

The effect of self-care program based on the Orem self-care model on fatigue and quality of life in patients with COPD

Iman Reiszadeh¹, Shahla Abolhassani², Reza Masoudi³, Soleiman Kheiri⁴

¹Department of Medical Surgical Nursing, School of Nursing Midwifery, Shahrekord University of Medical Sciences, ³Community Oriented Nursing Midwifery Research Center, Shahrekord University of Medical Sciences, ⁴Social Health Determinants Research Center, Shahrekord University of Medical Sciences, Shahrekord, ²Department of Adults Health Nursing, Faculty of Nursing and Midwifery, Nursing and Midwifery Care Research Center, Isfahan University of Medical Sciences, Isfahan, Iran

ORCID:

Iman Reiszadeh: <https://orcid.org/0000-0003-1320-0418>
Shahla Abolhassani: <https://orcid.org/0000-0002-5191-7586>

Abstract

Context: Fatigue and the reduced quality of life are among the most common problems of patients with chronic obstructive pulmonary disease (COPD), affecting all aspects of life in these patients.

Aims: This study aimed to evaluate the effects of self-care program based on the Orem self-care model on fatigue and quality of life in patients with COPD.

Setting and Design: This was a randomized controlled trial conducted on 66 patients with COPD who were admitted to hospitals of Shahrekord University of Medical Sciences, Iran.

Materials and Methods: The patients were randomized either to the intervention group or control group using random numbers by random allocation software. The intervention group received self-care program based on the Orem's self-care theory, including four educational sessions as well as a 2-month follow-up. The control group received only usual care. The needed data were collected using the Fatigue Severity Scale and 12-item Short-Form Health Survey questionnaire once before and once after the interventions and then analyzed using descriptive and analytic statistics.

Statistical Analysis Used: These data were analyzed by SPSS software using descriptive and analytic statistics.

Results: In the intervention group, the mean score of fatigue reduced and the mean score of quality of life significantly increased after performing the interventions ($P < 0.05$). Moreover, the mean scores of fatigue and quality of life were significantly different between the groups ($P < 0.05$). The mean changes in terms of fatigue and quality of life scores were significantly greater in the intervention group compared to the control group ($P < 0.05$).

Conclusion: Orem's self-care theory is an effective nursing theoretical framework used to reduce fatigue and improve quality of life, thus it can be used for other chronic diseases and conditions as well.

Keywords: Chronic obstructive pulmonary disease, Fatigue, Orem self-care model, Quality of life, Self-care

Address for correspondence: Dr. Shahla Abolhassani, Department of Adults Health Nursing, Faculty of Nursing and Midwifery, Nursing and Midwifery Care Research Center, Isfahan University of Medical Sciences, Isfahan, Iran.

E-mail: abolhasani@nm.mui.ac.ir

Received: 19 October 2021; Revised: 14 June 2022; Accepted: 21 June 2022; Published: 14 December 2022

Access this article online	
Quick Response Code:	Website: www.jnmsjournal.org
	DOI: 10.4103/jnms.jnms_170_21

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Reiszadeh I, Abolhassani S, Masoudi R, Kheiri S. The effect of self-care program based on the Orem self-care model on fatigue and quality of life in patients with chronic obstructive pulmonary disease. *J Nurs Midwifery Sci* 2022;9:241-48.

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a disabling respiratory disease,^[1,2] which is known as a global health problem. Accordingly, its prevalence rate among adult population is estimated to be 12%.^[3,4] COPD is the fourth cause of mortality worldwide.^[5] It is estimated that COPD will be the third cause of mortality up to 2030.^[6,7] Based on statistics in Iran, 10% of Iranian people on average have COPD.^[8]

COPD is a progressive and disabling disease accompanied by a variety of symptoms such as dyspnea, cough, and increased sputum production.^[9] One of the important symptoms experienced by patients with COPD is fatigue, which was reported by these patients as the second common symptom of COPD following dyspnea.^[10] The reported prevalence rate of fatigue among patients with COPD was between 50% and 95%.^[11] Peters *et al.* in their study have evaluated fatigue among COPD patients and reported that 23% of the patients experienced mild and 24% of them experienced severe fatigue.^[12]

Patients with COPD often report fatigue as one of the key factors leading to the decreased quality of life.^[13] It has also been shown that fatigue affects the level of physical activity, hospitalization, and mortality rate among patients with COPD.^[14,15] Those patients experiencing fatigue are lethargic, unwillingness, and uninterested with the environment, and they cannot well perform their social activities.^[16]

Another major problem of patients with COPD is the decreased quality of life. The World Health Organization defined quality of life as an individual's perception of his/her position in life in the context of the culture and value systems in which they live and related to their goals, expectations, standards, and concerns.^[17] It is noteworthy that quality of life is more important than health status, because health status is one of the components of quality of life, while the quality of life represents the satisfaction level in an individual by achieving biopsychosocial needs and general well-being.^[18,19]

It is notable that COPD disrupts all the physiological, psychological, and social activities of patients. As well, the reduced quality of life in patients with COPD is not solely due to restricted airflow.^[20] Accordingly, the reduced quality of life in patients with COPD was reported in several previous studies.^[21-23]

As fatigue and reduced quality of life cause various problems in all aspects of the affected patient's life,

it is important to improve these variables in patients with COPD. Therefore, one of the best approaches for achieving this goal is empowering patients in doing self-care activities.^[24]

Self-care is a basic concept, which is known as the main philosophy in the nursing profession making nursing different from other health-care professions.^[25] One of the nursing theories that have been previously proposed in the field of self-care, the positive effects of which have been shown in various studies, is the Orem's self-care theory.^[26]

Implementing the Orem's self-care theory can improve patient's self-care ability, thereby reducing health-care costs, and improving quality of care and patient's outcomes.^[27] A review on previous studies showed that the Orem's self-care model is effective on reducing fatigue in patients with multiple sclerosis^[28] and breast cancer^[29] and it could also be effective on improving the quality of life of the elderly^[30] and patients with migraine headache.^[31] In regard to the importance of self-care in patients with COPD and the potential effects of the Orem's self-care model on reducing fatigue and improving quality of life, the present study was conducted with the purpose of evaluating the effects of self-care program based on the Orem self-care model on fatigue and quality of life of the patients with COPD.

MATERIALS AND METHODS

Research design and setting

This study was a randomized controlled trial study conducted in Hajar and Kashani hospitals of Shahrekord University of Medical Sciences, Iran. The inclusion criteria were the followings: willingness to participate in this study, respirologist-diagnosed COPD, being hospitalized, stable medical condition, being at stage 2 or 3 of COPD based on the Global Initiative for Chronic Obstructive Lung Disease classification, no history of any underlying disease that can interfere with the patient's self-care ability, the ability to do activities of daily living with no need for oxygen, having no mental disorder, not being under treatment with sedative or analgesic drugs, ability to read and speak Persian, having reading literacy by either the patient or one of his/her family members, and having no auditory or visual problem. The exclusion criteria were unwillingness to continue participating in this study, self-care ability of 50% or above, not performing the educated self-care tasks, a disease exacerbating COPD, exacerbation of COPD symptoms in a way that it interferes with patient's self-care ability, and receiving other training programs at the same time.

Sample size and sampling procedure

This study was conducted on 66 patients with COPD. The patients were selected for participating in this study using convenience sampling method. Thereafter, they were randomized using random numbers by random allocation software. Based on a study conducted by Jokar *et al.*, assuming that the average quality of life in people with COPD is equal to $-21^{[11]}$ and, during the intervention, should be a difference of at least 8 points in the quality of life of the intervention group, considering the following formula, the 95% confidence interval and 80% power, the sample size in each group was determined to be at least 30. Considering the 10% probability of sample loss during the study, the sample size in each group was 33.^[32]

$$n = \frac{2(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta})^2 \sigma^2}{d^2}$$

Data collection tools and procedure

The required data were collected using demographic data questionnaire, the Fatigue Severity Scale, the 12-item Short-Form Health Survey (SF-12) quality of life questionnaire, and self-care ability assessment form that was developed based on the Orem's self-care theory. Demographic data questionnaire included questions on age, sex, marital status, educational level, job status, and disease's condition (duration of the disease, hospitalizations, and drug history).

The Fatigue Severity Scale used in this study was a 9-item questionnaire evaluating patient's fatigue severity in different situations. Scoring for each item is ranged from 1 (complete disagreement) to 7 (complete agreement). A score ≥ 4 is considered fatigue, and higher scores indicate more severe fatigue levels.^[33] This questionnaire was shown to have appropriate validity and reliability, and Cronbach's alpha for the Persian version of this questionnaire was reported as 0.96.^[34,35]

Quality of life was evaluated using a SF-12. This questionnaire consists of 12 questions categorized into 8 domains.^[36] SF-12 has the following two subscales: the physiological subscale that evaluates physical function, role function limitations caused by physical problems, and perception of general well-being and pain, as well as the psychological subscale evaluating the role function limitation caused by psychological problems, energy level and vitality, mental status, and social function. The overall score of this questionnaire is between 0 and 100.^[37] Montazeri *et al.* in their study have reported that the Persian version of this questionnaire has both suitable validity and reliability.^[38] In

the present study, the reliability of this questionnaire was evaluated among 20 patients with COPD using test-retest method, and Cronbach's alpha was obtained as 0.93.

The self-care ability assessment form was developed by the researchers based on the concepts obtained from the Orem's self-care theory. This form included 61 questions in the following 4 main domains: general understanding of self-care problems (including 6 questions), universal self-care requisites (40 questions), developmental self-care needs (2 questions), and health deviation self-care requisites (13 questions). This assessment form was used to evaluate the self-care ability of patients and, thereafter, for designing self-care program based on the patients' needs that were identified. As well, the content validity of this questionnaire was approved by 10 faculty members of nursing and midwifery faculty of Shahrekord University of Medical Sciences. In addition, test-retest reliability coefficient for this questionnaire (with a 2-week interval, for 20 patients with COPD) was obtained as 0.81.

Quality of life and fatigue level of patients in both the groups were evaluated before the interventions and by passing 2 months from implementing the self-care program by the patients. In this study, the interventions were conducted by the main researcher and the needed data were collected by another researcher, so the researcher who collected the study data was blind to the allocation of the patients to the study groups.

In the present study, the randomization was conducted after completing the sample size (by inclusion of all 66 patients in the study), and afterward, the interventions were started in the experimental group.

The self-care program was developed by the researcher in the framework of the Orem's self-care theory, based on the data obtained from the self-care ability assessment forms. The nursing system used in this study was educative-supportive system. Thereafter, the self-care program was implemented for the intervention group in four sessions performed once a week, and each session lasted 30–45 min [Table 1]. The self-care program was then presented to patients by lecture and group discussions. In each one of these groups, between two and ten patients were included.

At the end of each one of these sessions, the patients were asked to complete a checklist related to the topics of that session, in order to indicate the level of learning in the patients. At the end of the fourth session, a booklet containing all the topics was given to the participants who were asked to implement the self-care program for a 2-month duration.

During these 2 months, the researcher made a phone call to each subject 2 weeks later and evaluated implementing the self-care program by the patients. Moreover, the patients were asked to complete the checklist regarding performing the educated self-care program in these 2 months. Of note, the patients in the control group received usual cares.

Data analysis

Data were analyzed by SPSS software (version 16) produced by SPSS Inc, Illinois state, Chicago, USA using descriptive (including mean and standard deviation) and analytic (including independent samples *t*-test, paired-samples *t*-test, Chi-square, and Fisher's exact tests) statistics. In all these tests, $P < 0.05$ was considered the statistically significant level.

Ethical consideration

This study was approved by the Ethics Committee of Shahrekord University of Medical Sciences (ethics code: IR.SKUMS.REC.1395.315) and the Iranian Registry of Clinical Trials (IRCT code: IRCT2017030432764N2). Written informed consent was also obtained from all the participants included in this study. The samples were assured that the data collected were confidential.

RESULTS

Out of all 66 patients included in this study, 3 patients in the intervention group were excluded due to not participating in all four educational sessions and 2 other patients in the intervention group were excluded due to not completing posttest questionnaires. The mean age of the participants in the control and intervention groups was 62.78 ± 8.73 and 60.62 ± 8.73 years, respectively. The study groups had no significant differences in terms of the mean score of their age ($P = 0.240$). In this study, 38 participants (62.3%) were

male and 23 participants (37.7%) were female. Of note, gender, marital status, educational level, duration of illness, number of hospitalizations, and job status had no significant differences between the two study groups. The demographic data of the participants in this study are presented in Table 2.

The mean score of fatigue in the intervention group was obtained as 46.1 ± 4.58 and 40.3 ± 5.93 before and after the interventions, respectively. In the control group, the mean score of fatigue before and after the interventions was obtained as 44.68 ± 3.35 and 44.94 ± 4.05 , respectively. By performing independent samples *t*-test, it was shown that the mean score of fatigue had no significant difference between these two groups at pretest stage ($P = 0.178$), but at the posttest stage, its mean score was found to be significantly different between the two groups ($P < 0.001$). Based on the result of paired samples *t*-test, the mean score of fatigue in the intervention group significantly reduced after the interventions ($P < 0.001$), but the mean score of fatigue did not change significantly in the control group after performing the interventions ($P = 0.578$). Table 3 compares the mean scores of fatigue before and after the interventions between the two groups.

The change in the mean score of fatigue (posttest compared with pretest) was obtained as $-5.8(4.35)$ in the intervention group and as 0.26 ± 2.55 in the control group. Independent samples *t*-test showed a significant difference between these two groups in terms of the changes in the mean scores of fatigue ($P < 0.001$) [Table 3].

Before the interventions, the mean score of quality of life in the control group was calculated as 44.69 ± 7.9 , and in the intervention group, it was 43.13 ± 8.8 . The two study groups had no significant difference in terms of the mean score of quality of life before the interventions ($P = 0.46$). As well, after the interventions, the mean score of quality of life in the control group was obtained as 44 ± 6.77 , and in the intervention group, it was 48.7 ± 8.07 . In addition, independent samples *t*-test showed that the mean score of quality of life in the intervention group was significantly greater than that of the control group ($P = 0.017$). Furthermore, the mean change in scores of quality of life was estimated as -0.69 ± 3.23 in the control group and as 5.57 ± 3.55 in the intervention group. The mean change in scores of quality of life was significantly different between the two study groups ($P < 0.001$). These data are presented in Table 4.

DISCUSSION

This was a randomized controlled trial conducted in order to evaluate the effect of self-care program based on the

Table 1: Titles of self-care sessions

Session number	Topics
1	COPD disease, function of respiratory system, both breathing and respiration, airway secretions and ways decrease these secretions, cough and ways to reduce it, and the importance of self-care
2	Factors that can exacerbate the disease, how to prevent disease's exacerbations, preventing common cold, the importance of vaccination, and place of diet and how to eat and strategies for weight loss
3	How to take a shower, the importance of physical exercises, strategies for improving sleep, and strategies for enhancing social relationships, which were presented to the participants
4	When it is necessary to visit a doctor, the correct procedure of using sprays, oxygen therapy, pursed-lip breathing, and the importance of chest physiotherapy

COPD: Chronic obstructive pulmonary disease

Table 2: Demographic characteristics of the patients in the two study groups

Variable	Variable mode	Intervention, n (%)	Control, n (%)	P (Fisher's exact test)
Marital status	Single	1 (3.3)	2 (6.5)	0.829
	Married	24 (80)	23 (74.2)	
	Divorced	2 (6.7)	1 (3.2)	
	Widow	3 (10)	5 (16.1)	
	Total	30 (100)	31 (100)	
Education level	Illiterate	15 (50)	19 (61.3)	0.680
	Elementary education	9 (30)	6 (19.4)	
	High school	4 (13.3)	5 (16.1)	
	College education	2 (6.7)	1 (3.2)	
	Total	30 (100)	31 (100)	
Sex	Male	18 (60)	20 (64.5)	0.716
	Female	12 (40)	11 (35.5)	
	Total	30 (100)	31 (100)	
Age group	≤49	3 (10)	5 (16.1)	0.531
	50–59	6 (20)	8 (25.8)	
	60–69	14 (46.7)	15 (48.4)	
	≥70	7 (23.3)	3 (9.7)	
	Total	30 (100)	31 (100)	
Duration of the disease (years)	<1	4 (13.3)	3 (9.7)	0.573
	1–5	11 (36.7)	8 (25.8)	
	>5	15 (50)	20 (64.5)	
	Total	30 (100)	31 (100)	
Numbers of hospitalizations (times)	≤2	8 (26.7)	7 (22.6)	0.329
	3–5	11 (36.7)	7 (22.6)	
	>6	11 (36.7)	17 (54.8)	
	Total	30 (100)	31 (100)	
Job	Government's employee	5 (16.7)	7 (22.6)	0.798
	Retired	8 (26.7)	10 (32.3)	
	Homemaker	6 (20)	6 (19.4)	
	Others	11 (36.7)	8 (25.8)	
	Total	30 (100)	31 (100)	

Table 3: Comparing the mean score of fatigue before and after interventions between groups

	Control group	Intervention group	P (between groups)
Before interventions	44.68±3.52	46.1±5.48	0.178
After interventions	44.94±4.05	40.3±5.93	<0.001
Changes of mean score (posttest minus pretest)	0.26±2.55	-5.8±4.35	<0.001
Paired samples t-test results (P)	0.578	<0.001	-

Orem self-care model on fatigue level of the patients with COPD. The results of the present study show that self-care programs based on the Orem's self-care theory can significantly reduce fatigue level in patients with COPD.

The majority of the participants included in this study were elders, so it can be said that COPD is more prevalent among older adults. Accordingly, this result is consistent with some other studies such as those performed by Mollaoglu *et al.*,^[39] Ghanbari *et al.*,^[40] and Bhandari and Sharma *et al.*,^[41] which have also reported that COPD is more prevalent in older ages. However, there are studies that have reported the occurrence of the disease at a younger age.^[42,43] Due to the lack of diagnosis of the disease in the early stages, most of this disease is observed in elderly people.

In this study, the majority of the participants were male. This is because of that men are more prone to COPD risk factors compared to women.^[44]

In the present study, the mean score of fatigue significantly reduced in the intervention group compared with the control group. Given the reason that these two study groups were similar in terms of the demographic and confounding variables, a significant reduction in the mean score of fatigue in the intervention group may possibly be due to the self-care program applied for this group. The specific characteristic of the self-care program applied in the present study was its comprehensiveness. This self-care program was designed based on the participants' needs that were recognized earlier. In this regard, some previous studies have also evaluated the effect of self-care program based on the Orem's self-care theory on fatigue level. For example, Afrasiabifar *et al.*^[45] in their research have reported that interventions performed based on the Orem's self-care theory can reduce fatigue level in patients with multiple sclerosis. Moreover, in another study, Jiang *et al.*^[29] have evaluated the effect of the Orem's self-care theory on chemotherapy-related fatigue in patients with

Table 4: Comparing the mean score of quality of life before and after interventions between groups

	Control group	Intervention group	P (between groups)
Before interventions	44.69±7.9	43.13±8.8	0.467
After interventions	44±6.77	48.7±8.07	0.017
Changes of mean score (posttest minus pretest)	-0.69±3.23	5.57±3.55	<0.001
Paired samples <i>t</i> -test results (<i>P</i>)	0.244	<0.001	-

breast cancer and concluded that the Orem's self-care theory is effective on reducing fatigue level of patients during chemotherapy. Furthermore, Karimi *et al.*^[46] have reported that the Orem's self-care theory is effective on reducing fatigue level in patients with colorectal cancer. In another study by Masoudi *et al.*,^[28] the effect of self-care program based on the Orem's self-care theory on fatigue level of patients with multiple sclerosis was evaluated, and as a result, they reported that fatigue level of participants in the intervention group significantly reduced after interventions. Altogether, these results indicate the positive effects of the Orem's self-care theory on reducing fatigue level in various patients and under different medical conditions, and these are also consistent with the results of our study.

The results of our study show that after the interventions, the mean score of quality of life significantly increased in the intervention group. In addition, the mean score and the mean changes of quality of life in the intervention group were significantly higher than those of the control group. These results represent that study intervention (self-care program based on the Orem's self-care theory) was effective on enhancing life quality in COPD patients. In previous studies, interventions based on the Orem's self-care theory have led to significant improvements in quality life of patients with multiple sclerosis,^[47] burn patients,^[48] hemodialysis patients,^[49] elders,^[50] and patients with hypothyroid goiter.^[51] The results of these studies are consistent with the results of the present study.

One major and important difference between the present study and the abovementioned studies was that they did not evaluate self-care ability and self-care needs of participants before interventions. Self-care ability can be known as a confounding variable affecting patient's abilities to learn and accept the self-care programs. In the present study, in order to control this confounding variable, self-care ability of the participants was evaluated before the interventions.

Study limitations

One of the limitations of this study is the use of SF-12 quality of life questionnaire, which is not a specific questionnaire for patients with COPD.

CONCLUSION

The results of our study show a significant reduction in fatigue level and a significant improvement in quality of life in patients with COPD after the implementation of the self-care program based on the Orem's self-care theory. The Orem's self-care theory strengthens patients in performing self-care behaviors more efficiently through improving their knowledge level, attitude, and skills, and the care program is specifically designed for meeting the patient's needs. Thus, the Orem's self-care theory can be used in all chronic diseases that require the patients to care for themselves.

Conflicts of interest

There are no conflicts of interest.

Authors' contributions

SA conceived the study, participated in study design, performed analysis, and finalized the manuscript. IR gathered data, performed analysis, and finalized the manuscript. RM conceived of the study and participated in the study. SK conceived of the study and performed analysis. All of the authors read and approved the manuscript.

Financial support and sponsorship

This work was supported by the Shahrekord University of Medical Sciences. This university financed the costs related to the study.

Acknowledgment

The researchers are thankful to participants in this study and all who helped us in conducting the study.

REFERENCES

1. Nunes DM, Mota RM, Machado MO, Pereira ED, Bruin VM, Bruin PF. Effect of melatonin administration on subjective sleep quality in chronic obstructive pulmonary disease. *Braz J Med Biol Res* 2008;41:926-31.
2. Vestbo J, Hurd SS, Agustí AG, Jones PW, Vogelmeier C, Anzueto A, *et al.* Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease: GOLD executive summary. *Am J Respir Crit Care Med* 2013;187:347-65.
3. Adeloje D, Chua S, Lee C, Basquill C, Papan A, Theodoratou E, *et al.* Global and regional estimates of COPD prevalence: Systematic review and meta-analysis. *J Glob Health* 2015;5:020415.
4. Backman H, Eriksson B, Rönmark E, Hedman L, Stridsman C, Jansson SA, *et al.* Decreased prevalence of moderate to severe COPD

- over 15 years in northern Sweden. *Respir Med* 2016;114:103-10.
5. Varmaghani M, Farzadfar F, Sharifi F, Rashidian A, Moin M, Moradi-Lakeh M, *et al.* Prevalence of asthma, COPD, and chronic bronchitis in Iran: A systematic review and meta-analysis. *Iran J Allergy Asthma Immunol* 2016;15:93-104.
 6. KalagoudaMahishale V, Angadi N, Metgudmath V, Lolly M, Eti A, Khan S. The prevalence of chronic obstructive pulmonary disease and the determinants of underdiagnosis in women exposed to biomass fuel in India – A cross section study. *Chonnam Med J* 2016;52:117-22.
 7. Khoshkesht S, Zakerimoghadam M, Ghiyasvandian S, Kazemnejad A, Hashemian M. The effect of home-based pulmonary rehabilitation on self-efficacy in chronic obstructive pulmonary disease patients. *J Pak Med Assoc* 2015;65:1041-6.
 8. Omidi A, Kazemi N, Khatiban M, Karami M. Effect of self-care education on self-efficacy in patients with chronic obstructive pulmonary disease in the Educational and Medical Centers of Hamadan University of Medical Sciences. *Sci J Hamadan Nurs Midwifery Fac* 2015;23:74-84.
 9. Celli BR, MacNee W; ATS/ERS Task Force. Standards for the diagnosis and treatment of patients with COPD: A summary of the ATS/ERS position paper. *Eur Respir J* 2004;23:932-46.
 10. Blinderman CD, Homel P, Billings JA, Tennstedt S, Portenoy RK. Symptom distress and quality of life in patients with advanced chronic obstructive pulmonary disease. *J Pain Symptom Manage* 2009;38:115-23.
 11. Chen YW, Camp PG, Coxson HO, Road JD, Guenette JA, Hunt MA, *et al.* A comparison of pain, fatigue, dyspnea and their impact on quality of life in pulmonary rehabilitation participants with chronic obstructive pulmonary disease. *COPD* 2018;15:65-72.
 12. Peters JB, Heijdra YF, Daudey L, Boer LM, Molema J, Dekhuijzen PN, *et al.* Course of normal and abnormal fatigue in patients with chronic obstructive pulmonary disease, and its relationship with domains of health status. *Patient Educ Couns* 2011;85:281-5.
 13. Kouijzer M, Brusse-Keizer M, Bode C. COPD-related fatigue: Impact on daily life and treatment opportunities from the patient's perspective. *Respir Med* 2018;141:47-51.
 14. Kentson M, Tödt K, Skargren E, Jakobsson P, Ernerudh J, Unosson M, *et al.* Factors associated with experience of fatigue, and functional limitations due to fatigue in patients with stable COPD. *Ther Adv Respir Dis* 2016;10:410-24.
 15. Stridsman C, Svensson M, Johansson Strandkvist V, Hedman L, Backman H, Lindberg A. The COPD Assessment Test (CAT) can screen for fatigue among patients with COPD. *Ther Adv Respir Dis*. 2018;12:1-10. doi: 10.1177/1753466618787380. PMID: 30035671; PMCID: PMC6056783.
 16. Akgün Şahin Z, Dayapoğlu N. Effect of progressive relaxation exercises on fatigue and sleep quality in patients with chronic obstructive lung disease (COPD). *Complement Ther Clin Pract* 2015;21:277-81.
 17. Erfani A, Moezy A, Mazaherinezhad A, Mousavi SA. Does downhill walking on treadmill improve physical status and quality of life of a patient with COPD? *Asian J Sports Med* 2015;6:e25821.
 18. Poorgharakhhan A, Hekmatpou D, Javaherie A, Takhtie A. The effect of factors satisfaction of disease control and self-care behavior on quality of life of patients with Diabetes Mellitus type 2. *Journal of Clinical Nursing and Midwifery*. 2016;5(2):64-74.
 19. Ebrahimi H, Sadeghi M, Khatibi MR. The relationship between quality of life with dialysis efficacy and laboratory parameters in Shahroud/hemodialysis patients. *Iran J Crit Care Nurs* 2015;8:109-16.
 20. Gregersen TL, Green A, Frausing E, Ringbæk T, Brøndum E, Suppli Ulrik C. Do telemedical interventions improve quality of life in patients with COPD? A systematic review. *Int J Chron Obstruct Pulmon Dis* 2016;11:809-22.
 21. Zamzam MA, Azab NY, El Wahsh RA, Ragab AZ, Allam EM. Quality of life in COPD patients. *Egypt J Chest Dis Tuberc* 2012;61:281-9.
 22. Jones PW, Brusselle G, Dal Negro RW, Ferrer M, Kardos P, Levy ML, *et al.* Health-related quality of life in patients by COPD severity within primary care in Europe. *Respir Med* 2011;105:57-66.
 23. Burgel PR, Escamilla R, Perez T, Carré P, Caillaud D, Chanez P, *et al.* Impact of comorbidities on COPD-specific health-related quality of life. *Respir Med* 2013;107:233-41.
 24. Barandeh M, Babaei M, Mehdizadeh Toorzani Z, Sharifiyan R. Effect of self-care on quality of life in women with breast cancer undergoing chemotherapy. *J Urmia Nurs Midwifery Fac* 2017;15:199-207.
 25. Valizadeh S, Soheili A, Moghbeli G, Aliafsari E. Applicability of Orem's self-care model in Iran: An integrated review. *J Urmia Nurs Midwifery Fac* 2017;15:313-28.
 26. Dehghan Nayeri N. *Theory and Theories of Nursing*. Tehran: Hakim Heijadi Pub; 2014. p. 289-91.
 27. Shahbaz A, Hemmati Maslakpak M, Nejadrahim R, Khalkhali H. The effect of implementing Orem's self-care program on self-care behaviors in patients with diabetic foot ulcer. *J Urmia Nurs Midwifery Fac* 2016;14:108-17.
 28. Masoudi R, Kheiri F, Ahmadi F, Mohammadi E. The effect of self-care program base on the Orem frame work on fatigue and activity of daily living in multiple sclerosis patients. *Arch Rehabil* 2009;10:43-52.
 29. Jiang JF, Lao YC, Chen MZ. The application of Orem's self-care theory on fatigue of breast cancer patients during chemotherapy. *Zhonghua Zhong Liu Za Zhi* 2009;1:024.
 30. Baraz S, Rostami M, Farzianpor F, Rasekh A. Effect of Orem Self Care Model on Ederies' quality of life in health care centers of Masjed Solaiman in 2007-2008. *J Arak Uni Med Sci* 2009;12:51-9.
 31. Mahmoudzadeh Zarandi F, Raiesifar A, Ebadi A. The effect of Orem's self-care model on quality of life in patients with migraine: A randomized clinical trial. *Acta Med Iran* 2016;54:159-64.
 32. Jokar Z, Mohammadi F, Khankeh HR, Fallah Tafti S, Koushesh F. Comparing home-based pulmonary rehabilitation nursing on fatigue and quality of life in patients with COPD. *J Fasa Univ Med Sci* 2014;4:168-76.
 33. Economou NT, Ilias I, Velentza L, Papachatzakis Y, Zarogoulidis P, Kallianos A, *et al.* Sleepiness, fatigue, anxiety and depression in Chronic Obstructive Pulmonary Disease and Obstructive Sleep Apnea – Overlap – Syndrome, before and after continuous positive airways pressure therapy. *PLoS One* 2018;13:e0197342.
 34. Azimian M, Shahvarughli Farahani A, Dadkhah A, Fallahpour M, Karimlu M. Fatigue severity scale: The psychometric properties of the Persian-version in patients with multiple sclerosis. *Int J Biol Sci* 2009;4:974-7.
 35. Heidari M, Fayazi S, Borsi H, Moradbeigi K, Akbari Nassaji N. Effect of a self-management program based on 5A model on dyspnea and fatigue severity among patients with chronic obstructive pulmonary disease: A randomized clinical trial. *Hayat* 2015;20:89-99.
 36. Bagheri H, Shahabi Z, Ebrahimi H, Alaenejad F. The association between quality of sleep and health-related quality of life in nurses. *J Hayat* 2007;12:13-20.
 37. Mirbagheri N, Memarian R, Mohamadi E. Effects of regular walking programme on quality of life of elderly patients with moderate COPD. *Iran J Nurs Res* 2007;2:19-28.
 38. Montazeri A, Vahdaninia M, Mousavi SJ, Omidvari S. The Iranian version of 12-item Short Form Health Survey (SF-12): Factor structure, internal consistency and construct validity. *BMC Public Health* 2009;9:341.
 39. Mollaoglu M, Fertelli TK, Tuncay FÖ. Fatigue and disability in elderly patients with chronic obstructive pulmonary disease (COPD). *Arch Gerontol Geriatr* 2011;53:e93-8.
 40. Ghanbari A, Shirmohamadi N, Paryad E, Kazemnejad Leily E. Predictors of fatigue in patients with chronic obstructive pulmonary disease. *KNH* 2016;11:25-31.
 41. Bhandari R, Sharma R. Epidemiology of chronic obstructive pulmonary disease: A descriptive study in the mid-western region of Nepal. *Int J Chron Obstruct Pulmon Dis* 2012;7:253-7.
 42. Viegi G, Pistelli F, Sherrill DL, Maio S, Baldacci S, Carrozzi L. Definition, epidemiology and natural history of COPD. *Eur Respir J* 2007;30:993-1013.
 43. Zakerimoghadam M, Shaban M, Kazemnejad A, Tavasoli KH. The

- effect of breathing exercises on fatigue level of COPD patients. *Hayat* 2006;12:17-25.
44. Tavakkolizadeh J, Ghahramani M, Moghimian M. The survey of stressful events on smoked and nonsmoked early adults of Gonabad city. *HMS* 2004;10:52-60.
 45. Afrasiabifar A, Mehri Z, Javad Sadat S, Ghaffarian Shirazi HR. The effect of Orem's self-care model on fatigue in patients with multiple sclerosis: A single blind randomized clinical trial study. *Iran Red Crescent Med J* 2016;18:e31955.
 46. Karimi S, Vanaki Z, Bashiri H, Hassani SA. The effects of Orem's self-care model on the nutrition status and fatigue of colorectal cancer patients. *J Nurs Midwifery Sci* 2016;3:1-10.
 47. Masoudi R, Mohammadi E, Nabavi SM, Ahmadi F. The effect of Orem based self-care program on physical quality of life in multiple sclerosis patients. *J Shahrekord Univ Med Sci* 2008;10:21-9.
 48. Hashemi F, Rahimi Dolatabad F, Yektatalab S, Ayaz M, Zare N, Mansouri P. Effect of Orem self-care program on the life quality of burn patients referred to Ghotb-al-Din-e-Shirazi Burn Center, Shiraz, Iran: A Randomized Controlled Trial. *Int J Community Based Nurs Midwifery* 2014;2:40-50.
 49. Narimani K. A study of the effect of self-care training on the hemodialysis patients' quality of life. *Daneshvar Med* 2009;16:63-70.
 50. Rostami M, Baraz Pordanjani S, Farzianpour F, Rashekh AA. Effect of Orem self care model on ederies' quality of life in health care centers of Masjed Solaiman in 2007-2008. *Arak Medical Univ J* 2009;12:51-9.
 51. Rahimi A, Salehi S, Afrasiabifar A. The effect of Orem's self-care model on quality of life of patients with hypothyroid goiter. *Armaghane Danesh* 2012;17:398-406.