

Investigating the Effect of a Family-Centered Empowerment Model on Quality of Life in Patients with Chronic Obstructive Pulmonary Disease

Zahra Heydari,

Nursing Graduate Student, Ardabil University of Medical Sciences, Iran.

Nasrin Mehrnoush*,

Department of Faculty of Nursing and Midwifery, Ardabil University of Medical Sciences, Ardabil, Iran.

E-mail: n.mehrnoush@arums.ac.ir

Masoumeh Aghamohammadi,

Department of Faculty of Nursing and Midwifery, Ardabil University of Medical Sciences, Ardabil, Iran.

Saeed Hosseininia,

Internal Medicine Department Pulmonary Division, Faculty of Medicine, Ardabil University of Medical Sciences, Ardabil, Iran.

Abstract--- Introduction: Empowerment-based training has been thus far introduced as one of the care plan standards for patients with chronic obstructive pulmonary disease (COPD) in order to, achieve health maintenance and promotion. The present study aimed to investigate the effect of a family-centered empowerment model (FCEM) on quality of life (QoL) in people with COPD.

Method and Materials: In this quasi-experimental study, a total number of 84 male patients with COPD, referred to the Imam Khomeini Hospital in the city of Ardabil, Iran, in Jan to July 2022, were recruited and evaluated in experimental and control groups. The patients accompanied by one of their family members in the experimental group benefited from six Empowerment sessions of 90 minutes, but the control group did not receive any training for this purpose. Before and two months after the intervention, the patients' QoL was assessed via Questionnaire SF-36 in both groups. The data analysis was then performed using the SPSS software (ver. 23) through descriptive and inferential tests.

Result: Considering the significance level of $P < 0.05$. The study results demonstrated no statistically significant difference in QoL and its dimensions before the intervention between the experimental and control groups, but a significant difference was observed in QoL in the patients between both groups after it ($p < 0.05$). Based on the study results, the FCEM-based intervention had a positive effect on QoL in patients living with COPD.

Conclusion: Considering the factors related to improved QoL in people with COPD, the use of this intervention program was thus recommended in order to better promote QoL in such patients.

Keywords--- Empowerment, FCEM, QoL, COPD.

I. Introduction

As a progressive incurable health problem, chronic obstructive pulmonary disease (COPD) is a disorder in which breathing is impaired due to partial airway obstruction. The most defining characteristic of COPD is the airflow limitation, which causes shortness of breath (SOB, viz. dyspnea), fatigue, and decreased activity of daily living, resulting in reduced quality of life (QoL) [1]. According to projections, COPD will become the third leading cause of death by 2030 in the world [2]. Nevertheless, unfortunately, there is no cure for this health condition [3]. As COPD downgrades QoL due to its long-term negative impact on health status, lung function, respiratory symptoms, and limited exercise capacity in patients [4], improving QoL thus seems critical because there is also the lack of definitive treatments [5]. Health-related QoL (HRQoL) in patients with chronic respiratory diseases is accordingly a good severity indicator, which can be significantly associated with exacerbation frequency, and its evaluation can be acknowledged as an excellent indicator for predicting mortality rates [6]. In this sense, Antoniu et al. [7] in an exploratory study had found that patients living with COPD suffered from a low level of HRQoL. Yang et al. [8] had further reported poor QoL in patients with stable COPD.

Due to the recurrence of the disease symptoms, patients with COPD are in dire need of training programs to involve themselves in self-care activities and show behaviors such as medication adherence and regular follow-up, and thus affect their comfort and functional abilities [9]. Family-centered empowerment models (FCEMs) are becoming increasingly popular in nursing education and healthcare due to the prevalence of chronic diseases and insufficient physical space in hospitals [10]. Empowerment here refers to an opportunity to boost the abilities of

family members to meet the needs of their patients, given to such primary caregivers by professional teams because family members are the most important elements in a community, responsible for providing proper healthcare services to such patients [11]. Accordingly, the main objective of an FCEM is to raise awareness and involve family members in the decision-making process to maintain and promote health in patients [12].

As a result of FCEMs, individuals gain self-esteem, self-efficacy, and increased skills in order to counteract perceived threats (by understanding their severity and sensitivity) [10]. A review of studies in this domain show that such models have thus far affected the knowledge of the parents of children with thalassemia [13], the QoL of mothers of hospitalized children [14] as well as patients with high blood pressure [12], and those undergoing hemodialysis [15], QoL and self-efficacy in adolescents living with diabetes mellitus (DM) [16], and self-esteem in patients suffering from multiple sclerosis (MS) [17]. The main objectives of COPD management include preventing the disease progression, reducing exacerbation frequency and severity, relieving SOB and other respiratory symptoms, improving exercise tolerance test results, providing immediate treatment for the exacerbated complications of the disease, promoting health status, and lowering mortality rates in these patients. To this end, a systematic approach is required [18]. FCEMs also put importance on the effectiveness of the role of family members in three motivational, psychological, and functional dimensions, and involve the general stages of threat perception, self-efficacy, self-esteem, and evaluation [19].

Since QoL is of utmost importance in clinical decisions and health-related policies [20], it is indispensable to conduct research to improve QoL in chronic patients. Considering that the COPD complications in physical, behavioral, psychological, and social dimensions lead to the failure to control the disease and its adverse effects on QoL in patients and other family members, and given that the effect of an FCEM as an intervention on QoL had not been determined in people living with COPD in previous research, to the best of the authors' knowledge, this study aimed to investigate the effect of an FCEM on QoL in such patients.

II. Method and Material

It was conducted on a statistical population of students using a pretest-posttest design with a control group as a comparator, consisting of male patients with a definitive diagnosis of COPD by a specialist along with their family members as primary caregivers referred to the Men's Internal Medicine Ward of Imam Khomeini Hospital in the city of Ardabil, Iran. With reference to similar studies, 95% confidence interval (CI) and 90% statistical test power were initially considered for 38 cases in each group, and then 45 patients and a total number of 90 individuals were determined (namely, 45 cases in the experimental [viz. intervention group] and 45 patients as the controls), considering the possible sample loss in each group.

Convenience sampling was used to select study samples according to the inclusion criteria, i.e., definitive diagnosis (based on the specialist's diagnosis as well as physical examination and the interpretation of spirometry indicators), ability to read and write by the patients or their family members, residing in the city of Ardabil, living with a family member who was responsible for daily care, willingness in the patients and their family members to participate in training sessions, no history of illnesses such as mental, cognitive, and neurological disorders, no history of drug addiction or use of psychotropic medications, and no development of other progressive chronic diseases. Those suffering from SOB or acute respiratory distress syndrome should be monitored closely during their attendance at the training sessions, those absent for more than one session, and the ones reluctant to continue contributing to the study were also excluded.

To collect data, a demographic information form and the 36-Item Short Form Health Survey Questionnaire (SF-36) were used. In addition to the patient's age and marital status, education level, history of smoking, monthly income, and duration of COPD, all demographic information was gathered from the patients' medical records using the COPD assessment test. The SF-36 was also a standard questionnaire designed by Weber et al. (1992) to assess a person's physical and mental health using 36 items and eight different dimensions of physical functioning (10 items), bodily pain (2 items), social functioning (2 items), mental health (5 items), general health (5 items), vitality (4 items), physical problems (4 items), and mental problems (3 items). The questionnaire was comprised of two dimensions, namely, physical health (the subscales of general health, physical limitation. To assess HRQoL, a Likert-type scale was used to assess physical health, mental health, and role limitation for emotional reasons. The score for each dimension could be thus calculated based on its subscales so that the total score was added to each subscale and divided by the number of the subscales in each dimension. To find the total score of the questionnaire, the sum of the scores obtained from each subscale were divided by eight (viz. the total number of the subscales), so the scores for each scale could vary from zero to 100 [21]. This tool had been already administered in various studies and its validity and reliability had been confirmed [21-23].

The current research was shown after obtaining the code of ethics from Ardabil University of Medical Sciences, Ardabil, Iran. In this way, the researcher, after receiving permission to conduct the research from the esteemed officials of the School of Nursing and Midwifery affiliated to Ardabil University of Medical Sciences, Ardabil, Iran,

and a letter of introduction from the given school, referred to the study setting and sampled upon making the necessary arrangements with the hospitalized male patients. The researcher explained the study objectives as well as confidentiality, anonymity, and confidentiality of the patients' information to their family members, obtaining written consent from them as primary caregivers. The patients were then asked to fill out the SP-36. The patients were also assigned to the experimental and control groups in a simple random manner. In order to place the samples into both groups, envelopes containing cards, labeled A and C, were prepared and the patients were asked to randomly select one of them. The individuals receiving card A were accordingly assigned to the experimental group and those with card C were put in the controls. Sampling also continued until reaching the specified sample size. The intervention was further performed on the experimental group, including the implementation of an FCEM based on the protocol developed by Alhani et al. [24] with the participation of the patient and one of the family members in six training sessions of 90 minutes once a week at four stages of perceived threat, problem-solving, educational participation, and evaluation (namely, process evaluation in each session and final evaluation). In the control group, routine patient care was received (Table 1).

Table 1: The Protocol of the FCEM-based Intervention Sessions

| Sessions | Topics | Objectives and Content |
|----------|---|---|
| First | Perceived threat (two concepts of perceived severity and sensitivity) | During two 45-60 minute group sessions, the patients' knowledge, attitudes, and beliefs about COPD were assessed and explained in accordance with their physical, mental, and psychological conditions. |
| Second | Problem-solving (Self-efficacy) | The problem-solving sessions were held in groups of three-to-five patients and they actually coped with some challenges and were involved in the problem-solving process. The patients also discussed with each other, under the constant and direct supervision of the researcher, citing concrete examples of their own conditions and the strategies adopted to solve a similar problem with the help of others. |
| Third | Educational participation | The patients received training and then the successful implementation of preventive behaviors involved in their QoL designed in the model was observed to increase their sense of self-efficacy and empower them. |
| Fourth | Evaluation (process and final evaluation) | The process evaluation was done as an encouraging agent for many patients as much as possible to internalize their axis of control. This evaluation was also utilized in this process and throughout the implementation of the model, and then the patient and his family member as a primary caregiver were evaluated during the intervention program. |

Neither experimental nor control groups of patients were asked to complete the SP-36 two months after the intervention. Those in the control group were given educational booklets at the end of the study containing the intervention topics taught to the experimental group.

In order to analyze the data, SPSS Statistics (ver. 23) was used. The demographic characteristics of the samples were also evaluated using descriptive statistics. In addition, the Chi-square test was used to compare the frequency distribution of qualitative variables. Further comparisons were carried out between control and experimental groups during the pre-and post-tests by the Chi-square test, Wilcoxon signed rank test, and Mann-Whitney U test.

III. Results

There were 90 patients in this study, but 84 cases (42 in the experimental group and 42 in the control group) were evaluated, but three patients in the experimental group were excluded due to their absence for more than one session and three patients in the control group were excluded due to their inability to attend follow-up sessions. Table 2 illustrates the comparison between experimental and control groups based on demographic characteristics. A statistically significant difference in demographic variables was not found between the two groups ($P < 0.05$).

Table 2: Experimental and Control Group Demographics

| Groups | Experimental (N = 42) | Control (N = 42) | Statistical test results |
|---|-----------------------|------------------|--------------------------|
| Demographic Variables | | | |
| Age (years old) Mean±standard deviation (SD) | 49.3±1.02 | 50.6±12.6 | 0.531=p* |
| Disease duration (years) Mean±SD | 7.38±4.1 | 7.38±3.2 | 0.9*= p |
| Marital status | Married | 34 (81) | 28 (66.7) 0.214=p** |

| | | | | |
|------------------------|---------------------------|-----------|-----------|-----------|
| | Single | 8 (19) | 14 (33.3) | |
| Educational background | Below high school diploma | 29 (69) | 25 (59.5) | 0.599=p** |
| | High school diploma | 9 (21.5) | 13 (31) | |
| | Higher education | 4 (9.5) | 4 (9.5) | |
| Employment status | Unemployed | 18 (42.9) | 12 (28.6) | 0.358=p** |
| | Self-employed | 15 (35.7) | 17 (40.4) | |
| | Other | 9 (21.4) | 13 (31) | |
| History of smoking | No | 34 (81) | 29 (69) | 0.208=p** |
| | Yes | 8 (19) | 13 (31) | |
| Disease severity | Mild | 14 (33.3) | 13 (31) | 0.49=p** |
| | Moderate | 9 (21.5) | 12 (28.6) | |
| | Severe | 8 (19) | 11 (26.2) | |
| | Chronic | 11(26.2) | 6 (14.2) | |

*Mann-Whitney U test **Chi-square test

Results from the Mann-Whitney U test presented in Table 3 show that there were no statistically significant differences between experimental and control groups in SP-36 mean scores and SDs before intervention ($p>0.05$). In the investigational group, Wilcoxon signed-rank test results indicated a significant increase in the HRQoL mean and standard deviation only in physical functioning ($p=0.0001$), vitality ($p=0.006$), role limitations due to emotional functioning ($p=0.001$), mental health ($p=0.005$) and overall HRQoL ($p=0.0001$).

Table 3: The Comparison of Mean and SD of HRQoL and its Dimensions in Study Groups Before Intervention up to Two Months After It

| HRQoL and its dimensions | Groups | Before intervention | After intervention |
|--------------------------|--------------|---------------------|--------------------|
| | | Mean±SD | Mean±SD |
| General health | Intervention | 62±4.71 | 60.5±3.29 |
| | Control | 62.6±4.72 | 63.3±3.2 |
| Statistical test results | | $p^*=0.512$ | $p^{**}=0.001$ |
| Physical functioning | Intervention | 66.5±3.44 | 73.7±4.95 |
| | Control | 65.9±4.19 | 66.3±4.37 |
| Statistical test results | | $p^*=0.456$ | $p^{**}<0.0001$ |
| Physical limitation | Intervention | 65.4±6.71 | 64.7±7.04 |
| | Control | 65.7±4.17 | 65.1±7.09 |
| Statistical test results | | $p^*=0.504$ | $p^{**}=0.737$ |
| Mental problems | Intervention | 66.6±5.18 | 72.1±4.88 |
| | Control | 67±4.14 | 66.9±4.48 |
| Statistical test results | | $p^*=0.703$ | $p^{**}<0.0001$ |
| Social functioning | Intervention | 68.4±3.8 | 65.9±4.66 |
| | Control | 67.9±3.93 | 67.5±6.05 |
| Statistical test results | | $p^*=0.575$ | $p^{**}=0.18$ |
| Bodily pain | Intervention | 63±4.06 | 61.4±4.55 |
| | Control | 62.2±4.82 | 62.3±5.68 |
| Statistical test results | | $p^*=0.554$ | $p^{**}=0.233$ |
| Vitality | Intervention | 70.3±5.05 | 72.3±5.27 |
| | Control | 68.8±3.86 | 68.4±6.92 |
| Statistical test results | | $p^*=0.164$ | $p^{**}=0.006$ |
| Mental health | Intervention | 72.2±10.6 | 75.4±4.84 |
| | Control | 72±4.58 | 72.3±4.65 |
| Statistical test results | | $p^*=0.178$ | $**P=0.005$ |
| Total QoL | Intervention | 75.5±8.51 | 80.3±7.19 |
| | Control | 73.6±4.59 | 74.7±6.05 |
| Statistical test results | | $p^*=0.507$ | $**P=0.001$ |

*Mann Whitney U test **Wilcoxon signed-rank test

A Mann-Whitney U test and Spearman's rank correlation test of the experimental group revealed no relationship between age, educational level, employment status, monthly income, and smoking record and HRQoL ($p<0.05$). In

the experimental group with COPD severity, HRQoL was significantly correlated with HRQoL ($p=0.004$), thus showing that severe conditions had superior QoL than mild and moderate diseases.

Table 4: The Relationship between Demographic Variables and Improved QoL in the Intervention Group

| Variables | | Improved QoL | Statistical test results |
|--------------------|--|--------------|--------------------------|
| Marital status | Married | 10.8±5.79 | *P=0.421 |
| | Single | 12.1±0.62 | |
| Level of education | Below high school diploma | 10.3±4.17 | *P=0.957 |
| | High school diploma and higher education | 12.9±6.23 | |
| Employment status | Unemployed | 7.76±7.22 | *P=0.143 |
| | Employed | 12.9±3 | |
| Monthly income | Less than four million tomans | 12.7±5.63 | *P=0.528 |
| | Four million tomans and more | 9.28±3.9 | |
| History of smoking | No | 15±7.5 | *P=0.498 |
| | Yes | 10.1±4.18 | |
| Disease severity | Mild and moderate | 8.85±2.09 | *P=0.046 |
| | Severe and chronic | 12.8±8.1 | |
| Age | | | $r=0.128$, **P=0.42 |
| Disease duration | | | $r=0.226$, **P=0.151 |

*Mann Whitney U test **Spearman's rank correlation test

IV. Discussion

This research aimed to investigate the effect of an FCEM-based intervention on QoL in patients with COPD. In this sense, the results revealed an increase in the total QoL mean score after the intervention in the patients receiving this program. Moreover, this significant elevation was observed in the mean scores of general health, physical functioning, vitality, mental problems, and mental health, so the FCEM could have an important effect on improving the proportions of HRQoL in the patients living with COPD. FCEM was effective in strengthening their belief that they had excellent health status (general health), optimal performance despite severe physical limitations (physical functioning), and that they were vital and capable of performing daily activities (vitality), and that they were free of depressions and emotion problems at work and during other daily activities (mental health). In addition, the findings showed that the FCEM did not improve the dimensions of physical problems, social functioning, and bodily pain statistically significantly between the experimental and control groups after the intervention for patients with COPD. In other words, the FCEM had no impact with regard to fulfilling job-related functions and other daily activities on physical health (physical problems) as well as the relationship between social functioning and general health, that is, there were recurrent interruptions in typical physical and emotional limitations preventing social activities in patients after the intervention (social functioning). Moreover, this model was not effective in the dimension of bodily pain. Of note, this dimension represented the extent to which pain could interfere with daily activities and the very severe and limited bodily pain that might interrupt such activities.

As reported by Rostami et al. [25], the present study confirms these findings, the FCEM had further revealed a significant increase in QoL of children with hemophilia, one month after the intervention. According to the results of both studies, the FCEM as a nursing intervention and educational model could help family members as primary caregivers to change for the better and to the maximum of their ability to help their patients as much as possible, which could, in turn, improve their QoL [26], the present study was justified in terms of its results. Salar et al. [15], supporting the findings of the current research, examining the impact of the FCEM on the QoL of patients undergoing hemodialysis had also demonstrated an improvement as measured by the mean of total QoL and its proportions, one and two months after the intervention. It seemed that the FCEM, through the individuals and family members play an effective role in three cognitive, psychological, and functional areas could improve QoL in patients with chronic disorders such as COPD in the present study and those receiving hemodialysis based on the four stages of training and involvement of the family and the patients in perceived threat, educating, participating, evaluating, and promoting problem-solving the QoL of the patients regardless of the type of disease. In agreement with the current research and the reports by Salar et al. [15], the results disclosed by Pahang et al. [27] on the effect of the FCEM on the QoL of patients, undergoing kidney transplant surgery, had indicated significant growth in the QoL scores in these individuals before and after the intervention (two months later). Considering that most of the mentioned diseases were chronic and needed follow-up to achieve control and treatment, they had almost the same conditions and the FCEM could improve QoL by empowering patients and their families to have motivation, self-efficacy, and self-esteem. In Pahang et al. [27], as opposed to the previous study, which involved 11 sessions of

training, the present study involved six sessions. There is therefore no evidence that increasing the amount of training sessions or implementing the FCEM will improve patient quality of life.

The results of the study by Arief et al. [28] on the effect of an FCEM on QoL in patients with leukemia and the reports by Luthfa et al. [29] on the impact of this model on QoL in patients with type 2 DM had also indicated no difference in QoL between the experimental and control groups during one and two months after the intervention, which did not correspond to the results of the present study. The main reason for the inconsistency of both studies was the different levels of QoL at the onset (namely, poor quality of life) compared with that in the present study. In both studies, the methods, the number of sessions, and the session topics (viz. the four basic stages of the FCEM) were similar; therefore, it was hypothesized that the implementation of this intervention on patients suffering from COPD with low QoL had no effect before the intervention.

Moreover, in contrast with the results of the current research, Nizar et al. [30] and Lian et al. [31], examining the effect of the FCEM on QoL in patients with type 2 DM had suggested that such an intervention had not influenced QoL in patients with COPD during two months. Among the reasons for the discrepancy between the results of these two studies and the present one were the differences in how the intervention had been performed. Therefore, the method of implementation and the level of QoL before the intervention could be one of the important determinants of the effect of the FCEM on patients' QoL. Possibly, one of the reasons for the inconsistency in the outcomes of the mentioned studies with the present one was the improper implementation of the four stages of the FCEM or not meeting the needs of patients and their family members in terms of training only via the given model. This study found that and other similar surveys, the effect of implementing an FCEM depended on some factors such as QoL in patients with COPD before the intervention and the method of implementation. It seemed that the implementation of the FCEM intervention in patients with moderate levels of QoL and the method of face-to-face implementation could have the greatest impact on improved QoL in this group of people. Educational and care interventions, along with follow-up in the families of chronic patients, had been further associated with improvements in patients' QoL [32]. Interactions between family members of patients with COPD and the experimental group could thus help the family members to prevent problems, deal with psychological challenges facing patients by increasing their level of performance, provide care for patients, and support them in order to improve the level of their daily activities, including social activities [33]. Accordingly, FCEM as one of the approaches for providing care could play a vital role in families in terms of choosing a treatment decision [34] for patients with COPD as well as participating in taking measures for such patients and improving their QoL [35]. The main purpose of this model was to empower patients' families in order to improve the health status of their patients, emphasizing the effective role of family in three dimensions of motivation, psychology (self-esteem, self-efficacy, and self-control), and personal characteristics (knowledge, attitudes, and perceived threat) [27]. Therefore, the necessary training to family members of the COPD patients in the present study was provided using the same topics.

According to the results of the present study, the rate of improvement in QoL in the patients with severe and chronic COPD was significantly higher compared with those with mild and moderate conditions. Moreover, the FCEM in patients living with COPD with severe and chronic conditions during two months could have a significant positive effect on their QoL. In justifying the results of the present study, it was argued that systemic inflammation and dysfunction of peripheral and respiratory muscles associated with COPD could lead to decreased muscle strength, osteoporosis, and heart disease. Chronic SOB was also an unpleasant feeling [36], so these systemic effects could result in decreased health status, lower exercise test tolerance, higher social isolation, more depression, and muscle weakness in COPD patients, which could negatively affect their QoL. In addition, airway obstruction due to the disease could limit the patients in performing their daily living activities and impose heavy mental and physical burdens on them [37]. As COPD could be associated with high degrees of disability, the four-stage FCEM could have a significant impact on QoL using the patients' participation and primary care through the systematic training mechanism to meet their needs. It seemed that such an improvement in patients with moderate and severe symptoms had a greater impact on their QoL.

Study results are inconsistent with these findings, Soriano et al. [38] had shown a direct relationship between metabolic disease duration and QoL in the elderly after implementing the FCEM intervention, while the disease severity had not been relevant in this regard. The results reported by Amer et al. [26] were also in line with the outcomes of the current research, suggesting that children with hepatitis with a longer duration of infection and receiving an FCEM-based intervention had a higher QoL at the post-intervention stage. The inconsistency of the results of both studies with the present one seemed to be related to the difference between the type of chronic disease in the relationship between disease severity or duration and their QoL after the FCEM intervention because the results of other interventions in patients with COPD had shown the effect of disease severity on improved QoL following the intervention but not its duration upon its completion. Among other results were the ones reported by Vu et al. [39] in terms of the effect of electrical neuromuscular stimulation on QoL in patients living with

COPD, the impact of self-care on QoL in people with COPD in the study by Julie et al. [40], and the effect of telemedicine care on QoL in patients living with COPD in Tupper et al. [41], which confirmed the results of the present study. According to the outcomes of the present study and its comparison with similar ones, it was essential to design interventions to improve QoL in patients with COPD, considering disease severity.

Based on the results of this study, the FCEM could be utilized as one of the care and educational measures for patients with COPD by reflecting on its advantages such as being easy to implement, cheapness, being understandable for each age group, and its socio-economic level. Therefore, according to the results of this study and the positive effect of this model on patients with COPD, it would be possible to help healthcare providers to develop and support programs such as the FCEM intervention for people with COPD and their family members as primary caregivers. Supporting such patients and their families and improving their HRQoL could thus improve their sense of well-being in their daily functioning and mental health, and directly enhance their QoL. One of the strengths of this study was the comparison of the effect of implementing the FCEM in experimental and control groups and follow-up during two months after the intervention. Phone-based follow-ups could be also regarded as the other positive point of this research. Among the limitations of the present study was the lack of a valid and reliable questionnaire to assess patients living with COPD. Another limitation of this study was also the implementation of this intervention using a limited number of patients.

V. Conclusion

When compared with controls, the total QoL mean score increased in the experimental group after the intervention. Besides showing a significant improvement in the general health, physical function, vitality, mental problems, mental health, and overall quality of life of patients with COPD in the experimental group, the results also showed improvements in overall health and physical functioning. The level of QoL after the intervention was unrelated to any individual-social factors within the experimental group. Furthermore, patients with severe conditions improved at a faster rate than those without.

Further study is required to evaluate and compare the effect of FCEM interventions on HRQoL in patients with COPD and chronic diseases, to evaluate the effects of FCEM training and self-care on HRQoL in these patients, and to assess the impact of FCEM training on spirometry and respiratory function measures in such cases.

VI. Consent for Publication

All authors declare that they have Consent for publication.

VII. Competing Interests

The authors declare that they have no competing interests.

VIII. Funding

No direct funding was received for this project.

IX. Authors' Contributions

All authors contributed to the design of the study, as well as data collection and analysis, and the writing of the manuscript. All authors read and approved the final manuscript.

X. Acknowledgements

Not applicable.

XI. Conflict of Interest

There is no contradiction in the article.

XII. Ethical Approval

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