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Original Article

Effect of telephone and SMS Follow-up on quality of life and fatigue in patients with chronic obstructive pulmonary disease: A three-month RCT-follow-up study

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Abstract

Background and aims: To compare the effect of telephone and SMS follow-up of an empowerment program on quality of life (QOL) and fatigue in patients with chronic obstructive pulmonary disease (COPD).

Methods: Non-blind randomized clinical trial (RCT). Two hospitals and clinics in Shahrekord. 105 patients with COPD grades 2 and 3 were recruited and, after implementation in empowerment sessions, were randomly assigned to three control, telephone follow-up, and SMS follow-up groups (35 individuals in each group). First, the pulmonary empowerment program was designed and implemented for six 90-minute sessions. Then, the patients were randomly assigned to three groups using a random number table. Follow-up ended after three months, and the control group received routine care. Data were collected in the first and sixth sessions of the empowerment program and at the end of the follow-up period using demographic (QOL) and fatigue questionnaires. Eventually, they were analyzed through correlation coefficient and analysis of variance (ANOVA) tests in the SPSS software (Version 20).

Results: The study results on QOL showed that the groups were not statistically significantly different before and after the empowerment (respectively: $P=0.29$ and $P=0.56$). However, the groups showed statistically significant differences at the end of the quarterly follow-up period ($P<0.001$). ANOVA results for fatigue indicated no statistically significant differences between the groups before and after the empowerment (respectively: $P=0.10$ and $P=0.32$). The results of this study showed that follow-up by SMS and telephone improved patients' QOL, and SMS had a greater effect in this regard.

Conclusion: The findings suggest using follow-up as an essential approach to empowerment using various technology methods and designing more comprehensive empowerment to reduce patient fatigue.

Keywords: Empowerment, Fatigue, Quality of life, Chronic obstructive pulmonary disease

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Introduction

The number of chronic obstructive pulmonary disease (COPD) patients is estimated at 328 million worldwide and is predicted to increase by 30% in the next decade, becoming the third cause of death globally in 2030. A 6.2% COPD incidence rate is estimated among Asian people, and this fatigue is 1%-40%, with an average of 10% among Iranians depending on the climatic conditions of the living area (1,2). Due to their debilitating and progressive pulmonary conditions, COPDs can lead to physical limitations, mental disorders, and economic burdens on patients and their families (3). Long-term progressive airway obstruction leads to dyspnea, muscle atrophy, physical dysfunction, social isolation, and weight loss, which together result in progressive atony and decreased quality of life (QOL) in these patients (4). Fatigue is also frequently seen in almost half of the patients. Nevertheless, it is often overlooked despite its high prevalence and important effects, including impaired QOL and increased risk of hospitalization (5,6).

Regarding the disability of most medications to completely treat the disease, symptomatic treatment has been proposed to prevent disease exacerbation and empower the patient (7,8). In this regard, the

empowerment program is a strategy that can replace the conventional education approach (9). Despite the critical role of empowerment and its numerous uses, little attention has been paid to all its dimensions in managing such diseases as COPD (10). Continuous patient follow-up is required to achieve positive outcomes in disease management. Therefore, in chronic diseases, the World Health Organization (WHO) recommends making patients continuously available for face-to-face visits and other means of telecare (11,12). Mobile phones are among the important components of e-health that increase the quality of care while reducing costs (13), which will improve health outcomes (14) by expanding compassionate nursing interaction with patients (15). Although the two telephone and SMS methods are similar, they differ in the results that have been reported (16). The patient can be trained using the two telephone and SMS methods, and the nurse can identify patients' problems and provide appropriate solutions (16-18).

Sadeghi Shermeh et al claimed that telephone and SMS follow-ups are equally effective in increasing patients' QOL after heart valve replacement (19). However, telephone and SMS follow-up effects were investigated previously in other diseases (19,20). Kotsani et al concluded the telephone helped manage diabetes type 1 (compliance with glucose self-monitoring and glycemic control) (21). Despite this evidence, Rush et al (22) showed that the telephone has been used more for education, and its role needs to be investigated for follow-up.

Given the high prevalence of COPD, its socioeconomic burden, the need for patient empowerment, and the need for a study to compare the two methods of SMS and telephone follow-up in patients with COPD, in the current study, we aimed the effect of telephone and SMS follow-up of an empowerment program on QOL and fatigue in patients with COPD.

Methods

This study is a non-blinded randomized clinical trial in patients with COPD that was conducted on the patients after obtaining the code of ethics. The research population included COPD patients admitted to Kashani and Hajar hospitals and clinics in Shahrekord in 2019. All patients were informed about the publication of data and results without including their names and signed a written consent form. Then, an empowerment program was started. A sample size of 35 subjects in each group was calculated. However, considering a confidence factor of 95%, a power of 80%, and an attrition rate of 10%, sampling continued until 105 people were reached. Inclusion criteria were diagnosis of COPD grades 2 and 3 according to GOLD criteria (23), willingness to participate, ability to speak and communicate, the absence of hearing problems, literacy, having mobile and landline numbers, patient's ability to use SMS, age over 40 years (24), no participation in other empowerment programs during the last 6 months, and no history of the mental disorder according to the medical record and the physician's comment. The exclusion criteria were reluctance to continue participation, patient unavailability for 2 weeks or more, diseases making the patient unstable, and absence of more than 2 sessions in empowerment sessions (25).

During classes, 20 samples were excluded; these samples among the eligible entry criteria were replaced. Randomization was done by using a table of random numbers; numbers 1-105 prepared at the end of the sixth session of each group were divided among the participants so that each subject was given a unique number. At the end of the empowerment program for all patients, each subject was included in one of the three groups according to this table. Figure 1 shows the flowchart of this study.

The St. George's Respiratory Questionnaire (SGRQ) measured QOL. The SGRQ has three dimensions: symptoms, activity, and effectiveness, and it has 17 questions. The symptom subscale has eight questions measuring cough, dyspnea, sputum, wheezing, and recurrent attacks. The activity subscale contains two questions that examine the dyspnea-inducing physical activities or the effects of dyspnea on daily activities. The impact dimension includes seven questions and measures the disease's effect on one's social and emotional functioning. Each subscale of the questionnaire and its total score are between 0 and 100, indicating the best and the worst states of QOL. The Iranian version of this questionnaire was validated ($\alpha = 0.93$) by Shariati et al (1), and its reliability was calculated in the present study (0.82).

Fatigue was measured using the standard Piper Fatigue Scale (PFS). The PFS covers behavioral, emotional, perceptual, and cognitive dimensions and consists of 26 sentences. Of these sentences, 22 are scored in the range of 0-10 according to the severity of the signs. Scores of 0 and 10 indicate the lowest and the highest severities of the intended sign, respectively. Finally, the fatigue severity is obtained by summing the numbers selected by the

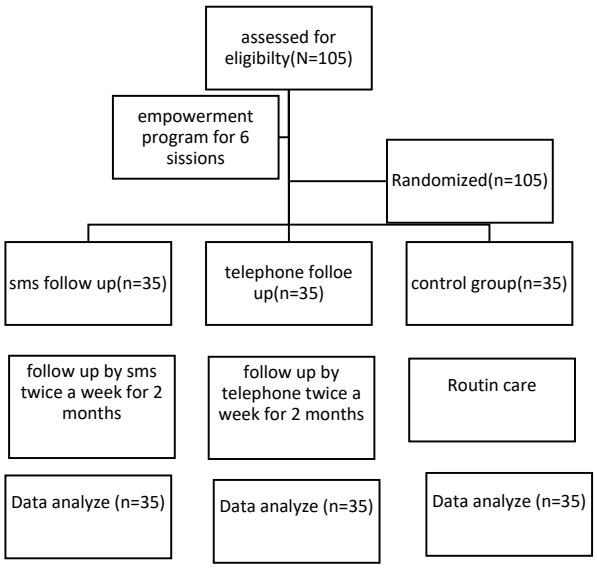

Figure 1. Flow chart of study

patient and dividing the product by 22 as follows: 0 (non-fatigued), 1-3 (mild), 4-6 (moderate), and 4-7 (severe). Its validity was confirmed in a study by Khayeri et al (26), and its reliability was determined by Cronbach's alpha (0.91) in this study. Patients completed all these questionnaires independently at all stages of the study.

The empowerment program was started in coordination with the management, security, and audio-visual management of Hajar Hospital. The researcher held the program using lectures, questions/answers, and video projectors at Hajar Hospital twice a week, each lasting 90 minutes. The empowerment program used here was designed in line with the methods presented by Disler et al (27) to empower patients with COPD.

In Disler et al, pulmonary rehabilitation, knowledge acquisition, social support, telehealth, web-based interfaces, and collaboration with healthcare professionals improved the empowerment of patients with COPD. These factors were implemented in this empowerment program.

The questionnaires were completed and returned to the researcher at the start of the first session. During the empowerment sessions, an educational brochure was provided to all patients. The questionnaires were completed for the second time at the end of the sixth session. Afterward, the patients were assigned to three groups: control, telephone follow-up, and SMS follow-up, using a random number table by the researcher. Numbers 1-105 prepared in the sixth session of each group were divided among the participants so that each subject was given a unique number. At the end of the empowerment program for all patients, each subject was included in one of the three groups according to the table of random numbers. Blinding was not possible as each patient knew the type of follow-up intervention.

For 3 months (12), the researcher performed follow-ups using landline and SMS services, and the control group received routine care. This stage of the study coincided with the COVID-19 epidemic. In the first month, the patients were followed up by telephone as 2 calls and then one per week. All calls were according to the plan designed by the researcher for giving information, encouraging the patient to socialize and take the proper treatment, strengthening hope, and setting a goal for the coming week. Also, the patient was free to ask questions and express his/her concerns and needs.

For SMS follow-ups, pre-designed SMSs, such as two per week, were sent in the first month and then one per week. There are two general types of SMS: educational (increasing patient knowledge) and reminder (encouraging the patient to take a specific action). Educational SMS, such as a summary of recognizing the disease and its long-term effects on other systems.

Reminders one such as advising to quit smoking and not come in contact with its smoke, managing the aggravation of symptoms, managing fatigue and shortness of breath, managing sleep and eating disorders, managing stress, pulmonary rehabilitation, encouraging physical activity, etc. Also, after reading each SMS, the patient sent a confirmation message to the researcher, which was completely free for the patient, and she/he could ask her/his questions and receive an answer.

At the end of the follow-up period, data were collected by demographic questionnaires, SGRQ for QOL, and PFS by someone other than the researcher and analyzed by SPSS 22 software using inferential and descriptive statistics at a significance level of < 0.05 in all tests.

Results

The comparison of groups revealed that the three groups were homogeneous regarding demographic variables (Table 1). There were 18 (51%) men in the SMS follow-up group, 21 (60%) in the telephone follow-up group, and 20 (57%) men in the control group. The one-way ANOVA statistical test did not show any significant statistical difference in terms of gender distribution ratio in the groups ($P = 0.76$). In the SMS follow-up group, 24 (64%) people, in the telephone follow-up group, 23 (66%) people; and in the control group, 26 (74%) people were GOLD Stage II. The one-way ANOVA statistical test did not show a significant statistical difference in the gender distribution ratio in the groups ($P = 0.72$). The studied units in the SMS intervention group in terms of educational status are 18 people with primary education (51%), two people with secondary education (6%), eight people with diploma (23%), four people with post-graduate diploma (11%), two people with bachelor's degree (6%); One person with higher education (3%). In the telephone intervention group, in terms of educational status, 19 people (54%) have primary education, eight people have a bachelor's degree (23%), five people have

Table 1. Demographic variables in three groups after follow-up

Variables	SMS follow-up group (n = 35)	Telephone follow-up group (n = 35)	Control group (n = 35)	*P*
Age (y)	55	59	58	0.19
BMI	26 ± 0.98	25 ± 0.97	28 ± 1	0.15
Duration of COPD (y)	2 ± 1.7	7 ± 1.12	12 ± 1.7	0.94
Gender				0.76
Female	17	14	15	
Male	18	21	20	
Smoking				0.26
Smoker	4	8	4	
Non-smoker	31	27	26	
GOLD Stage				0.73
Stage I	24	23	26	
Stage II	11	12	8	
Education				0.39
Primary	18	19	22	
Middle school	2	8	5	
High school	8	5	4	
College or above	7	3	3	

a diploma (14%), one has a post-graduate diploma (3%), and two have a bachelor's degree (6%); There were zero people with higher education (0%).

In the control group, in terms of literacy level, there are 22 people with elementary literacy (63%), five people with cycle (14%), four people with diploma (11%), two people with post-graduate diploma (6%), one person with bachelor's degree (3%), There were zero people with higher education (0%). The ANOVA test did not show a statistically significant difference in the ratio of education level distribution in the two groups ($P=0.39$).

The QOL score in the control group before empowerment was 37.38 ± 1.39; after empowerment, it was 27.57 ± 1.02; after three months, 27.87 ± 1.1. In the SMS intervention group, 34.78 ± 1.4; after empowerment, 28.23 ± 1.37; and after three months, 20.87 ± 7.36. In the telephone intervention group, it was 29.69 ± 1.27 before empowerment, 25.50 ± 1.03 after empowerment, and 19.54 ± 8.13 after three months. The data analysis using the ANOVA test showed no statistically significant difference between the groups before and after empowerment ($P>0.05$). However, after the end of the three-month follow-up period, a statistically significant difference was seen ($P<0.001$). No patients lost to follow-up, and the findings indicated that the average QOL after empowerment did not change statistically significantly in all the groups; however, the QOL of patients improved after 3 months of follow-up (Table 2 and 3; Figures 2 and 3).

Data showed that patients' fatigue did not decrease statistically significantly after empowerment but decreased after the follow-up period with no statistical significance.

Discussion

We aimed to compare the effect of telephone and SMS follow-up of an empowerment program on QOL and fatigue in patients with COPD. This study showed that empowerment without follow-up did not statistically significantly influence the improvement in patients' QOL and fatigue. After the follow-up period, SMS follow-up had the greatest effect on QOL, but follow-ups did not

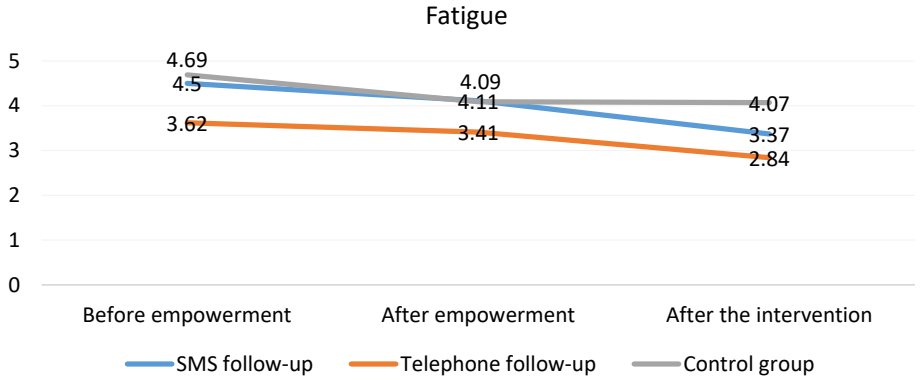

Figure 2. Comparing the average fatigue of patients before empowerment, after empowerment, and after the intervention in the two intervention groups of phone and SMS follow-up and the control group

Table 2. The quality-of-life variable in three groups and three stages of research after follow-up

Stage			Groups			*P* value
			SMS follow up	Telephone follow up	Control	
			Mean ± SD	Mean ± SD	Mean ± SD	
QOL	Before intervention		34.78 ± 1.4	29.69 ± 1.27	37.38 ± 1.39	0.29
	After empowerment		28.23 ± 1.37	25.50 ± 1.03	27.57 ± 1.02	0.56
	After intervention		20.87 ± 7.36	19.54 ± 8.13	27.87 ± 1.10	0
	Mean changes compared to before the intervention	After empowerment	-6.55 ± 1.63	-4.1 ± 18.14	-4.80 ± 1.46	0.48
		After intervention	-14.15 ± 1.78	-10.14 ± 1.35	-4.50 ± 1.76	0

SD, Standard Deviation

Table 3. Fatigue variable in three groups and three stages of research after follow-up

Stage			Groups			*P* value
			SMS follow up	Telephone follow up	Control	
			Mean ± SD	Mean ± SD	Mean ± SD	
Fatigue	Before intervention		4.5 ± 2.17	3.62 ± 2.42	4.7 ± 2.06	0.10
	After empowerment		4.12 ± 2.32	3.42 ± 2.42	4.09 ± 1.84	0.32
	After intervention		3.72 ± 2.06	2.84 ± 2.34	4.07 ± 1.94	0.05
	Mean changes compared to before the intervention	After empowerment	-0.39 ± 0.19	-0.21 ± 0.13	-0.60 ± 0.18	0.25
		After intervention	-22.1 ± 0.26	-0.77 ± 0.17	-0.62 ± 0.21	0.13

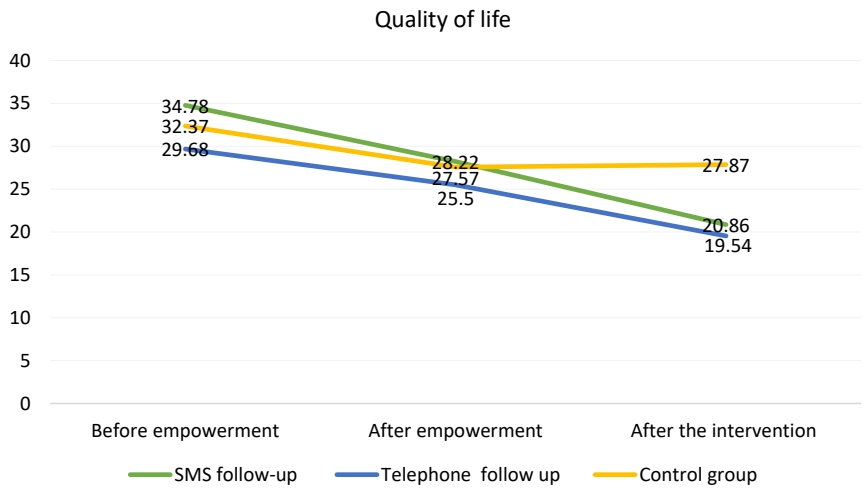

Figure 3. Comparison of the average quality of life of patients before empowerment, after empowerment, and after the intervention in the two intervention groups of telephone and SMS follow-up and the control group

statistically significantly affect the improvement of fatigue. In patients with COPD, empowerment means coping with the disease and having the ability to perform daily tasks and medical procedures (28) independently. Many factors can affect the outcome. In the present study, patients in the three groups receiving the empowerment program were not statistically significantly different regarding QOL and fatigue. This result disagrees with Sadate Moazeni et al (29), probably due to the lack of face-to-face sessions at home in our study or different types of interventions during the empowerment, maybe face-to-face sessions at home are one of those important factors that can affect the outcome as mentioned above.

The WHO defines QOL as a broad concept. It combines people's perceptions of physical and mental independence, social interaction, and interaction with the environment, beliefs, and personal values (30). The QOL index is so important that the effectiveness of many health interventions is evaluated with this index. Numerous studies have been conducted on this indicator. In agreement with our results, Folch-Ayora et al presented evidence that training and telephone follow-up could improve the total QOL score (31). However, training on disease exacerbation was only a part of it, and the total QOL score was improved by follow-up. Consistent with the present study, another work reported the effect of telephone counseling on the QOL of patients after coronary artery bypass graft surgery (32). However, the present study needs to be more consistent with other studies conducted on QOL. For instance, a study compared telephone and SMS follow-ups in increasing the QOL of patients after heart valve replacement and concluded that these two methods were equally effective (19). Also, the study of Kotsani et al indicates that text messaging does not cover the flexibility of a direct exchange of information between the patient and the professional (21). These are different from the results of our research because SMS intervention was more effective than telephone intervention in the present study, probably due to the difference between the study population and the number of samples. In a three-group clinical trial study, Jalali et al concluded that SMS follow-up could effectively improve the QOL of these patients. However, routine and telephone follow-up had no statistically significant impacts (16). Their study disagrees with our research regarding the ineffectiveness of telephone follow-up on QOL, although SMS follow-up was more effective than the telephone in the present study. This inconsistency may be attributed to the lack of a clear and continuous protocol and untargeted telephone calls in the study of Jalali et al)16).

A study claimed that home-based pulmonary rehabilitation was more effective in reducing patients' fatigue than QOL (23); this result is inconsistent with the present study, possibly due to differences in the follow-up duration.

The simple traditional training could not change patients' behavior and motivation for recovery. Nevertheless, as a dynamic and comprehensive process, empowerment can be very helpful in its positive effect on patients' QOL in other diseases such as stroke, hypertension, and diabetes (33). However, according to the present study, the empowerment results will not be statistically significant positive on patients' QOL until all these factors are combined. This finding reflects telecare's severe and essential effect, as its neglect can lead to failure to improve patients' QOL. Among the means of telecare, telephones, and mobile phones are more accessible and widely used than other means. Overall, using these measures as telenursing care improves the quality of nursing services, reduces traffic and patients' travel expenses, and helps patients improve their health (34).

Fatigue is also a multidimensional symptom with three possible causes of systemic, behavioral, and psychophysical general categories (35). Accordingly, fatigue is an essential complex variable in patients' lives. Its effectiveness and improvement require designing multidimensional (physiological, behavioral, and psychological) and personalized interventions; even the type of exercise can also influence the effectiveness of the intervention. Another critical factor in fatigue rate is the fear of

activity due to the fear of pain or injury, referred to as kinesiophobia in psychology. A patient may suffer from it and refuse to express this problem. Because kinesiophobia is closely related to the patient's fatigue (36), some of the patients in the present study might have experienced some degree of kinesiophobia and refused to talk to the researcher about it. The follow-up phase in this study coincided with the COVID-19 epidemic, which might have affected the ineffectiveness of follow-up on patients' fatigue. Future studies are recommended to investigate the effect of empowerment of patients with COPD using various sports, such as water sports and Tai Chi, monitoring devices while following up with this group of patients, and utilizing technology for empowerment and monitoring (37). The strength of this study includes the type of research, which is a three-group clinical trial, along with the design of an empowerment program, which has rarely been done in other studies.

Limitations of the study

The limitations of the study were that we had to withdraw, firstly, illiterate subjects because of the need for reading and sending SMS and secondly, patients with grade 4 COPD due to their difficult circumstances and they were not allowed to attend 6 class sessions, which prevents its generalization.

Conclusion

Overall, it can be concluded that patients need a comprehensive empowerment program with follow-up to improve their QOL, and patients' fatigue is a very complex complication that requires further comprehensive studies. This approach can include grade 4 patients in the program and be used for all pulmonary patients with COVID-19 conditions. SMS is also more effective in improving the QOL than a telephone.

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Authors' Contribution

Conceptualization: Haydeh Heidari and Parisa Fathizadeh Dehkordi.
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Formal analysis: Parisa Fathizadeh Dehkordi and Morteza Sedehi.
Funding acquisition: Haydeh Heidari and Parisa Fathizadeh Dehkordi.
Investigation: Haydeh Heidari and Parisa Fathizadeh Dehkordi.
Methodology: Haydeh Heidari and Parisa Fathizadeh Dehkordi.
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Software: Parisa Fathizadeh Dehkordi and Morteza Sedehi.
Supervision: Reza Masoudi and Haydeh Heidari.
Validation: Reza Masoudi and Haydeh Heidari.
Visualization: Reza Masoudi and Haydeh Heidari.
Writing–original draft: Haydeh Heidari and Parisa Fathizadeh Dehkordi.
Writing–review & editing: Haydeh Heidari and Parisa Fathizadeh Dehkordi.

Competing Interests

The authors declare that there is no conflict of interest.

Data Availability Statement

The data from this manuscript will be made available to others upon reasonable request by the corresponding author.

Ethical Approval

This is a non-blinded randomized clinical trial involving patients with COPD. The study was conducted after obtaining ethical approval (IR.SKUMS.REC.1398.104) and registration (identifier: IRCT20170122032101N4) on April 6, 2020. Written consent was obtained from each participant prior to their inclusion in the trial.

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References

1. Shariati A, Eidani E, Goharpei S, Latifi M, Bakhshandeh Bavarsad M. Surveying the effect of inspiratory muscle training on quality of life in COPD patients. Jundishapur Sci Med J. 2013;12(1):59-68. [Persian].
2. Nguyen HT, Collins PF, Pavey TG, Nguyen NV, Pham TD, Gallegos DL. Nutritional status, dietary intake, and health-related quality of life in outpatients with COPD. Int J Chron Obstruct Pulmon Dis. 2019;14:215-26. doi: 10.2147/copd.s181322.
3. Baker E, Fatoye F. Patient perceived impact of nurse-led self-management interventions for COPD: a systematic review of qualitative research. Int J Nurs Stud. 2019;91:22-34. doi: 10.1016/j.ijnurstu.2018.12.004.
4. Lan CC, Yang MC, Huang HC, Wu CW, Su WL, Tzeng IS, et al. Serial changes in exercise capacity, quality of life and cardiopulmonary responses after pulmonary rehabilitation in patients with chronic obstructive pulmonary disease. Heart Lung. 2018;47(5):477-84. doi: 10.1016/j.hrtlng.2018.06.006.
5. Seyedi Chegeni P, Gholami M, Azargoon A, Hossein Pour AH, Birjandi M, Norollahi H. The effect of progressive muscle relaxation on the management of fatigue and quality of sleep in patients with chronic obstructive pulmonary disease: a randomized controlled clinical trial. Complement Ther Clin Pract. 2018;31:64-70. doi: 10.1016/j.ctcp.2018.01.010.
6. 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. doi: 10.1016/j.rmed.2018.06.011.
7. Pedersen PU, Ersgard KB, Soerensen TB, Larsen P. Effectiveness of structured planned post discharge support to patients with chronic obstructive pulmonary disease for reducing readmission rates: a systematic review. JBI Database System Rev Implement Rep. 2017;15(8):2060-86. doi: 10.11124/jbisrir-2016-003045.
8. Perkins-Porras L, Riaz M, Okekunle A, Zhelezna S, Chakravorty I, Ussher M. Feasibility study to assess the effect of a brief mindfulness intervention for patients with chronic obstructive pulmonary disease: a randomized controlled trial. Chron Respir Dis. 2018;15(4):400-10. doi: 10.1177/1479972318766140.
9. Razzazan N, Ravanipour M, Gharibi T, Motamed N, Zarei A. Effect of self-management empowering model on the quality of life in adolescents and youths with major thalassemia. J Nurs Educ. 2014;3(2):48-59. [Persian].
10. Fotokian Z, Mohammadi Shahboulaghi F, Fallahi-Khoshknab M, Pourhabib A. The empowerment of elderly patients with chronic obstructive pulmonary disease: managing life with

the disease. PLoS One. 2017;12(4):e0174028. doi: 10.1371/journal.pone.0174028.
11. Javanmardi Fard S, Ghodsbin F, Kaviani MJ, Jahanbin I, Bagheri Z. The effect of follow up (telenursing) on liver enzymes in patients with nonalcoholic fatty liver disease: a randomized controlled clinical trial. Int J Community Based Nurs Midwifery. 2016;4(3):239-46.
12. Zolfaghari M, Mousavifar SA, Pedram S, Haghani H. The impact of nurse short message services and telephone follow-ups on diabetic adherence: which one is more effective? J Clin Nurs. 2012;21(13-14):1922-31. doi: 10.1111/j.1365-2702.2011.03951.x.
13. Dorri S, Asadi F, Olfatbakhsh A, Kazemi A. A systematic review of electronic health (eHealth) interventions to improve physical activity in patients with breast cancer. Breast Cancer. 2020;27(1):25-46. doi: 10.1007/s12282-019-00982-3.
14. Aminuddin HB, Jiao N, Jiang Y, Hong J, Wang W. Effectiveness of smartphone-based self-management interventions on self-efficacy, self-care activities, health-related quality of life and clinical outcomes in patients with type 2 diabetes: a systematic review and meta-analysis. Int J Nurs Stud. 2021;116:103286. doi: 10.1016/j.ijnurstu.2019.02.003.
15. Ali S, Kleib M, Paul P, Petrovskaya O, Kennedy M. Compassionate nursing care and the use of digital health technologies: a scoping review. Int J Nurs Stud. 2022;127:104161. doi: 10.1016/j.ijnurstu.2021.104161.
16. Jalali R, Hoseinpour A, Menati L, Amini M. The effect of three methods of follow-up (short message service SMS, telephone and regular) on the quality of life in heart failure patients. Future Med Educ J. 2018;8(1):11-6.
17. Walter B, Klare P, Strehle K, Aschenbeck J, Ludwig L, Dikopoulos N, et al. Improving the quality and acceptance of colonoscopy preparation by reinforced patient education with short message service: results from a randomized, multicenter study (PERICLES-II). Gastrointest Endosc. 2019;89(3):506-13.e4. doi: 10.1016/j.gie.2018.08.014.
18. Newton L, Sulman C. Use of text messaging to improve patient experience and communication with pediatric tonsillectomy patients. Int J Pediatr Otorhinolaryngol. 2018;113:213-7. doi: 10.1016/j.ijporl.2018.07.048.
19. Sadeghi Shermeh M, Ghafouri F, Tadrisi SD, Tayyebi A. The effect of follow-up care by telephone and short massage services on patient's quality of life after cardiac valve replacement surgery. Iran J Crit Care Nurs. 2013;6(1):65-72.
20. Danielsen SO, Moons P, Sandvik L, Leegaard M, Solheim S, Tønnessen T, et al. Impact of telephone follow-up and 24/7 hotline on 30-day readmission rates following aortic valve replacement - a randomized controlled trial. Int J Cardiol. 2020;300:66-72. doi: 10.1016/j.ijcard.2019.07.087.
21. Kotsani K, Antonopoulou V, Kountouri A, Grammatiki M, Rapti E, Karras S, et al. The role of telenursing in the management of diabetes type 1: a randomized controlled trial. Int J Nurs Stud. 2018;80:29-35. doi: 10.1016/j.ijnurstu.2018.01.003.
22. Rush KL, Hatt L, Janke R, Burton L, Ferrier M, Tetrault M. The efficacy of telehealth delivered educational approaches for patients with chronic diseases: a systematic review. Patient Educ Couns. 2018;101(8):1310-21. doi: 10.1016/j.pec.2018.02.006.
23. 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(2):168-76. [Persian].
24. do Nascimento ES, Sampaio LM, Peixoto-Souza FS, Dias FD, Gomes EL, Greiffo FR, et al. Home-based pulmonary rehabilitation improves clinical features and systemic inflammation in chronic obstructive pulmonary disease patients. Int J Chron Obstruct Pulmon Dis. 2015;10:645-53. doi: 10.2147/copd.s76216.
25. Moein M, Aghajani M, Mirbagher Ajorpaz N, Khorasanifar L. Effect of an empowerment program on self-efficacy of patients with type 2 diabetes. Iran Red Crescent Med J. 2017;19(1):e29252. doi: 10.5812/ircmj.29252.
26. Khayeri F, Rabiei L, Shamsalinia A, Masoudi R. Effect of Fordyce Happiness Model on depression, stress, anxiety, and fatigue in patients with multiple sclerosis. Complement Ther Clin Pract. 2016;25:130-5. doi: 10.1016/j.ctcp.2016.09.009.
27. Disler RT, Appleton J, Smith TA, Hodson M, Inglis SC, Donesky D, et al. Empowerment in people with COPD. Patient Intell. 2015;8:7-20. doi: 10.2147/pi.s61195.
28. Sam Khanian Z, Ghaffari F, Jannat Alipoor Z, Fotokian Z. Designing and validating the empowerment scale for the older individuals with chronic obstructive pulmonary disease (ESOCOPD). Heliyon. 2020;6(5):e03909. doi: 10.1016/j.heliyon.2020.e03909.
29. Sadate Moazeni S, Ghaljeh M, Navidian A. The effect of pulmonary rehabilitation on fatigue and quality of life in patients with chronic obstructive pulmonary disease: a quasi-experimental study. Med Surg Nurs J. 2020;9(1):e103899. doi: 10.5812/msnj.103899.
30. Masroor D, Rafii F, Fadaeeaghdam N, Hoseini F. Health-related quality of life in patients with chronic obstructive pulmonary disease. Iran J Nurs. 2012;25(76):19-27. [Persian].
31. Folch-Ayora A, Orts-Cortés MI, Macia-Soler L, Andreu-Guillamon MV, Moncho J. Patient education during hospital admission due to exacerbation of chronic obstructive pulmonary disease: effects on quality of life-controlled and randomized experimental study. Patient Educ Couns. 2019;102(3):511-9. doi: 10.1016/j.pec.2018.09.013.
32. Bikmoradi A, Masmouei B, Ghomeisi M, Roshanaei G, Masiello I. Impact of telephone counseling on the quality of life of patients discharged after coronary artery bypass grafts. Patient Educ Couns. 2017;100(12):2290-6. doi: 10.1016/j.pec.2017.06.010.
33. Wu Y, Zhang L, Peng X. Current status of the application of the empowerment theory in patients with chronic obstructive pulmonary disease. Yangtze Med. 2019;3(3):212-24. doi: 10.4236/ym.2019.33021.
34. Ghoulami-Shilsari F, Esmaeilpour Bandboni M. Tele-nursing in chronic disease care: a systematic review. Jundishapur J Chronic Dis Care. 2019;8(2):e84379. doi: 10.5812/jjcdc.84379.
35. Spruit MA, Vercoulen JH, Sprangers MAG, Wouters EFM. Fatigue in COPD: an important yet ignored symptom. Lancet Respir Med. 2017;5(7):542-4. doi: 10.1016/s2213-2600(17)30158-3.
36. Vardar-Yagli N, Calik-Kutukcu E, Saglam M, Inal-Ince D, Arikan H, Coplu L. The relationship between fear of movement, pain and fatigue severity, dyspnea level and comorbidities in patients with chronic obstructive pulmonary disease. Disabil Rehabil. 2019;41(18):2159-63. doi: 10.1080/09638288.2018.1459886.
37. Naranjo-Hernández D, Talaminos-Barroso A, Reina-Tosina J, Roa LM, Barbarov-Rostan G, Cejudo-Ramos P, et al. Smart vest for respiratory rate monitoring of COPD patients based on non-contact capacitive sensing. Sensors (Basel). 2018;18(7):2144. doi: 10.3390/s18072144.

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