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The effect of COPD stage on self-care management in COPD Patients: The mediating role of illness perception

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ABSTRACT

Background: Determining the stage of COPD is essential for disease prognosis and management. Self-care management is among the basic elements of non-pharmacological treatment in COPD patients and is associated with illness perception.

Objective: The current study aimed to investigate the mediating role of illness perception in the relationship between COPD stage and self-care management.

Methods: The research was conducted in the chest diseases outpatient clinic of a hospital located in the eastern Mediterranean region between July 2024 and January 2025. The cross-sectional and predictive correlational research was completed with 145 patients. The patient descriptive form, the Brief Illness Perception Questionnaire, and the Self-Care Management Processes-Guarding Scale were used to collect data. Descriptive statistics were used in the data analysis, and SPSS Process Macro Model 4 was utilized to test the mediating role.

Results: A positive and moderately significant relationship was identified between COPD stage and illness perception. A negative and moderate relationship was found between COPD stage and self-care management. Furthermore, a negative and highly significant relationship was determined between illness perception and self-care management. It was observed that COPD stage and illness perception were significant predictors of self-care management. Since the indirect effect of COPD stage on self-care management was significant, it was revealed that illness perception mediated COPD stage and self-care management.

Conclusion: It is essential to assess COPD stage and illness perception when evaluating self-care management in COPD patients and in patient care.

Introduction

Chronic obstructive pulmonary disease (COPD) is a respiratory system disease that usually leads to progressive and permanent obstruction in the lungs. COPD ranks third among the causes of death in the world.¹ The disease is still a significant public health problem worldwide, as a cause of mortality and morbidity.^{1,2} A spirometry test is used to diagnose the disease. According to the test results, a post-bronchodilator Forced Expiratory Volume in 1 s (FEV1) / Forced Vital Capacity (FVC) ratio of <70 % confirms the diagnosis of COPD. The Global Initiative for Chronic Obstructive Lung Disease (GOLD) recommends that the percentage of the predicted value of FEV1 be used to determine the stage of

airway obstruction.¹

Identifying the disease stage is essential for determining its prognosis and treatment.³ The severity and frequency of symptoms positively correlate with the stage of COPD.⁴ Increased dyspnea, cough, sputum, and fatigue cause individuals to experience difficulties even in activities of daily living.⁵ The progression of airway obstruction also causes an increase in exacerbations, hospitalizations,^{6,7} and mortality rates.³ An increase in presentation to emergency service and hospitalization due to exacerbations because of the progression of the disease stage adversely impacts individuals' self-care management.⁸

Self-care is the basic element of the non-pharmacological treatment of chronic diseases, such as COPD, and is the cornerstone of many

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interventions.⁹ Self-care intervention has an individually structured, multi-component nature. It motivates and supports patients and ensures their participation to improve their health behaviors and disease management skills.¹⁰ Self-care management helps individuals develop the behaviors and skills necessary to effectively manage their disease and the possible psychological and physical complications due to the disease.¹¹ Self-care management in COPD patients involves behaviors such as symptom monitoring, adherence to treatment, ensuring physical activity, breathing exercises, quitting smoking, nutrition, and vaccination.¹² It supports preventing and managing disease progression by helping cope with disease symptoms.¹³ Self-management interventions should include not only symptom management but also goals to reduce patients' negative emotions.¹⁴ Hence it is recommended that nurses and other healthcare professionals also evaluate illness perceptions to maintain self-care management while assessing patients.¹⁵ In this respect, how the illness is perceived is an important factor in providing self-care management.^{15,16}

Illness perception covers an individual's emotional, cognitive, and psychological approach to their illness. This impacts management, control, causes, outcomes, and beliefs about disease progression in individuals.¹⁶ Patients' self-efficacy motivations and beliefs about their illness conceptually shape their behaviors in managing their illness.¹⁷ Patients' cognitive and emotional representations of their illnesses (identity, cause, consequences, timeline, control, coherence) and coping mechanisms are explained by the Common-Sense Model of Self-Regulation as influencing self-management behaviors.¹⁸ Additionally, according to Self-Efficacy Theory, an individual's belief and perception that they can successfully perform a certain behavior determines their desire to perform that behavior, their effort, and the outcome of their behavior.¹⁹ In this respect, individuals with a positive illness perception have higher self-care management.^{16,20} As COPD progresses and symptoms intensify, patients may experience a growing sense of helplessness; this negatively affects their perception of the disease and makes effective self-care and disease management more difficult.¹⁵ In this context, the theoretical framework of our research is based on the Common-Sense Model of Self-Regulation and Self-Efficacy Theory.

Self-care management, disease stage, and illness perception are connected in COPD patients. No study in literature has examined the mediating role of illness perception in the effect of COPD stage on self-care management in COPD patients. The current research aimed to examine the relationship between disease stage, self-care management, and illness perception in COPD patients and assess the mediating role of illness perception in this relationship. Fig. 1 presents the mediating effect model established to test our hypotheses in line with the study's purpose.

Research hypotheses

H1₁: The stage of COPD statistically significantly predicts patients' self-care management.

H1₂: The stage of COPD statistically significantly predicts patients' illness perception.

H1₃: Illness perception statistically significantly predicts patients' self-care management.

H1₄: Illness perception mediates the relationship between the stage of COPD and self-care management.

Methods

Study design and participants

This cross-sectional and predictive correlational study was conducted in the chest diseases outpatient clinic of a hospital in the eastern Mediterranean region of Türkiye between July 2024 and January 2025. The hospital where the data collected has four chest diseases specialists working daily, and approximately 200 patients are cared for. COPD patients who presented to the chest diseases outpatient clinic of the hospital where the study was performed constituted the study's population. Facilitated sampling was employed in sample selection. The study included patients who had a confirmed COPD diagnosis for at least 1 year, had communication skills (without hearing or speech problems, speaking Turkish, etc.), and volunteered to take part in the research. This study did not include patients with malignant disease who were in the exacerbation period and who were diagnosed with psychiatric disorders. A total of 177 patients were interviewed. Eight patients did not agree to participate in the study. Ten patients were excluded from the research since they were in the exacerbation period, 7 patients due to not speaking Turkish, four patients due to hearing problems, and 3 patients due to incomplete data. The research was completed with 145 patients. The STrengthening the Reporting of OBservational studies in Epidemiology (STROBE) checklist was followed to ensure the study's quality.

Sample size

The program G*Power 3.1.9.7 was used to calculate the sample size.²¹ No studies similar to our research, in which the stage of COPD, self-care management, and illness perception were examined together, were found in the literature. Therefore, studies in which pairwise comparisons were performed were taken as a reference to calculate the study's sample. According to a study investigating the relationship between illness perception and self-management behavior in COPD patients, when the effect size was taken as 0.274,²⁰ the sample size was computed to be 102 (two tails, Correlation: Bivariate normal model) at a 80 % power, 95 % confidence interval, and 5 % margin of error. Considering the data losses, the research was completed with 145 participants.

Data collection tools

The patient descriptive form, the Brief Illness Perception

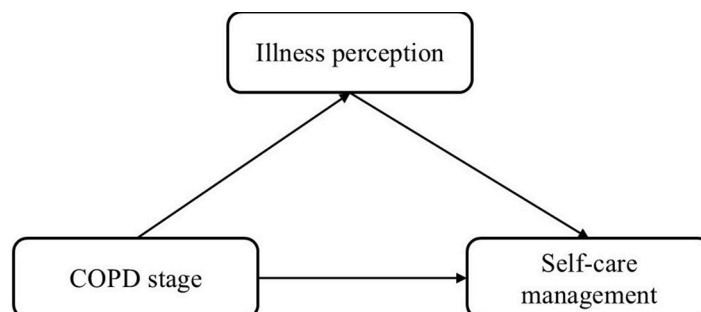


Fig. 1. Theoretical model hypothesized.

Questionnaire, and the Self-Care Management Processes-Guarding Scale were used to collect the data.

Patient descriptive form

The form prepared by the researchers by reviewing the literature^{20,22} includes 21 questions about patients' socio-demographic and disease-related information.

This form determined patients' COPD stage and diagnosis by asking the chest diseases specialist. Spirometric measurement values in the GOLD guide were taken as a reference to determine the stage of COPD. In this regard, spirometry measurements are based on post-bronchodilator FEV1 / FVC <70 %. According to FEV1, patients are classified as GOLD 1 (≥ 80), GOLD 2 (50–79), GOLD 3 (30–49), and GOLD 4 (<30).¹

Brief illness perception questionnaire

Broadbent et al. developed the questionnaire above to assess individuals' illness perceptions.²³ Karataş et al. conducted its validity and reliability study in Turkish in 2017 on cancer patients. The questionnaire, whose validity and reliability study in Turkish was conducted, comprises eight items. Seven items are Likert-type questions scored between 0 and 10. Item 8 represents an open-ended question about the causal factors of the disease. Items 2, 3, and 6 are reverse scored. The lowest score on the scale is 0, while the highest is 70. A high score on the scale indicates a negative illness perception.²⁴ The Turkish validity and reliability study of the scale found Cronbach's alpha coefficient to be 0.85. Cronbach's alpha coefficient of the scale in this study was 0.91.

The self-care management processes-guarding scale (SCMP-G)

The scale in question was developed by Jones to evaluate self-care management in chronic illnesses.²⁵ Hançerlioğlu and Aykar carried out its validity and reliability study in Turkish in 2018.²⁶ The scale consists of 35 items. Items 3, 15, 19, and 28 on the scale include negative statements and are reverse scored. The scale items consist of Likert-type questions scored between 1 and 5. The scale's total score is obtained by summing up the scores to the items. The lowest score on the scale is 35, whereas the highest is 175. A high score on the scale demonstrates that individuals have better self-care management. Cronbach's alpha coefficient of the scale was 0.85 in the Turkish validity and reliability study.²⁶ Cronbach's alpha coefficient of the scale in the present study was 0.98.

Data collection

Patients were informed about the study, and verbal and written consent was obtained from those who volunteered to take part in the research. The researcher collected data face-to-face from patients in line with the data collection forms. Data were collected in an appropriate, quiet area next to the chest outpatient clinics, with seating areas for patients. Data were collected in about 20–25 min for each patient.

Data analysis

The IBM SPSS 27 package program was used for data analysis. Skewness and kurtosis values were examined to assess whether the data were normally distributed. Since skewness and kurtosis values were between +1.5 and -1.5, it was found that the data were suitable for normal distribution.²⁷ Individuals' descriptive variables are presented as number, percentage distribution, mean and standard deviation. Pearson's correlation test was conducted to determine the relationship between the scales. SPSS Process Macro Model 4 was utilized to test the mediating role of illness perception in determining the impact of COPD stage on self-care management.²⁸ The model included self-care

management (Y) as the dependent variable, COPD stage (X) as the independent variable, and illness perception (M) as the mediator variable. Our study evaluated the COPD stage as a continuous variable due to continuous progression in obstruction. In this way, the impact of a one-unit change in COPD stage on self-care power and the mediator role of illness perception were assessed. The 5000 resampling options with the Bootstrap technique was preferred in the mediation analysis. The bootstrap technique enables more accurate confidence intervals to be obtained by resampling when determining confidence intervals for indirect effects. It is a suitable method for small and medium-sized samples.²⁸ If the Bootstrap 95 % CI value intervals did not include zero, the indirect effect was accepted to be statistically significant. The level of statistical significance was considered $p < 0.05$.

Ethical considerations

Non-interventional research ethics committee approval was obtained by applying to a university's ethics committee (decision dated 24.04.2024 and numbered 2024/08–02). Written institutional permission was received from the institution where the research would be performed. Patients were informed about the study, and their written and verbal consent was obtained, indicating that they volunteered to take part in the research. It was indicated that they could withdraw from the research whenever they wished. Our study was carried out in line with the Declaration of Helsinki.

Results

The mean age of the participating patients was 67.51 ± 8.37 , the mean illness duration was 9.37 ± 5.10 years, and the mean number of exacerbations in the last year was 1.50 ± 1.40 . Of the patients, 78.6 % were male, 68.3 % were married, 57.2 % were primary school graduates, and 75.2 % had an income less than their expenses. Of the patients, 21.4 % were still smoking, and 3.4 % continued to consume alcohol. Of them, 82.1 % had an additional chronic illness other than COPD, and 57.2 % did not undergo regular health check-ups. Furthermore, 60.7 % of the patients used a nebulizer, 42.1 % used oxygen, 9.0 % used a BiBAP device, and the COPD stage in 33.8 % was GOLD 3. Of the patients, 74.5 % felt inadequate in managing the illness during exacerbations, the illness significantly impacted the life of 31.7 %, and 53.8 % were hospitalized due to COPD in the last year (Table 1).

The mean COPD stage of the participating patients was 2.66 ± 0.96 , and their mean scores on the Brief Illness Perception Questionnaire and the Self-Care Management Processes-Guarding Scale were 35.63 ± 14.69 and 116.66 ± 26.95 , respectively (Table 2).

Table 3 shows the relationship between the stage of COPD, illness perception, and self-care management. Accordingly, a positive and moderately significant correlation was identified between the stage of COPD and illness perception ($r = 0.628, p < 0.001$), whereas a negative and moderately significant correlation was found between the stage of COPD and self-care management ($r = -0.475, p < 0.001$). A negative and highly significant correlation was determined between illness perception and self-care management ($r = -0.781, p < 0.001$, Table 3).

Regression analysis based on the Bootstrap method was employed to assess whether illness perception plays a mediating role between patients' COPD stages and self-care management scores. The model showed that the stage of COPD had a positive and significant effect on illness perception ($\beta = 0.628, SE = 0.995, p < 0.001$). The stage of COPD explained 39.5 % of illness perception. It was found that illness perception had a negative and significant effect on self-care management ($\beta = -0.797, SE = 0.124, p < 0.001$). Moreover, COPD stage and illness perception together explained 61.0 % of self-care management (Table 4, Fig. 2). When the mediator variable, illness perception, was not included in the model, the total effect of COPD stage on self-care management was negatively significant ($B = -13.327, SE = 2.066, p < 0.001$). When the mediator variable, illness perception, was included in

Table 1
Descriptive characteristics of COPD patients (n = 145).

Variables	Min.-Max.	$\bar{X} \pm SD$	
Age (years)	48–86	67.51 ±8.37	
Duration of illness (years)	1–27	9.37 ±5.10	
Number of exacerbations in the past year	0–6	1.50 ±1.40	
Gender	n	%	
	Female	31	21.4
Marital Status	Male	114	78.6
	Married	99	68.3
Education level	Single/widow/divorced	46	31.7
	Illiterate	20	13.8
	Literate	21	14.5
	Primary education	83	57.2
Socio-economic status	High school	21	14.5
	Income less than expenditure	109	75.2
	Income equal to expenditure	36	24.8
Smoking	Current smoker	31	21.4
	Quitting	83	57.2
	Never smoking	31	21.4
Alcohol use	Drinking alcohol	5	3.4
	Quitting	28	19.3
	Never alcohol	112	77.2
Chronic disease other than COPD	Yes	119	82.1
	No	26	17.9
Regular health check	Yes	62	42.8
	No	83	57.2
COPD stages	GOLD 1 (Mild)	18	12.4
	GOLD 2 (Moderate)	46	31.7
	GOLD 3 (Severe)	49	33.8
	GOLD 4 (Very severe)	32	22.1
Using nebulizer	Yes	88	60.7
	No	57	39.3
Using oxygen concentrator	Yes	61	42.1
	No	84	57.9
Using BIBAP	Yes	13	9.0
	No	132	91.0
Feeling competent to manage exacerbations	Yes	37	25.5
	No	108	74.5
Level of life impact of COPD	Low	38	26.2
	Middle	61	42.1
	High	46	31.7
Hospitalization in the past year	Yes	78	53.8
	No	67	46.2

\bar{X} : Mean, SD: Standard Deviation.

Table 2
Patients' COPD stage, disease perception, and mean scores of self-care management scale (n = 145).

Variables	Min-Max	$\bar{X} \pm SD$
COPD Stage	1–4	2.66±0.96
Brief Illness Perception Questionnaire	9–63	35.63±14.69
The Self-Care Management Processes-Guarding Scale (SCMP-G)	40–163	116.66 ±26.95

\bar{X} : Mean, SD: Standard Deviation.

the model, the indirect effect determined was significant since the lower and upper values in the 95 % confidence interval did not include zero ($B = -14.064$, $SE = 1.793$, 95 % CI $[-17.589, -10.582]$). Accordingly, the indirect effect of COPD stage on self-care management was significant (Fig. 1). In this respect, it was revealed that illness perception mediates the relationship between COPD stage and self-care management.

Table 3
The relationship between COPD stage, brief illness perception questionnaire and self-care management processes-guarding scale (n = 145).

Scales	COPD stage	Brief Illness Perception Questionnaire	Self-Care Management Processes-Guarding Scale
COPD stage	1		
Brief Illness Perception Questionnaire	.628**	1	
Self-Care Management Processes-Guarding Scale	-0.475**	-0.781**	1

**p < 0.001 Pearson's Correlations.

Discussion

The present research was designed as a cross-sectional and predictive correlational study to test the mediating role of illness perception in the relationship between COPD stage and self-care management. Our research findings revealed a statistically significant relationship between COPD stage, self-care management, and illness perception. It was found that the progression of COPD stage and poor illness perception adversely impacted patients' self-care management. Additionally, it was determined that illness perception mediated the relationship between COPD stage and self-care management. In light of the findings above, the hypotheses of our research were confirmed.

Symptoms become more evident with the progression of the disease stage in COPD patients. Fatigue, sleep problems, the frequency of exacerbations, hospital admissions, hospitalization rates, and especially dyspnea, increase in patients due to the progression of COPD.^{29,30} The increasing symptom burden due to the disease progression makes self-care management more challenging in patients.³¹ Our study revealed a moderate negative relationship between the COPD stage and self-care management; in other words, patients' self-care management decreased with the increasing COPD stage. Studies in the literature support the findings of our research.³¹⁻³³ It can be stated that the increase in symptoms, such as fatigue, sleep problems, and especially dyspnea, in patients with COPD progression affects self-care management.

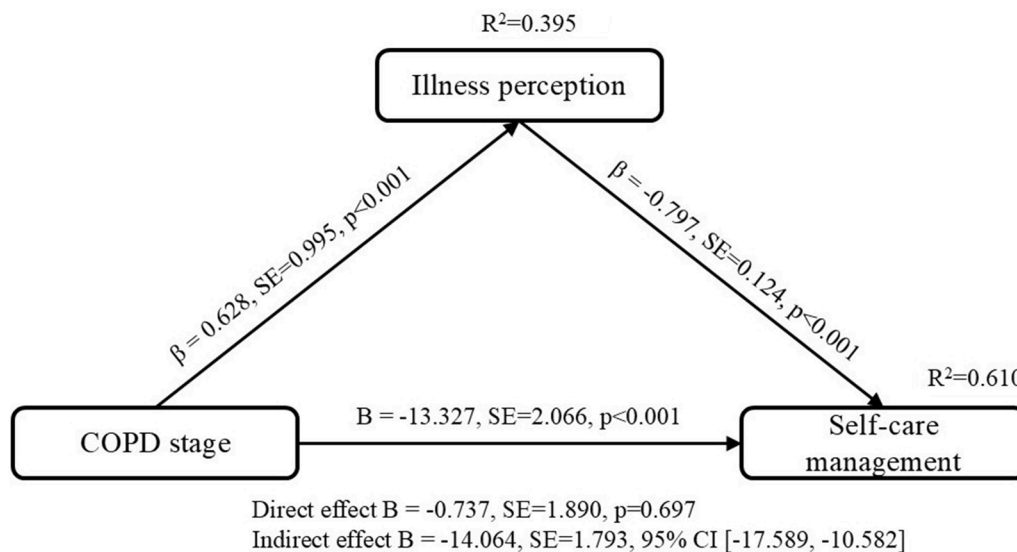
Illness perception is associated with how individuals evaluate the impacts of the illness on their lives.³⁴ The increased symptom burden due to the progression of the COPD stage, hospitalizations, and emergency room visits significantly influence patients' psychosocial and physical health.¹ Individuals may experience anxiety, tension, and sadness about their illness with the progression of the disease stage, which causes them to have a worse perception of the illness.³⁴ Our study found a moderate positive relationship between the COPD stage and illness perception. A high score on the Brief Illness Perception Questionnaire employed in our study indicates a negative perception of the illness. The progression of the COPD stage leads to poor illness perception in patients. Previous studies have demonstrated that illness progression adversely affects illness perception, supporting our research findings.^{34,35} The increased symptom burden with the progression of the illness stage can influence patients physically, socially, and psychologically. This may be a factor in the formation of negative illness perceptions in individuals.

Illness perception affects self-care management by influencing individuals' compliance with treatment, their beliefs and attitudes toward illness, symptom control, and health behaviors.¹⁶ Our study found that a positive illness perception positively affects self-care management. Guo et al. determined that illness perception was an important predictor of self-management behavior in COPD patients.²⁰ Midthun et al. conducted a qualitative study examining the experiences of COPD patients undergoing a home-based pulmonary rehabilitation program with health

Table 4
Results of regression analysis of the mediating effect of illness perception on the relationship between COPD stage and self-care management (n = 145).

Estimation Variables	Outcome Variables					Outcome Variables				
	M (Illness perception)		95 % CI			Y (Self-care management)		95 % CI		
X (COPD stage)	B	β	SE	LLCL	ULCI	B	β	SE	LLCL	ULCI
M (Illness perception)	9.614*	0.628*	0.995	7.647	11.582	0.737	0.026	1.890	-2.999	4.474
Constant	10.100		2.809	4.547	15.653	-1.463*	-0.797*	0.124	-1.707	-1.219
	R ² =0.395					R ² =0.610				
	F (1, 143) = 93.310, p < 0.001					F (2, 142) = 111.168, p < 0.001				

*p < 0.001, B: Unstandardized Regression Coefficient, β: Standardized Regression Coefficient, SE; Standard Error, LLCL; Lower Confidence Interval (B), ULCL; Upper Confidence Interval (B).



B: Unstandardized Regression Coefficient, β: Standardized Regression Coefficient, SE; Standard Error

Fig. 2. The mediating role of illness perception in the relationship between COPD stage and self-care management (n = 145).

coaching support. Patients reported that the application increased their motivation and belief in self-management and facilitated self-care practices.³⁶ In another study, patients were made aware of their symptoms and illnesses through a model incorporating a holistic approach called IARA (Meeting, Compliance, Responsibility, Autonomy). It has been observed that patients who applied the model experienced increased self-confidence and a more positive perception of their disease.³⁷ Other studies support our research findings.^{15,16} In this regard, it can be said that positive perceptions of the disease may increase self-care management by facilitating symptom management and disease control in patients.

The findings of our research demonstrated the mediating role of illness perception in the relationship between COPD stage and self-care management. No study in the literature has examined the mediating effect of illness perception in the relationship between COPD stage and self-care management. Hence we could not perform a comparison with a study including the current research results in evaluating the mediating effect. Studies in the literature, including pairwise comparisons, have shown a significant relationship between illness perception, COPD stage, and self-care management. The progression of COPD stage leads to the formation of negative illness perception in patients^{34,35} and reduced self-care management.³¹⁻³³ Additionally, negative illness perception reduces patients' self-care management.^{15,20,35} These findings show that illness perception may mediate the relationship between COPD stage and self-care management and confirm our research results. The findings of the present research revealed the importance of illness

perception in the assessment of self-care management, one of the cornerstones of disease management. It is thought that our research findings will guide the assessment of patients' self-care management by nurses and healthcare professionals.

Limitations of the study

The current work has some limitations. The fact that the research was carried out in a hospital located in one region may reduce the generalizability of our results to other regions. The study's cross-sectional and predictive correlation design may limit the determination of the cause-and-effect relationship. This may limit the study results since the effects of individual, cultural, and environmental factors that may lead to confounding impacts are not assessed. Furthermore, the data on illness perception and self-care management were obtained with subjective information. Despite an adequate sample size in our study compared to the research conducted, a larger sample and a multi-center study may increase the generalizability of results. Our study did not include patients with a malignant disease and those in the exacerbation period, but no distinction was made in terms of other chronic illnesses. The fact that COPD occurs at an advanced age and that many patients have comorbidities may affect illness perception and self-care management, which may limit our results. Making a distinction in comorbidity cases will reduce the sample size and extend the research duration. It is recommended that subsequent studies evaluate comorbidities that may influence illness perception and self-care management.

The other limitation of our study is that, although we recommended that nurses assess patients' illness perception, we were unable to guide this assessment due to the correlational nature of our study design. This limitation affects the applicability of our findings in the clinical setting. Future studies should focus on structured nursing strategies that integrate patients' perceptions of illness into routine care to facilitate self-care management and also aim to change the illness perception.

Conclusion

The results of the present study demonstrate that the advanced stage of COPD is associated with negative illness perception and decreased self-care management in patients. The stage of COPD explained 39.5 % of illness perception. Moreover, negative illness perception adversely impacts patients' self-care management. The stage of COPD and illness perception are predictors of self-care management. Illness perception and the stage of COPD explained 61.0 % of self-care management. Our research demonstrated that the stage of COPD adversely affects self-care management and that illness perception plays a mediating role in this relationship. The findings of our study reveal the importance of evaluating the stage of COPD and illness perception in assessing self-care management in patients. Hence it is recommended that nurses and healthcare professionals evaluate illness perception while assessing self-care management in COPD patients and planning their care for self-management. Including practices aimed at positive illness perception in nursing practices will increase self-care management and help improve self-care skills. No study in the literature has examined the mediating role of illness perception in the relationship between COPD stage and self-care management. Therefore, more studies are needed.

List of abbreviations

COPD: Chronic obstructive pulmonary disease

FEV1: Forced Expiratory Volume in 1 s

FVC: Forced Vital Capacity

GOLD: Global Initiative for Chronic Obstructive Lung Disease

STROBE: STrengthening the Reporting of OBServational studies in Epidemiology

SCMP-G: Self-Care Management Processes-Guarding Scale

Ethical approval and informed consent statements

This study was approved by the Ethics Committee of Kahramanmaraş İstiklal University (Date 24.04.2024/No 2024/08–02). All participants provided written informed consent prior to enrolment in the study. This research was conducted ethically in accordance with the World Medical Association Declaration of Helsinki.

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Data availability statement

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

CRedit authorship contribution statement

Yasemin Sazak: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Resources, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Meltem Kalaycı:** Writing – review & editing, Writing – original draft, Visualization, Validation, Investigation, Data curation, Conceptualization. **Keriman Aytakin Kanadlı:** Writing – review & editing, Writing –

original draft, Visualization, Validation, Resources, Investigation. **Nermin Olgun:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Resources, Conceptualization.

Declaration of competing interest

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

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