



Investigating the effect of implementing continuous care model on fatigue and quality of life of patients with COVID-19 disease

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Abstract

Background and aims: Chronic fatigue and decreased quality of life are complications of COVID-19. This study aimed to determine the impact of the continuous care model implementation on fatigue and quality of life of patients with COVID-19.

Methods: This semi-experimental study was conducted with pre-test and post-test design in Shahrekord, Iran, 2022. The study was conducted on 80 patients with COVID-19 who were hospitalized at Hajer hospital in Shahrekord and Seyed al-Shohda hospital in Farsan. They entered the study by convenient sampling and were randomly assigned to intervention and control groups using cards. The continuous care model was implemented in 4 stages for the intervention group for three months. Data were gathered using the demographic data questionnaire, Krupp et al.'s fatigue intensity questionnaire (1989), and St. George's Quality of Life Questionnaire (SGRQ) (1991), then analyzed with SPSS19 software.

Results: Before the intervention, both groups had no statistically significant difference between fatigue intensity ($P=0.65$) and quality of life ($P=0.47$). The fatigue intensity immediately after the intervention and three months later in the intervention group was significantly lower than in the control group ($P<0.001$). The quality of life immediately after the intervention and three months later in the intervention group was significantly higher than the control group ($P<0.001$).

Conclusion: Considering the effectiveness of the continuous care model in COVID-19 complications, it is recommended that healthcare professionals train and use it to take care of these patients and in similar cases.

Keywords: Continuous care model, Fatigue, Quality of life, COVID-19

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Introduction

The COVID-19 disease emerged as a big problem of world health, and on March 11, 2020, the World Health Organization declared it a pandemic due to its high transmission rate (1). Until June 22, 2023, more than 690 million people were infected, and more than 6 900 000 of them died worldwide. In Iran, 7 612 000 infections and more than 146 000 deaths were reported (2). COVID-19 was introduced as a respiratory disease that can affect different body systems (3,4). Although there is a good understanding of the acute phase of the COVID-19 disease, studies have paid less attention to the long-term complications of the disease, which can cause many problems for patients, families, and society (5). According to the study of Iqbal et al. 2023 and Desai et al. 2022, many long-term symptoms and complications of the COVID-19

disease need to be studied to design better strategies to reduce its damage (6,7). The most common symptoms reported in hospitalized patients with COVID-19 were fatigue (62%) and shortness of breath (57%) (8). They exist long after being discharged from the hospital (5).

Fatigue characterized by lack of energy, muscle weakness, slow reactions, sleepiness, and lack of concentration (9) impedes the patient from performing his/her individual and social tasks and roles, which reduces health care outcomes (10). For decades, physicians have referred to a controversial disorder called post-viral fatigue syndrome (11). The study by Dale et al reported that affecting with COVID-19 diminishes the quality of life up to one year after recovery (12).

Paying attention to fatigue in patients with COVID-19 and improving their quality of life is very important

(13). Education (14), rehabilitation (15), and cognitive-behavioral therapy (16) have been used to reduce the intensity of fatigue and increase the quality of life in patients with chronic diseases. Considering these complications' destructive and profound effects on a person's life, it may be better to manage them via a continuous and persistent approach (17). The continuous care model is a nursing care model based on such a situation (18), while a native Iranian care model. The concept of persistent or continuous care is a regular and continuous process to establish practical, interactive, and ongoing communication between the client and health care providers in order to recognize the client's needs and problems and sensitize them to perform continuous health behaviors, maintain and promote health (19). Roshan Ghias et al, through a study on patients undergoing coronary artery transplant surgery, showed that the continuous care model effectively improves their quality of life (20).

Due to the contagious nature of COVID-19 and the need to observe social distancing, increasing the number of patients, and the nursing shortage, these patients unintentionally receive less support from their families and the health care providers after leaving the hospital (21). The patient is deprived of dynamic and continuous interaction with the health care provider and optimal care. This situation can delay the patient's recovery and may reverse the process (22). Considering earlier studies' suggestions (6,7) and the numerous people with COVID-19, it seems necessary to implement a suitable model to help these patients and similar cases to increase the quality of life after discharge from the hospital. Therefore, this study aims to investigate the Effect of the follow-up care model on fatigue and quality of life in patients with COVID-19.

Materials and Methods

This semi-experimental study was conducted with a pretest-posttest with a control group and follow-up period in 2022 at Shahrekord University of Medical Sciences in Iran. The study population included patients with COVID-19 who were hospitalized in Hajar Shahrekord and Seyed al-Shohda hospitals in Farsan.

Participants

The sample size is based on the study of Asheri et al, assuming that the difference in the average score of the quality of life after the intervention is equal to 6.9. The SD of the two groups is equal to 11.5 and 7.1, taking into account the CI of 95%. The power of 90% was considered equal to 36 people in each group. Considering the 10% dropout of the sample, 40 people entered each group (23). Then, they were allocated to two intervention and control groups using cards.

Inclusion criteria include; confirmation of COVID-19 by an infectious disease specialist based on a positive polymerase chain reaction (PCR) test, Age of 18 or older,

not receiving training through the continuous care model before, accessibility for follow-up, no history of mental or physical illness (depression, bipolar disorder, mental retardation, cardiovascular disease, chronic obstructive pulmonary disease). Being able to read, write, and verbally communicate. Exclusion criteria included intra-tracheal intubation, death or migration, incomplete completion of the questionnaire, and failure to implement at least 70% of the educational program.

Collecting data

The data were collected using three questionnaires: a demographic data questionnaire (including sex, marital status, education level, employment status, residence, Age, and monthly outcome), Krupp et al.'s (1989) Fatigue Severity Questionnaire (FSS), and St. George's (1991) Respiratory Questionnaire (SGRQ) all the questionnaires' filled by patients. The demographic data questionnaire was reviewed and approved by the nursing faculty members.

FSS consists of 9 questions based on a seven-point Likert scale (completely agree, agree, somewhat agree, neither disagree nor agree score, somewhat disagree, disagree, and completely disagree). It scores 9-63. That higher score means a higher level of fatigue (24). Shahvarughi-Farahani et al confirmed the reliability and validity of its Persian version via the content validity method. Its reliability was evaluated using the internal consistency method by calculating Cronbach's alpha correlation coefficient $r=0.96$ (25). In the current study, the reliability of the questionnaire in 40 patients was obtained by determining Cronbach's alpha coefficient, which was confirmed to be $r=0.88$.

SGRQ was developed by Jones et al. in 1991 to evaluate the quality of life of patients with respiratory diseases. It contains 50 questions, which are arranged in three sections: symptoms (questions 1-8), activity (questions 9-10), and impact on daily life (11-50). Each question in the questionnaire was graded in percentage and from zero (perfect health) to 100, which is the lowest quality of life. The content validity of the Persian version of the questionnaire was confirmed by Fallah Tafti et al in 2009. Its reliability was also proved by calculating Cronbach's alpha coefficient equal to 0.91(26).

Educational intervention

For the intervention group, the continuous care model was implemented in 4 stages: orientation, sensitization, control, and evaluation, lasting 12 weeks (26). Orientation and sensitization stages were done in the hospital, and the rest were done according to the patient's conditions, whether in the hospital or at home. The first stage was carried out in two face-to-face meetings with the patient and his/her family and included introducing the nurse to the patient and his family, taking the medical history and explaining the condition of the patient and his/her family, clarifying the nurse's expectations and the patient and his/

her family. In the sensitization stage, educational content was presented. The educational content is unified for all participants and includes an explanation of COVID-19 and its complications and an assessment of educational needs in treatment, care, and risk factors. After studying the relevant literature, the research team compiled the educational content, including books and research articles. Then, it will be given to 10 faculty members for review. After collecting the points of 8 people to validate, the content has been modified and presented to participants.

Meetings were held separately to comply with the personal protection protocol. The third stage (control) was carried out to continue and consolidate health behaviors in the patient and his family; at this stage, once a week, the nurse controlled, reviewed and evaluated the behaviors of the patients for continuous care. The fourth stage (evaluation) was done in two ways: Formative and final. Also, the self-evaluation checklist prepared by the researcher, including ten questions, was provided to the samples. If a person did not perform at least 70% of the necessary measures, he was excluded from the study. At the end of the 12-week intervention and three months later, FSS and SGRQ were filled again by all participants in both groups. The control group only received routine care. It should be noted that at the end of the study and if desired, the educational content was provided to the control group.

Statistical analysis

Statistical Package for the Social Sciences (SPSS) software version 19 was used for data analysis. Independent t-tests, repeated measures analysis of variance, and chi-square squares tests were used to analyze the data. A *P* value less than 0.05 was considered a statistically significant level.

Results

In this study, 88 patients were initially selected, 5 of whom were excluded from the study because they did not meet the inclusion criteria. 83 patients were randomly assigned to two control and intervention groups. Among these, two people from the intervention group and one person from the control group also stopped working, and the data of 80 patients were analyzed in two equal groups (Figure 1).

The two groups had no significant difference regarding demographic data before the intervention ($P > 0.05$) (Table 1).

The fatigue intensity before the intervention and in the control group did not show a significant difference ($P = 0.65$). Immediately after the intervention, this difference was significant ($P < 0.001$). Three months later, this difference was repeated ($P < 0.001$), and the intensity of fatigue decreased in the intervention group (Table 2).

The mean quality of life before the intervention in the two intervention and control groups was not significantly different ($P = 0.47$). However, immediately after the

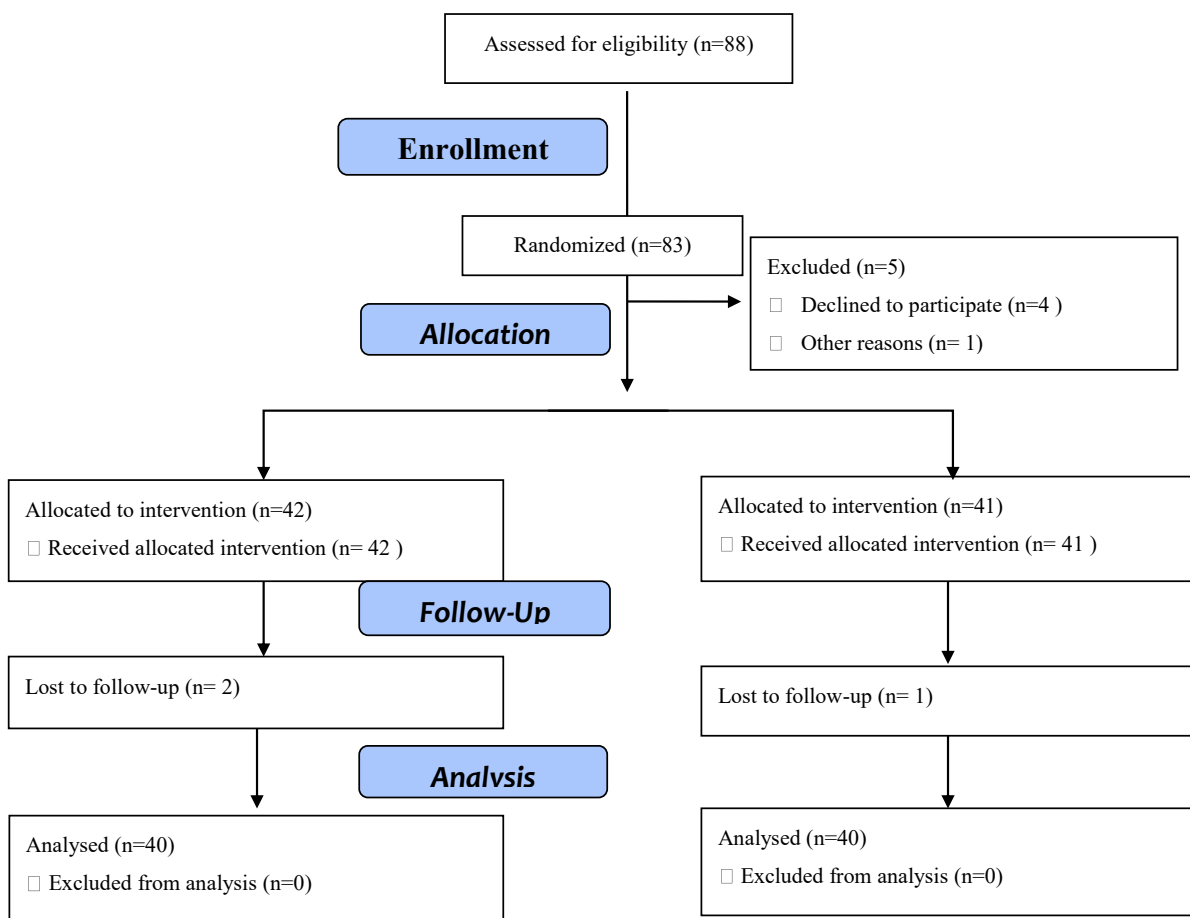


Figure 1. Flow chart of the study

intervention and three months later, the mean quality of life in the two groups was significantly different ($P < 0.001$). The quality of life in the intervention group was improved (Table 3).

Discussion

This study was conducted to determine the impact of the implementation of the continuous care model on fatigue and quality of life of patients with COVID-19. The results showed that immediately and three months

after the implementation of the continuous care model, the severity of fatigue in patients with COVID-19 was reduced. Calvo-Paniagua et al reported that rehabilitation programs improved activities of daily living and quality of life while decreasing shortness of breath (27). In the research of Lashkari et al entitled “Effect of Collaborative Care Model on Fatigue of Maintenance Hemodialysis Patients,” they reported that the implementation of the Collaborative Care Model has a positive effect on the fatigue of hemodialysis patients. Therefore, it is possible to improve patients’ fatigue by applying this model by nurses (28). De Sire et al also reported that home-based rehabilitation significantly reduced fatigue in patients with COVID-19 (15). A study aimed at the Effect of the continuous care model on the fatigue of patients with COVID-19 was not found. However, since one of the most critical components of rehabilitation programs is the continuous follow-up of patients, it can be said that these two studies support the present study.

The results of the study by Gholipour et al on the Effect of a virtual 21-day educational program on the comfort of patients with COVID-19 showed that the comfort score before and after the intervention significantly did not differ (29). One aspect of comfort is not being tired. Their study does not support the present study’s findings. Since education takes time to make an impact and their study was shorter, this difference is driven by the difference in method and duration of education in their study and ours. On the other hand, unlike their study, the present study covered patients and their families based on a continuous care model.

Pepa et al showed that distance rehabilitation programs were influential in the recovery of patients after covid-19. The most important problems of patients after COVID-19 have been fatigue and anxiety, which have been well managed (30). The common feature of rehabilitation and intervention programs based on continuous care is the

Table 1. Demographic data in intervention and control groups

Variable		Intervention No. (%)	Control No. (%)	P value
Gender	Female	19 (47.5)	19 (47.5)	0.99**
	Male	21 (52.5)	21 (52.5)	
Marital status	Unmarried	3 (7.5)	12 (30)	0.21**
	Married	37 (92.5)	28 (70)	
Education level	Illiterate	4 (10)	8 (20)	0.48***
	Preliminary	10 (25)	9 (22.5)	
	High school	15 (37.5)	10 (25)	
	Academic degree	11(27.5)	13 (32.5)	
Employment status	Full- time	12 (30)	12 (30)	0.25**
	Part-time	5 (12.5)	1 (2.5)	
	Student	0 (0)	1 (2.5)	
	Self- employed	15(37.5)	18(45)	
	Retired	5 (12.5)	4(10)	
	Unemployed	3(7.5)	4 (10)	
residence	City	28 (70)	31 (77.5)	0.61**
	village	12 (30)	9 (22.5)	
		Mean ± SD	Mean ± SD	
Age (year)		58.33 ± 9.54	58.72 ± 9.61	0.81*
Monthly income (million Tomans)		4.03 ± 1.14	4.82 ± 2.10	0.22*

* One-sample t-test; **Fisher exact test; *** Chi-square.

Table 2. Comparison of the fatigue intervention and control groups at the appointed times

Groups	Time			P value within group	F statistics
	Before the intervention (Mean ± SD)	After the intervention (Mean ± SD)	3months later (Mean ± SD)		
Control	43.95 ± 15.51	40.65 ± 13.90	36.55 ± 11.31	<0.001*	70.6
Intervention	42.23 ± 17.73	34.23 ± 13.27	25 ± 9.36	<0.001*	61.0
P value between group	0.65**	<0.001**	<0.001**	-	

* Repeated measurement ANOVA.

** Independent t test.

Table 3. Comparison of the quality of life in intervention and control groups at the appointed times

Groups	Time			P value within group	F statistics
	Before the intervention (Mean ± SD)	After the intervention (Mean ± SD)	3months later (Mean ± SD)		
Control	58.34 ± 21.87	40.41 ± 15.12	27.56 ± 9.47	<0.001*	113.5
Intervention	54.56 ± 24.98	31.12 ± 12.34	17.19 ± 6.33	<0.001*	118.0
P value between group	0.47**	<0.001**	<0.001**	-	

* Repeated measurement ANOVA.

** Independent t test.

continuous follow-up of patients. Therefore, their study's results align with the present study's results.

The other result showed that the follow-up care model increased patients' quality of life with COVID-19 immediately and three months after the intervention. No similar study was found to compare with.

Del Corral et al proved that home-based breathing exercises effectively improve patients' quality of life with COVID-19 (31). Anderson et al also suggest home-based nursing plans to improve the quality of life of the elderly with COVID-19 (32). Considering that the intervention based on continuous care provides a more comprehensive form of respiratory care based on the needs and the living environment of the patient, and considering that in both cases, the interventions have led to an increase in the quality of life of the patients, it can be claimed that their study supports the results of the present study.

No foreign or domestic study was found that is not in line with this study regarding the Effect of intervention based on a continuous care model.

Limitation and recommendation

A critical limitation of this research, which reduces the generalizability of its results, was the non-random sampling and limited number of hospitals. A more comprehensive study with a more extensive research community is suggested to remove the shortcoming. On the other hand, the outbreak of Covid-19 caused fewer face-to-face appointments between researchers and participants. Repeating the study with other participants in more stable health-social conditions is recommended.

Conclusion

This study's findings showed that using a continuous care model effectively reduces the severity of fatigue caused by COVID-19 and improves the quality of life. Therefore, using the continuous care model as one simple, Affordable, applicable, and practical nursing intervention can reduce disease complications such as fatigue and, in turn, improve the quality of life. Establishing effective and continuous interaction between the patient and healthcare providers is essential. Using the continuous care model while increasing the patient's interaction with the health care providers after discharge can encourage them to adhere to the treatment regimen more extended to reduce their fatigue and increase their quality of life.

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Authors' Contribution

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Writing-review & editing: Shirmohammad Davoodvand, Hedayat Allah Lalegani and Rahimali Shaikhy.

Competing Interests

The authors declare that there is no conflict of interest.

Ethical Approval

Ethical approval for this study was obtained from the ethics committee of Shahrekord University of Medical Sciences (IR.SKUMS.REC.1400.123). All participants gave their written informed consent to participate in this study. Also, they were assured that their identity would be kept confidential and anonymous, that this study would not harm them anyway, and that they would not be forced to enter or leave the study.

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