social distancing and practice personal hygiene than men (Liao et al., 2010; Park et al., 2010). In our study, no significant difference was found between the self-care behaviors of men and women. However, it is reported that the relationship between self-care behaviors and age, gender, occupation, education, and marital status might vary in different countries and communities with different cultural contexts (Bermejo-Martins et al., 2021). Another study found that people younger than 35, unemployed, and low-income had weaker self-care

behaviors in the face of COVID-19 (Bann et al., 2021). Clark et al. found that self-care behaviors were better in women and young people with high incomes than others (Clark et al., 2020). However, Płomecka et al. reported that during the COVID-19 outbreak, self-care behaviors were greater in men aged 29-39 than in women in the same age group (Płomecka et al., 2020). Keyvanara et al. reported no significant differences between participants' self-care behaviors and their demographic characteristics (age, gender, occupation, and education) in the prevalence of COVID-19 (Keyvanara et al., 2020).

Table 2. Mean±SD scores of health literacy, general health, and self-care behaviors (n=385)

Variables	Min	Max	Mean±SD
Health literacy	33	135	63.78±21.28
General health	28	101	50.99±12.81
Self-care behaviors	125	269	224.89±21.49

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Table 3. Correlation between self-care behaviors with health literacy and general health (n=385)

Variables	Correlation Coefficient	P*
Health literacy	r=0.567	0.001
General health	r=0.235	0.001

*The Pearson correlation coefficient.

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The results showed that changes in self-care behaviors score are explained by health literacy and general health variables in COVID-19 patients. In line with the present study, Asadi et al. showed that self-care behaviors in COVID-19 patients have a positive relationship with health literacy and a negative association with anxiety. In their research, as the level of health literacy increased, patients' self-care behaviors improved, and their anxiety decreased (Asadi et al., 2020). Bann et al. showed a positive relationship between knowledge, self-care behaviors, and general health in patients with COVID-19 (Bann et al., 2021). Chen et al. reported no significant relationship between variables of health literacy and self-care behaviors in heart failure patients (Chen et al., 2013). It has been shown in another study, a significant relationship between health literacy and self-care behaviors (Gaffari-Fam et al., 2020). Buck et al. found self-efficacy and knowledge major predictors of health and self-care (Buck et al., 2015). In the present study, health literacy and general health variables were two significant predictors of self-care behavior. Previous studies by Barati et al., Tamizkar et al., and Alizadeh Aghdam et al.

Table 4. Relationships between demographic characteristics and changes in self-care behaviors, general health, and health literacy

Variables	Self-care Behaviors				
	B	SE	β	t	P*
Constant	263.04	7.61	-	34.55	0.00
Age (y)	0.16	0.09	0.08	1.76	0.07
Female to male	3.43	1.79	0.07	1.91	0.05
Married to single	1.31	2.23	0.02	0.58	0.55
Urban to rural	0.67	2.60	-0.01	-0.25	0.79
Moderate to high income	-0.90	2.06	-0.01	-0.43	0.66
Low to high income	-5.09	4.16	-0.05	-1.22	0.22
High-school diploma to less education	0.87	2.97	0.01	0.29	0.76
Academic education to less education	7.30	2.95	0.16	2.47	0.1
Health literacy	-0.64	0.04	-0.63	-13.89	0.001
General health	-0.162	0.07	-0.09	-2.20	0.02
R^2=0.42					

*Logistic regression.

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on hypertensive patients, elderlies, and the mental health of Tabriz citizens, Iran, respectively, supported this finding (Barati et al., 2020; Tamizkar et al., 2019; Alizadeh Aghdam et al., 2017). The results of another study revealed no significant relationship between variables of health literacy and self-care behavior in patients with type 2 diabetes (Chaleshgar-kordasiabi et al., 2020).

The need to observe precautions related to COVID-19 led to some limitations in this study. In this regard, questionnaires were completed over the phone, and the participants' verbal consent was obtained similarly. Also, the study environment was limited to a hospital in Kashan City, Iran. Another limitation of this research was using a researcher-made self-care behavior tool that was not psychometrically evaluated. Considering the mentioned cases and the nature of cross-sectional studies, it is necessary to use the study's results cautiously.

5. Conclusion

The results showed that health literacy and general health variables explain self-care behaviors score changes in COVID-19 patients. Therefore, it is recommended to take appropriate measures to improve health literacy and the general health of patients affected by COVID-19 to help improve their self-care behaviors. Our results can integrate into the body of knowledge to help improve the health and well-being of populations in the COVID-19 outbreak.

Ethical Considerations

Compliance with ethical guidelines

In this study, we considered the ethical principles of the 1964 Helsinki Declaration. The study was approved by the Kashan University of Medical Science (KAUMS) Ethics Committee (Code: IR.KAUMS.NUHEPM. REC.1399.051). We explained the study objectives, the voluntary nature of participation, the confidentiality of their information, and the right to withdraw from the study for the participants. They provided verbal informed consent to participate in the study.

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Authors' contributions

Conception and design: Fatemeh Asgari, andNeda Mirbagher Ajorpaz; Data collection: Fatemeh Asgari; Data analysis and interpretation: Zahra Rahemi, and Zohreh Sadat; Final approval: Fatemeh Asgari and Neda Mirbagher Ajorpaz.

Conflict of interest

The authors declared no conflict of interest.

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