

Impact of COPD stage on self management with COPD patients: The mediating role of symptoms management

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Abstract

Aims: It is extremely important to determine the relationship between COPD and self-management (SM) in the disease process. However, the impact of symptom management (SpM) on this relationship is still unclear. The study aimed to examine the mediating role of SpM in the effect of the COPD stage on SM.

Design: A predictive correlational study was reported following the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.

Methods: This study was conducted between 15 February 2023 and 15 June 15 2023, with 306 patients. Data were collected using the Symptom Management Scale for Self-Efficacy and the Chronic Disease Self-Management Scale. Descriptive statistics and Process Macro Model 4 in the SPSS program were used for data analysis.

Results: Most of the patients were in the moderate stage of COPD; their SM scores were at low levels; SpM scores were at moderate levels. The model was significant, and the variables explained 65% of the model. The COPD stage was significantly positively correlated with SpM and negatively correlated with SM. There was a significant positive impact between SpM and SM. The positive and significant standardised indirect effect of SpM on SM evidenced a full mediating effect.

Conclusions: Symptom management has a full mediating role in the effect of the COPD stage on SM. It was revealed that the level of SM can be increased by achieving SpM.

Implications for the Profession and/or Patient Care: Symptoms are vital in COPD. Progression of COPD increases symptom severity. Being successful in SpM greatly contributes to the achievement of self-management. Therefore, nurses should definitely consider symptom control in strengthening self-management in the care of patients with COPD.

Patient or Public Contribution: Patients' COPD stage was determined by a pulmonologist involved in the study. Voluntary patients with COPD hospitalised in the pulmonology clinic were included in the study.

KEYWORDS

COPD, mediating role, self-management, symptoms management

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1 | INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is an obstructive and progressive respiratory disease. Various symptoms, depending on the particles exposed, the individual characteristics of the patient, weather conditions and the course of the disease, negatively affect patients' life activities. In particular, increased and thickened mucus secretion in the airway renders breathing difficult and leads to shortness of breath in varying degrees. Furthermore, with the accompanying symptoms such as cough, phlegm, and fatigue, patients' activities are severely restricted (Zatloukal et al., 2020). The severity and number of symptoms are directly associated with the disease stage. The number and severity of symptoms increase as the disease progresses. Therefore, one of the most important problems in COPD is the proper management of symptoms (GOLD Science Committee Members, 2023).

Serious complications can occur when the disease is not properly treated (Zatloukal et al., 2020). To prevent this, it is necessary to continue inhaled drugs requiring special skills, nebulizer therapy or respiratory support devices, and oxygen therapy, and support these therapies with non-pharmacological methods (López-Campos et al., 2019). Patients are expected to be encouraged to perform these skills, make appropriate plans, and have faith that they can succeed (Lorig & Holman, 2003). Thus, disease management and sustainability of care are ensured with the correct techniques.

2 | BACKGROUND

Adopting and implementing coping strategies by being aware of chronic diseases is defined as self-management (SM) skills (Lorig & Holman, 2003). This theoretical concept is based on the patient's awareness of his/her disease, what is expected of him/her, and his/her capacity to do what is expected of him/her. Although the concepts of self-efficacy and self-care have been used interchangeably in the literature, SM consists of a more inclusive theoretical framework (Grady & Gough, 2014; Lorig & Holman, 2003). Lorig and Holman reported (Lorig & Holman, 2003) that the most inclusive description of this theory, described for many years by Thomas Creer, is recognised by individuals as the daily management of chronic conditions. In these stages, the SM process, SM intervention programs, and the outcomes of SM practices shows that this concept differs from being a uniform intervention (Grady & Gough, 2014). Nurse scientists have described five key elements in this concept: (1) problem solving, (2) decision-making, (3) resource utilisation, (4) partnerships with health care providers and (5) taking action (Lorig & Holman, 2003). As understood from these stages, SM is a comprehensive and important skill with multiple components.

One of the biggest challenges in the management of chronic conditions is symptoms. Appropriate control of the various above-mentioned symptoms is considered an important key to the patient's fulfilment of SM skills (Barlow et al., 2002; Holman & Lorig, 2004). Effective SpM and patient's awareness of effective SpM are crucial

What does this paper contribute to the wider global community?

- The COPD stage and symptom management have a direct positive effect on self management, and symptom management plays a full mediating role between COPD stage and self management.
- Individuals with COPD have more experience with increasing symptoms and have better symptom control.
- In COPD, strengthening of self management and symptom control is important for health professions. With the model established in our study, the relationship between the variables was clearly revealed.

for a progressive disease such as COPD. SM is a multidimensional component but can become a skill that can be developed and achieved through SpM. In the study conducted by Chatreewatanakul et al. (2022) with patients with COPD, it was reported that the desired goal can be achieved in patient care and improved quality of life if patients can recognise their symptoms early and fulfil symptom management. In this phenomenological study, it was also stated that patients' self-management skills improved even with a poor prognosis caused by the symptoms they had to cope with and that they gained greater experience in the recognition and management of COPD exacerbation (Chatreewatanakul et al., 2022). In the study of Korpershoek et al. (2016), COPD patients' awareness regarding the worsening of their symptoms and their ability to control their symptoms were determined to be highly effective in self-management success. It was reported that patients who did not take necessary actions for their symptoms (such as inhaler use, proper breathing techniques, and contact with caregivers) had low self-management skills and that this should be carefully addressed by health professionals. In an experimental study that included a 12-month follow-up of patients with COPD, it was found that symptoms could be better managed and that exacerbations and resulting hospitalizations were less in patients who were given self-management training compared to the control group (Sedeno et al., 2009). As reported in various studies in the literature (Chatreewatanakul et al., 2022; Korpershoek et al., 2016; Sedeno et al., 2009), the impact of symptoms on self-management is extremely important. Symptoms that appear in COPD are associated with the stage of COPD. In the European Respiratory Society (ERS) report, in which data from over 16 thousand patients from 13 countries were evaluated, it was reported that patients with more symptoms and poor clinical parameters were at Stage 4 according to the Global Initiative for Chronic Obstructive Lung Disease (GOLD) and that these patients had longer hospitalizations (Barlow et al., 2002).

In line with the literature reviewed, it is clear that self-management is very important in patients with COPD, that SpM has an effect on this skill, and that the stage of COPD is associated with these concepts. However, it was determined that this association

has not been addressed with appropriate test models in the literature. Therefore, it was considered necessary to examine the role of SpM in the relationship between the COPD stage and SM.

3 | THE STUDY

3.1 | Aims

A mediating effect model was used in this study, which aims to determine the role of SpM in the effect of the COPD stage on SM. The mediating effect model, which was created to test the hypotheses put forward in line with the purpose of the research, is shown in Figure 1.

3.2 | Hypotheses

Consistent with the conceptual framework that guides our study, the following hypotheses were empirically tested:

Hypothesis 1. The COPD stage of patients significantly predicts symptom management.

Hypothesis 2. The COPD stage of patients significantly predicts self-management.

Hypothesis 3. Symptom management of patients significantly predicts self-management.

Hypothesis 4. Symptom management mediates the relationship between the COPD stage and self-management.

4 | METHODS

4.1 | Design, study population, and data collection

This predictive correlational study was carried out at a central training and research hospital in Turkey. The training and research hospital is located in the central Anatolian region, serves a large number of

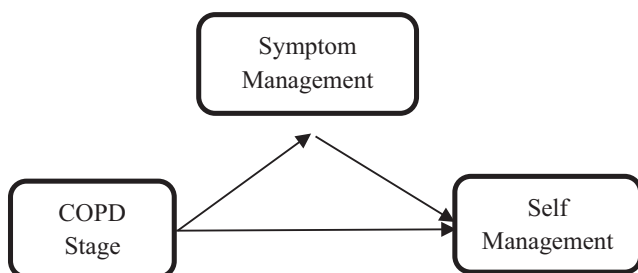


FIGURE 1 Hypothesized theoretical model.

individuals, has a high number of patient admissions during the day, and serves in coordination with the university in the city. The hospital, which provides both outpatient and inpatient services, also includes advanced intensive care units. The chest diseases unit is also actively providing treatment to patients. Daily 4–5 outpatient clinics (depending on the leave and shifts of the physicians) are exclusive for chest diseases and the number of COPD patients admitted varies between 60 and 90. In this respect, it can be said that hospital admissions are quite high in Turkey. The study was completed with 306 inpatients with COPD. The data were collected between February 15 and June 15, 2023, after receiving ethics committee approval. The data were obtained in face-to-face interviews in the patient room. Each patient interview lasted an average of 45 min. Individual interviews with patients were held in a calm environment in patient rooms and were within appropriate limits. Sufficient time was given for patients to answer the questions and understand the scales correctly.

Patients who met the eligibility criteria were included in the study. The eligibility criteria were as follows: (1) having been diagnosed with COPD for at least 1 year, (2) having been hospitalised for at least 24 h, (3) having no communication barriers, and (4) voluntarily participating in the study. The exclusion criteria were as follows: (1) being unable to communicate in the native language, (2) having different underlying comorbid diseases that may exacerbate symptoms (lung cancer, heart failure, pulmonary oedema, etc.), (3) having undergone a serious surgical operation in the last 6 months.

G*Power 3.1™ program was used for the calculation of the sample size of the study. In the program, two predictors were used as the statistical basis for calculating a linear multiple regression analysis (fixed model, R^2 deviation from zero). Accordingly, the study was completed with a sufficient sample with a power of 95%, $\alpha=0.05$, and an effect size of $f^2=0.15$. The minimum number of cases to be included in the study was determined as 119 with a confidence level of 95% ($1-\alpha$), a test power of 95% ($1-B$), and an effect size of $f^2=0.15$. As there is no study in which two scales were used together in the literature, the effect size was determined as 0.15, which is the medium effect size, using the Cohen coefficient (Cohen, 1988). The study was completed with 306 patients. According to the PostHoc power analysis, the power of the test was found to be 99.9%.

4.2 | Outcome and measures

COPD Stage: The COPD stage was determined by the pulmonologist involved in the study. In the determination of COPD stage according to the GOLD guideline, post-bronchodilator Forced Expiratory Volume in 1 s (FEV_1)/Forced Vital Capacity (FVC) <70% in the spirometry measurement, was taken as a basis (GOLD Science Committee Members, 2023). In its latest report (2023), GOLD updated the integrated staging system as groups A, B, and E (GOLD Science Committee Members, 2023). Patients in group E should have at least ≥ 2 exacerbations per year and at least ≥ 1 hospitalisation. Since the population of our study consisted of

inpatients hospitalised due to COPD, all patients who met the inclusion criteria were in group E. Since all patients with COPD were in group E, patients were classified according to the predicted FEV1 as mild (≥ 80), moderate (50–79), severe (30–49) and very severe (<30) in the interpretation (GOLD Science Committee Members, 2023).

Symptoms management: The Symptom Management Scale for Self-Efficacy was developed by Cicerone and Azulay in (Cicerone & Azulay, 2007) to evaluate the SM skills of people with chronic diseases. The original scale consists of 13 items that are ranked on a Likert-type scale ranging from 1 to 10. The scale score varies between 13 and 130. A total score of 13–59 indicates low SM; a score of 60–114 indicates moderate SM; a score of 115–130 indicates high SM. The Turkish validity and reliability study of the scale was conducted by Özel et al. in 2019 (Özel et al., 2019). According to the scale, SpM can be achieved through self-management of individuals with chronic diseases. For this purpose, it includes questions such as ‘Do you receive emotional support from your friends or family?’ (Item 2), ‘Do you experience any physical symptoms that prevent you from doing the things you want to do (such as fatigue, weakness or difficulty walking)?’ (Item 5), and ‘Do you feel sad or discouraged?’ (Item 11). The Cronbach’s α was 0.92 in this study.

Self-Management: The Chronic Disease Self-Management Scale was developed by Ngai et al. in (2020) to determine the SM skills of people with chronic diseases. The scale, which consists of a total of 21 items, has four subscales: self-stigma, coping with stigma, health maintenance efficacy, and treatment adherence. The scale is scored on a Likert-type scale ranging from 1 to 5. An increase in the scale score indicates an increase in the skill of SM. The Turkish validity and reliability study of the scale was conducted by Öztürk et al., (2021). Some items in the subscales are as follows: feeling embarrassed in social situations because of your illness (item 1), feeling worried about what others think of you because of your illness (item 5), you can plan how to improve the situation and take action (item 10), being able to manage your health (item 14), forgetting or ignoring the time of follow-up consultation recommended by your doctor (item 21), etc. The Cronbach’s α was 0.64 in this study.

4.3 | Data analysis

The data were analysed in SPSS V25 (IBM Corp., Armonk, New York, USA). Descriptive data were presented as number, percentage, mean (SD), and median (min-max). A multiple linear regression analysis was performed to explain the effect of patients’ level of COPD and SpM on SM. The fitness to normal distribution was examined with the assumption of multiple normality. To be able to use Maximum Likelihood in the multiple normality assumption, criteria such as outliers, kurtosis and skewness values, and missing data were taken into consideration (Kline, 2011). In the study, there were no missing data or outliers. Mahalanobis distances were taken into account in ensuring normality. A multivariate normality test value below 10 is

a very good result and a value up to 20 is within acceptable limits (Gürbüz, 2019). Considering these criteria, our study met the multiple normality assumption.

The mediating effect analysis was performed with PROCESS version 4.1 Model 4 (Hayes, 2017). The dependent variable (y) was SM; the independent variable (x) was COPD stage; the mediator (m) was SpM. The COPD stage, one of the study variables, was included in the analysis as continuous data because the main hypothesis of the study was to reveal even a precise one-unit change in the COPD stage. The categorical staging in the classical staging system we use in the clinic is intended to ensure that the patient appropriately receives the treatment algorithms specified in the guidelines. However, the main purpose of our study was not to determine the treatment method but to reveal the effect of the COPD stage on SM and the mediator role of SpM in this effect. In this respect, the term stage, which describes the current status of the patient, actually progresses continuously according to the level of obstruction in the patient. When the pathology of COPD is addressed from the theoretical framework, it is defined as an irreversible progressive disease (GOLD Science Committee Members, 2023). As can be understood from this point, in our study, the effect of a one-unit progression in obstruction in the COPD stage on SM and SpM was clearly addressed. According to PROCESS Model 4, direct and indirect results were obtained in the hypothesis tests. The mediating effect was determined according to the indirect effect and the completely standardised indirect effect of SpM results. Results are presented as unstandardized and standardised Beta, reporting confidence intervals of 95% (95% CI), t , p -values (p), and adjusted R^2 . The alpha level was set at $p=0.05$.

4.4 | Ethical considerations

Ethical permission (Decision No: 2023-02/07; Decision Date: 01/24/2023) was obtained from the Clinical Research Ethics Committee of Kirsehir Ahi Evran University to conduct the research. Furthermore, ethical principles and the Declaration of Helsinki were adhered to at all stages of the study. The patients were included in the study voluntarily and informed consent was taken after explaining the purpose of the study. The paper followed The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for the presentation of the study and checklist was provided as Data S1 (Cuschieri, 2019).

5 | RESULTS

The demographic and clinical characteristics of the patients with COPD are presented in Table 1. The mean age of the patients was 71.12 years and 57.2% of them were male. 55.6% of patients were in the moderate COPD stage. The patients had a variety of symptoms and 89.5% complained of dyspnea. The dyspnea level was 2.27, moderate–severe according to mMRC. While 97.4% of patients reported

TABLE 1 Demographic and clinical characteristics of the sample (N = 306).

Descriptive characteristics	N	%
Age (Mean, SD)	71.12 (12.71)	
Gender		
Male	175	57.2
Female	131	42.8
Marital status		
Married	302	98.7
Single	4	1.3
Profession		
Retired	167	54.6
Housewife	123	40.2
Worker	9	2.9
Self-employment	7	2.3
Education level		
Literate	158	51.6
Elementary school	120	39.2
Middle School	22	7.2
High school	5	1.6
Bachelor	1	0.3
COPD stage		
Mild	36	11.8
Moderate	170	55.6
Severe	83	27.1
Very severe	17	5.6
Time of diagnosis (year) (Mean, SD)	7.12 (4.52)	
COPD Symptoms*		
Dyspnea	274	89.5
Cough	211	69
Phlegm	188	61.4
Fatigue	278	90.8
Wheezing	144	47.1
Perspiration	174	56.9
Sleeplessness	195	63.7
Other (Pain, Palpitation, Numbness etc.)	20	6.5
Hospitalisation in the last year due to COPD exacerbations		
Yes	298	97.4
No	8	2.6
Number of COPD exacerbations in the last year (Mean, SD)	5 (3.16)	
Regular use inhalers (according to patient statement)		
Yes	298	97.4
No	8	2.6
Regular Dr check-up		
Yes	197	64.4
No	109	35.6
mMRC (Mean, SD)	2.27 (0.73)	

Abbreviations: mMRC: Modified Medical Research Council; SD, standard deviation.

*Multiple options specified.

a COPD attack in the last year, the mean number of attacks requiring hospitalisation was 5 (SD = 3.16).

When the COPD stage and the mean scale scores of the patients were analysed, the median COPD stage was 2 (GOLD Science Committee Members, 2023; López-Campos et al., 2019; Lorig & Holman, 2003; Zatlouk et al., 2020). The mean SM scale score was 42.63 and the mean SpM score was 61.77. According to these findings, patients' SM was at a low level and their SpM was at a moderate level (Table 2).

In this study in which whether SpM mediates the effect of COPD stage on SM was investigated, the model established was significant and explained 65% of these variables ($R^2: 0.655$; $p < 0.001$). The positive effect of the COPD stage on SpM was significant by 81% ($B^1: 0.809$; $p < 0.001$). Based on this result, the hypothesis H_1 was confirmed (Table 3).

When the joint effect of the COPD stage and SpM on SM was examined, the model was found to be significant, and the variables explained 6% of the model ($R^2: 0.06$; $p < 0.001$). Progression of the COPD stage showed a negative significant effect on SM ($B^1: -0.29$; $p = 0.002$). With this result, the hypothesis H_2 was confirmed. There was a positive significant effect between SpM and SM in the model ($B^1: 0.422$; $p < 0.001$). According to this result, hypothesis H_3 was confirmed (Table 3).

The total, direct, and indirect effects of the independent variable COPD stage and the mediating variable SpM on the dependent variable SM were analysed. Accordingly, the model was significant ($p < 0.001$) but the COPD stage alone was not significant ($p = 0.376$). The standardised indirect effect of SpM on SM was positively significant ($B: 0.341$; $CI: 0.04-0.66$). According to this result, SpM explained 34% of SM. This finding revealed an important result. While the COPD stage was insignificant in the model, the positively significant effect of SpM proved the full mediating effect (Figure 2). Thus, as a result of examining the mediating effect of SpM, H_4 was confirmed (Table 3). In light of these findings, it was seen that all of the study hypotheses were confirmed.

6 | DISCUSSION

In this study in which the mediating role of SpM in the effect of COPD stage on SM in patients with COPD was examined, it was revealed that most of the patients had moderate COPD (Table 1). In addition, SM skills were at low levels and SpM was at moderate levels (Table 2). In several studies conducted with patients with COPD, similar results to our findings have been reported (Hu et al., 2022; Wang et al., 2017; Yohannes et al., 2017).

The number and severity of symptoms to be managed increases as the stage of COPD progresses (Voll-Aanerud et al., 2008). Studies have shown that patients in advanced stages experience more symptoms (GOLD Science Committee Members, 2023; Vogelmeier et al., 2020). An increase in symptom severity is an important factor that complicates SpM. In particular, symptoms such as increased dyspnea, fatigue, and insomnia cause the person

TABLE 2 COPD stage and scale scores of the patients.

Variables	Mean	S.D	Median	Minimum	Maximum
COPD Stage	2.26	0.73	2	1	4
Self Management	42.63	6.74	42	26	71
Symptom Management	61.77	16.65	60	17	106

Abbreviation: SD, standard deviation.

TABLE 3 The effect of COPD stage and symptom management on self management.

	B	B ¹	LLCI	ULCI	SE	t	p
Model I COPD stage on symptom management							
Constant	20.329		16.76	23.89	1.81	11.21	<0.001
COPD Stage	18.298	0.8094	16.80	19.79	0.76	24.02	<0.001
Model Summary	R=0.809; R ² =0.655; F= 577.36; p < 0.001						
Model II COPD Stage and Symptom Management on Self Management							
	B	B ¹	LLCI	ULCI	SE	t	p
Constant	38.102		35.26	40.26	1.44	26.43	<0.001
COPD Stage	-2.664	-0.290	-4.36	-0.95	0.86	-3.07	0.0023
Symptom Management	0.171	0.422	0.09	0.24	0.03	4.45	<0.001
Model Summary	R=0.25; R ² =0.06; F= 10.36; p < 0.001						
Model III Total, direct, and indirect Effects of COPD Stage on Self Management							
	B	LLCI	ULCI	SE	t	p	
Constant	41.578	39.12	44.03	1.24	33.28	<0.001	
Effect (COPD Stage)	0.464	-0.56	1.49	0.52	0.88	0.376	
Model Summary	R=0.050; R ² =0.002; p=0.376						
Indirect Effect of COPD Stage on Self Management							
	B	LLCI	ULCI				
Indirect Effect Symptom Management	3.128	0.42	6.17				
Completely Standardised Indirect Effect of Symptom Management	0.341	0.04	0.66				

Abbreviations: B, unstandardized coefficient; B¹, standardised coefficient; LLCI, lower limit confidence interval; SE, standard error; ULCI, upper limit confidence interval.

Those with p < 0.05 are made bold.

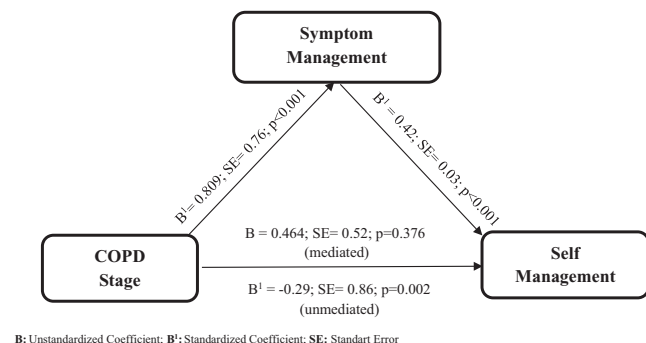


FIGURE 2 Mediating effect of symptom management on the relationship between COPD stage and self-management.

to become gradually weaker and SpM becomes more difficult. There are various studies in the literature supporting this finding (Chen et al., 2008; Vogelmeier et al., 2020). In our study, symptom control increased as the disease stage progressed (Table 3). This

was thought to be due to the positive contribution of the symptoms experienced by patients and the experience they gained in this process. Likewise, Chen et al. (2008, 2016) and Wang et al (2017) reported that patients gained competence in symptom control by gaining experience from the symptoms they suffered. Relevant phenomenological studies have shown that the expertise that patients gain from the experience is extremely important (Chatreewatanakul et al., 2022; Korpershoek et al., 2016). In addition, it was also thought that this result may have been reached because the patients in our study had moderate COPD. The fact that the mean SpM score was at a moderate level also supported our opinion.

The negative relationship between the COPD stage and SM revealed that SM skills decreased as the COPD stage progressed (Table 3). Advanced COPD stage is associated with poor prognosis (GOLD Science Committee Members, 2023; Ruparel et al., 2016). This shows not only the increase in symptoms but also the difficulty in disease management. This result in our study revealed that SM

skills could not be performed sufficiently and was also confirmed by the low SM score. As stated in the literature, the status of being able to perform certain actions that individuals with chronic diseases should perform for disease management indicates SM skills (Grady & Gough, 2014; Lorig & Holman, 2003). This skill is significantly affected by the patient's current state. It has been emphasised that the patient's awareness of his/her health level and sharing this awareness with health professionals is the key point in SM (Holman & Lorig, 2004). Hooft et al. reported that in nurse-led SM programs, nurses who established a strong relationship with patients and planned patient-specific SM interventions obtained highly successful results (van Hooft et al., 2017). In their study, Sedeno et al. (2009) revealed the effect of self-management training given to patients on patient SpM.

To perform SM skills, it is necessary to first identify the problem and take action within the context of a specific plan to solve this problem. In the GOLD guideline, the heterogeneity of studies on SM in the treatment and follow-up of COPD and the importance of correctly determining the SM concept were emphasised. The current studies have mainly focused on the development of SM skills and the importance of optimal follow-up and treatment of patients with COPD (GOLD Science Committee Members, 2023). In addition, it was suggested that patients' SM skills should be developed under the guidance of health professionals (GOLD Science Committee Members, 2023). However, the problems faced by patients due to COPD pose a problem in performing SM skills. The most important of these problems is the inability to manage symptoms properly. Because the patient's SpM can affect the achievement of other components of SM skills. In the study conducted by Barlow, it was pointed out that SpM practices are very important among the components of SM (Barlow et al., 2002). In the study conducted by Sigurgeirsdottir et al., patients stated that they could not meet their physiological and psychological needs due to the symptoms they experienced, and thus, their quality of life decreased as a result (Sigurgeirsdottir et al., 2019). However, in the comprehensive review of Yohannes et al., it was emphasised that SM skills can be improved, and symptom control can be achieved in patients through pulmonary rehabilitation or practices such as yoga (Yohannes et al., 2017). In different studies, it has been reported that it is possible to improve SM skills through education and that health workers have a critical role in this (Benzo & McEvoy, 2019; Chen et al., 2016; Hu et al., 2022; Vogelmeier et al., 2020). Thus, the importance of elucidating the effect of symptom control on SM skills in detail was revealed.

In light of these findings, it is clear that the COPD stage and SpM are important in achieving SM skills. However, there are a few remarkable points here, the first of which is the predictiveness of COPD stage and SpM on SM separately. The above-mentioned conditions explained this prediction. The second important point was how the COPD stage and SpM together had an effect on SM. As seen in Table 3, when the model was constructed together, the COPD stage alone did not have a significant effect on SM, but a significant result was found with the inclusion of SpM in the model.

This finding was due to the full mediating effect of SpM. This result proved the H_4 hypothesis that a one-unit increase in SpM leads to a 34-fold increase (B: 0.341) in SM. Thus, it became clear that SM skills should not be evaluated as a single component but should be evaluated together with various components that may have an effect, especially SpM. In various studies, it has been reported that the COPD stage is effective in SpM as in our study (Chen et al., 2016; Wang et al., 2017), whereas some studies have revealed a negative correlation (Chen et al., 2008; Vogelmeier et al., 2020). These results in the literature are associated with the fact that the parameters that may be effective in COPD self-management have only been researched to a limited extent. Therefore, multiple modelling is needed as in our study. However, no study in this direction was encountered. This gap in the literature that needs to be clarified has also been emphasised in different studies. Especially in the report of the National Institute for Health and Care Excellence, it was reported that individualised self-management interventions are of great importance in the management of COPD, yet they are inadequately implemented in practice (National Institute for Health and Care Excellence (NICE), 2023). In their review, Kaptein et al. emphasised the importance of developing SM skills in COPD patients and addressing patient care from a broader perspective by examining studies conducted in the last 50 years. According to the relevant study findings, the general findings of our study were similar to the literature (Kaptein et al., 2014). In addition, compared to relevant studies (Wang et al., 2017), our study revealed superior aspects with a larger sample and more than one modelling including the mediating role of symptom control. This is very important since SPM is an important determinant in the clinic, the multidimensional theoretical structure of SM, the correct interpretation of patient outcomes by making sense of this theoretical structure with clinical parameters, and the guidance to the effective and quality delivery of health services.

7 | CONCLUSION

As a result of the study, it was concluded that symptom control is an important predictor of SM skills in individuals with COPD. People with advanced COPD have to cope with more symptoms. However, in our study, this had a positive effect on symptom control due to the experience gained by the patient depending on the disease process. Moreover, in this study, the progression of the COPD stage led to a decrease in SM skills. Another important factor that reduces SM skills is the inadequate control of SpM. In light of these findings, it was understood that the effect of the COPD stage on SM skills was affected by SpM. In this model with a full mediating effect, important information was obtained in terms of the predictors of SM. SM, which is an indispensable concept in COPD management, is a very comprehensive skill that determines the current disease state and progression and that should be addressed within the scope of all components. For this reason, it is extremely important to determine the predictors affecting the patient's SM skills and to develop SpM as an important skill in the delivery of health care services.

7.1 | Strengths and limitations

One of the limitations of the study is the high number of patients admitted to the pulmonology clinic at the hospital. This number is approximately between 60 and 90 patients per day for one doctor. This leads to limitations in the duration of interviews held with patients in the clinics. It is not possible to ensure at least 30min for data collection, which is required for patients' clinic visits. Therefore, longer data collection sessions can be carried out with inpatients. The fact that the patients included in our study were inpatients relatively solved the problem in our study; however, this situation poses a serious limitation for different comprehensive studies. In addition, since the study was conducted at a single centre, the results are not generalizable. Although our sample size was large and the power was adequate compared to some studies in the literature, a multi-centre study with a larger sample size will provide more homogeneous results for COPD.

The presence of comorbidities, which is reported as an exclusion criterion, leads to a reduction in the sample group and requires a longer time for data collection. The fact that COPD occurs at an advanced age and that pathologies in the pulmonary system usually affect the cardiologic system leads to multiple chronic conditions. Therefore, it will be effective to perform comprehensive assessments specific to comorbidities in future studies.

The strength of our study is its design. Previous correlational studies have not clearly revealed the effect of the predictors of COPD. The determination of the predictors of self-management, which is very important in COPD and emphasised by many authorities, and the mediating role of symptoms will fill an important gap in scientific terms. In this context, it is thought that our study will guide future studies.

AUTHOR CONTRIBUTIONS

Ceyhan and Aydin made substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data; Ceyhan and Aydin carried out the implementation phase of the study; Ceyhan and Aydin involved in drafting of the manuscript or revising it critically for important intellectual content; and authors gave final approval of the version to be published. Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content.

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CONFLICT OF INTEREST STATEMENT

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

STATISTICS

The statistics were checked prior to submission by an expert statistician. Naci MURAT, PhD, e mail: nacimurats@gmail.com

ETHICS STATEMENT

Ethical approval was obtained from The Clinical Research Ethics Committee of Kirsehir Ahi Evran University (Decision No: 2023-02/07; Decision Date: 01/24/2023). Furthermore, ethical principles and the Declaration of Helsinki were adhered to at all stages of the study. The patients were provided with information about the aim and methods of the study and their written informed consent was obtained.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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