Self-management behavior and its influencing factors among adults with chronic obstructive pulmonary disease in Colombo, Sri Lanka: A cross-sectional study

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Abstract

Background: Self-management behaviors are essential to take care of chronic obstructive pulmonary disease (COPD). However, data on COPD self-management practices in Sri Lankan adults is limited. Therefore, identifying the level of COPD self-management and examining its influencing factors are essential for healthcare providers to manage COPD effectively.

Objectives: This research aimed to describe the level of self-management behaviors and determine whether dyspnea, perceived stress, COPD knowledge, and social support can predict self-management in adults with COPD in Colombo, Sri Lanka.

Methods: A predictive correlational study was conducted, and 108 adults with mild to moderate COPD were recruited from the central chest clinic in Colombo, Sri Lanka, from March to April 2024 using a simple random sampling technique. A self-administered questionnaire was used to gather data included demographic characteristics. The other instruments used were the COPD Self-Management Scale, the Perceived Stress Scale, the COPD Knowledge Questionnaire, and the Perceived Social Support Scale. Descriptive statistics and multiple regression were used for data analysis.

Results: The study showed a moderate self-management level with a mean of 3.04 ± 0.35. All variables could explain 41.7% of the variance in self-management among adults with mild to moderate COPD and COPD self-management behaviors significantly predicted by dyspnea ($\beta = 0.212$, $p = 0.006$), perceived stress ($\beta = -0.195$, $p = 0.018$), COPD knowledge ($\beta = 0.263$, $p = 0.001$), and perceived social support ($\beta = 0.366$, $p < 0.001$).

Conclusion: The study shows evidence that a program to intervene targeting COPD knowledge and perceived social support, in addition to reducing dyspnea and perceived stress, can be beneficial in promoting better self-management behaviors among adults with mild to moderate COPD.

Keywords

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Background

COPD is a progressive lifelong disease that needs long-term management with careful titration of therapy (Chen, 2022). COPD is now one of the top three causes of death worldwide, accounting for 3.3 million deaths in 2019, and the global prevalence is 11.7% (World Health Organization [WHO], 2023). The COPD prevalence in Sri Lanka is 10.5%, similar to the international (Amarasiri et al., 2017). The most common stages of COPD worldwide are mild to moderate (Varmaghani et al., 2019). In Sri Lanka, 90% of COPD patients belong to the mild and moderate levels (Amarasiri et al., 2017). Importantly, there is a rising trend of admissions in Sri Lanka

due to COPD exacerbation (Medical Statistics Unit Ministry of Health, 2020).

Globally, exacerbation is the most common problem of persons with COPD, and between 30% to 50% of people suffer from exacerbations, and approximately 20% of moderate COPD patients may experience frequent exacerbations, which are defined as two or more exacerbations per year (Chen, 2022). Frequent exacerbations are associated with a decline in lung function, increased mortality, and disease progression (Chen, 2022; Korpershoek et al., 2016). Self-management is one of the key strategies to enhance health-related quality of life (QOL) by reducing dyspnea and preventing COPD exacerbations, reducing subsequent hospitalizations (Chen,

2022). However, literature shows that the COPD population with mild-moderate diagnosis labels tends not to seek hospital care unless they have an exacerbation or worsening of symptomatology, which in turn limits their access to information and resources with regard to self-management, which hinders their ability to practice better self-management (Korpershoek et al., 2016).

Importantly, work productivity can improve among adults with COPD through self-management behaviors (Lee et al., 2020). Adults are physically active, and mostly, they have a working lifestyle. Therefore, adults usually expose to environmental factors, occupational triggers, and long-term exposure to traffic air pollutants may have contributed to the increase in COPD (Varmaghani et al., 2019). When considering self-management behaviors, adults can be actively involved in managing their disease condition by taking responsibility and making decisions to manage their condition rather than elderly (Bringsvor et al., 2018). COPD in young people may have a substantial impact on health. There may be significant structural and functional lung abnormalities among young adults due to smoking, exposed occupational triggers, and environmental factors (Chen, 2022). Therefore, focusing on self-management behaviors among adults and the early stage of the disease (mild-to-moderate) is essential to delaying the disease progression.

COPD self-management behavior includes symptoms, daily life, emotions, and information management for symptomatic relief, reduces the risk of further deterioration, hinders disease progression, and ultimately enhances health-related QOL (Zhang et al., 2013). However, for an effective overall management of a chronic disease, the involvement of the patient's family is of paramount importance. Family support and care are associated with better control of symptoms and patient self-management (Ryan & Sawin, 2009). Self-management of patients with COPD may vary since many factors relate to self-management behaviors, including age, gender, disease severity, dyspnea, perceived stress, co-morbidities, monthly income, education level, COPD knowledge, and social support (Bringsvor et al., 2018; Lan et al., 2022; Yadav et al., 2020; Yang et al., 2019).

However, based on the Individual and Family Self-Management Theory (IFSMT), disease conditions may affect self-management (Ryan & Sawin, 2009). Dyspnea is the main symptom of patients with COPD; moderate-to-severe dyspnea was observed in patients with mild COPD, indicating that dyspnea is not limited to patients with more severe COPD (Lan et al., 2022). Moreover, the literature shows that dyspnea can influence self-management behaviors. A study done in Norway revealed that higher dyspnea levels can influence emotional distress ($p = 0.004$, $\beta = 0.15$) in COPD patients (Lee et al., 2020).

Perceived stress belongs to individual and family factors in IFSMT. Individual cognitive status, perspectives, and information processing can enhance or diminish self-management behaviors (Ryan & Sawin, 2009). Most studies stated that COPD is found to be more common in men than women (Chen, 2022; Chokhani et al., 2021), and men are working outside of their homes and take responsibility for their families. Further, more adults with perceived stress are also related to professional activity ($r = 0.32$, $p < 0.05$) (Wrzeciono et al., 2021). A study done in Spain revealed that there was a significant relationship between perceived stress and quitting smoking in adults ($\beta = -0.0164$, $p < 0.01$) (Barroso-Hurtado et al., 2023). However, in patients with COPD, perceived stress can also affect treatment compliance and outcome, as evidenced by perceived stress reducing the level of function in everyday life and can lead to poor self-management (Hansen et al., 2023). A study done in Denmark revealed that perceived stress was a statistically significant predictor for disease management ($R^2 = 0.256$, $p < 0.05$) (Hansen et al., 2023).

The person will be more likely to engage in the recommended health behaviors if they have adequate knowledge about their condition (Ryan & Sawin, 2009). Studies done in Sri Lanka revealed that awareness of pulmonary rehabilitation, indoor air quality, COPD risk factors, and safety measures for risk factors remains poor (Kumari et al., 2019; Yasaratne & Dharmage, 2020). A study done in Nepal stated that poor disease knowledge was associated with activation in disease management ($OR = 1.01$, 95% CI: 1.00-1.11, $p < 0.05$) (Yadav et al., 2020). Two studies done in China and Korea showed that knowledge of the disease itself positively correlated to self-management practices ($r = 0.369$, $p < 0.01$) (Yang et al., 2019) ($r = 0.295$, $p < 0.001$) (Lim et al., 2022).

Based on IFSMT, patients are more likely to practice the recommended health behaviors if they receive positive support and influence in their day-to-day lives (Ryan & Sawin, 2009). The studies done in China revealed that the availability of support significantly predicted COPD self-management behaviors ($\beta = 0.236$, $p = 0.02$) (Lan et al., 2022), and social support positively correlates with self-management behaviors ($r = 0.451$, $p < 0.01$) (Zhao et al., 2023). A Korean study also revealed consistent findings ($r = 0.347$, $p = 0.001$) (Lim et al., 2022).

COPD is considered to be an utterly irreversible disease but can slow down symptoms and the disease process and maintain normal life through effective treatment and adequate self-management behaviors. In Sri Lanka, 55-60% of air pollution was due to emissions from motor vehicles, while industries accounted for 20-25% and 20% was due to domestic sources (Ileperuma, 2020). This results in increasing cases of respiratory disease due to air pollution in urban areas. In Colombo, they reported high levels of ambient air pollution due to over 50% of vehicles, 70% of industries, and several thermal power plants. Indoor air pollution is a significant health hazard since most households use firewood for cooking, often in congested, poorly ventilated kitchens (Ileperuma, 2020). However, the situation of self-management behaviors among adults with mild-to-moderate COPD in Sri Lanka, including Colombo, is not a clear idea in general because there is limited data available regarding self-management behaviors among adults with mild-to-moderate COPD.

Therefore, it is urgent to identify the level of self-management behaviors among adults with mild to moderate COPD. Nurses are front-line workers in the healthcare system and are responsible for increasing the knowledge of the patients and their relatives. Suppose there is clear empirical evidence regarding the level of self-management among the COPD population. In that case, the nurses can focus on interventions that help to increase the level of self-management behaviors, which can help to reduce frequent

exacerbation, recurrent hospitalization, and healthcare costs and improve their quality of life.

Therefore, guided by the IFSMT and literature, this study focused on describing the level of self-management behaviors and determining whether dyspnea, perceived stress, COPD knowledge, and perceived social support could influence self-management behaviors among adults with mild-to-moderate COPD in Colombo, Sri Lanka.

Methods

Study Design
A predictive correlational research design was used to explore the influence of the study variables on the self-management behavior of COPD persons. According to the literature, the direction and strength of the influence association among or between variables are established to predict the value of one variable based on another variable (Sutherland, 2017).

Samples/Participants
A simple random sampling technique was used to gather participants. Randomization was unbiased, and we ensured an equal chance for each unit to be selected. Inclusion criteria were patients aged 18-64 years, carrying a diagnosis of COPD for the last 6 months at least, oriented in time, place, and person, without any significant disability which physically hinders them, i.e. blindness, deafness, reduction in mobility needing assistance, void of unstable disease conditions (i.e. chronic kidney disease at end stage, decompensated congestive cardiac failure, diagnosis of advance carcinomas, no history of mental illness) and able to communicate in Sinhala in means of speaking and writing. During data collection, they were excluded if the participants had any symptoms of physical discomfort, such as exacerbation symptoms or breathing difficulties.

The sample size was calculated using G*power software. For linear multiple regression, Cohen suggested a medium effect size of 0.15, which is effective and more suitable for nursing research (Kang, 2021). The sample size was determined to be 108 adults with mild-to-moderate COPD, with an alpha of 0.05, an effect size of 0.15, and a power of 0.90. This calculation ensures that the study is adequately powered to detect significant effects, minimizing the risk of Type II errors. Moreover, choosing a medium effect size reflects a balance between practical significance and the feasibility of recruiting participants, making it particularly relevant in clinical settings where resources may be limited.

Instruments
Information was collected from the participants using self-reported questionnaires, including:

1. The researcher has developed a demographic questionnaire consisting of two parts. The first part targeted participant demographic characteristics, including age of the participant, gender, marital status, number of family members, main caregiver, smoking status, kind of fuel used for cooking and heating, adequate ventilation of the kitchen (open kitchen, windows, chimney), source of disease education. The second part aimed to collect health-related physical characteristics, i.e., height, weight, body mass index (BMI), the degree of airflow limitation/disease severity, dyspnea score (measured by the modified Medical Research Council dyspnea scale), history of exacerbation, COPD-related hospitalizations, respiratory symptoms, comorbidities, and COPD treatments.

2. The modified COPD Self-Management Scale (CSMS), which consists of 4 main domains, was used to gather data on individual self-management behaviors. Modified CSMS is derived from CSMS, which consists of five domains: symptom management, daily life management, emotional management, information management, and self-efficacy (Zhang et al., 2013). When deriving modified CSMS, the self-efficacy domain was omitted. Four domains in the modified CSMS contain 40 items, each using a 5-point grading system, where 1 equals never, and 5 is always. At the end of the questionnaire, the final mark ranged from 1-5, calculated by dividing 40 items by 40. The categorization of self-management according to score is as follows. The score of more than +1 SD of the mean was categorized as high, less than -1SD of the mean as low, and the ones equal or greater than minus 1SD of the mean and equal or lesser than +1SD of the mean were labeled as a medium score of disease self-management. This scale demonstrated excellent validity and reliability (Cronbach's α = 0.91) (Yang et al., 2019).

3. The Perceived Stress Scale (PSS-10) was used to measure perceived stress among adults with mild to moderate COPD. This scale was developed by Cohen et al. (1983), and the Sinhalese version of the perceived stress scale (S-PSS-10) was used in this study (Mendis et al., 2023). The scale consisted of 10 items, the score ranging from 0-never to 4-very often. Four items included reverse scoring; each of the 10 scores was summated to obtain a final score. The total score ranges from 0 to 40; a higher mean score indicates higher perceived stress. The described stress level is considered as 0-13 = low, 14-26 = moderate, and 27-40 = high levels of perceived stress (Cohen et al., 1983). This Sinhalese version scale demonstrated Cronbach's α = 0.85 (Mendis et al., 2023).

4. The COPD Knowledge Questionnaire (COPD-Q) was used to measure COPD Knowledge. This internationally validated questionnaire (Cronbach's alpha of 0.72) contained 13 questions covering patients' knowledge of disease prevention, clinical symptoms, management, and disease-associated risk factors (Maples et al., 2010). Out of 13 statements, eight were true, and five were false. The participant was given the option "yes/no/not sure." The correct answer carried one mark where the total was between 0 and 13, both scores inclusive. The higher the score, the better the participant's knowledge of the disease (Maples et al., 2010).

5. Perceived social support was measured using the Multidimensional Scale of Perceived Social Support (MSPSS), which contains 12 questions developed by Zimet et al. (1990). The 12 questions were targeted at support from family, support from peers, and others. Each question was given seven options ranging from strongly disagree to strongly agree, and marked 1 to 7, respectively. The sum was divided by 12 to grant the final score. The range of the score is from 1 to 7 points. The score indicated 1-2.9 = low, 3-5 = moderate, and 5.1-7 = high support. This scale showed good psychometric properties (Cronbach's α = 0.85) (Zimet et al., 1990).

6. The modified Medical Research Council (mMRC) dyspnea scale (Fletcher et al., 1960) was used to measure the level of dyspnea. This scale grades the disability caused by breathlessness on a scale of 0 to 4 (Fletcher et al., 1960). The

mMRC score was taken from medical records because doctors use it to assess the level of dyspnea and write it down in each patient's clinic book during every visit.

In this study, three questionnaires (CSMS, COPD-Q, and MSPSS) were translated into the Sinhalese language and back-translated according to WHO guidelines after obtaining the author's written permission via email (WHO, 2016). Secondly, the questionnaires were translated into Sinhala by two people who are bilingual (Sinhala/English), experienced healthcare professionals, and administrators. Thirdly, a bilingual expert (a person who is a member of the faculty of nursing involved in clinical and administrative nursing education) reviewed and corrected the draft version of the questionnaires. Next, as amended by the panel of experts, the Sinhalese version of the questionnaires was back-translated by a bilingual independent translator who has experience in Sinhalese to English translation yet was not aware of the original study instruments. Finally, the back-translated English version and original questionnaire were checked by the researcher, the principal advisor, an expert person, and a person whose native language is English.

Before starting the main study, the researcher conducted a pretest to check the questionnaire with 30 participants with the same characteristics. Cronbach's alpha of CSMS was 0.78, the PSS-10 was 0.82, the COPD-Q was 0.70, and the MSPSS was 0.91.

Data Collection

The data were collected at the central chest clinic in Colombo, Sri Lanka, from March to April 2024. The researcher asked for help from the nurse in the clinic to select COPD patients according to inclusion criteria. Invitations were extended to eligible people. Data collection was completed within a time frame of 20-30 minutes with self-reported questionnaires. Data collection was carried out by the researcher in a place that ensures participants' privacy near the pre-examination seating area of the clinic.

Throughout the data collection period, efforts were made to accommodate participants' schedules, providing flexibility in appointment times to maximize participation rates. The research team maintained close communication with clinic staff to monitor patient flow and optimize recruitment strategies, ensuring that a diverse sample was obtained that accurately represented the population of adults with COPD at the clinic.

Data Analysis

IBM SPSS version 26 is used for data analysis, and the significant level was set at .05. Frequencies, percentages, means, and SDs of demographic data and variables of the study population were taken as descriptive statistics. The standard multiple regression ENTER method was used because the literature review revealed that all independent variables had influenced COPD self-management. Therefore, it can examine the overall impact of all predictors on self-management without the bias of ordering or variable selection and helps understand each predictor's unique contribution to the explained variance in COPD self-management.

All assumptions of multiple regression were tested before the regression analysis. All variables conformed to a normal distribution. The assumptions of linearity, outliers, and homoscedasticity have been as per the scatter plot of residuals. The tolerance values were more than 0.2, and VIF values were less than 5, meaning the absence of multicollinearity and autocorrelation was determined by looking at the Durbin-Watson value, which ranged within 1.5-2.5, suggesting no significant autocorrelation in the residuals.

Ethical Considerations

This study obtained ethical approval from the Institutional Ethics Review Boards of Burapha University, Thailand (Protocol code G- HS 122/2566) and the University of Sri Jayewardenepura in Sri Lanka (Protocol code ERC 44/23). All participants were informed about the study's purpose, procedure, and their right to consent, decline, or withdraw from the study until data analysis was completed. Furthermore, all data were handled confidentially and stored securely to ensure participant privacy and comply with ethical standards.

Results

Characteristics and Health Information of the Participants

A total of 108 adults diagnosed with mild to moderate severity of COPD took part in the study. The participants ranged from 19 to 64 years old, with a mean age of 54.6 years (SD = 9.83). The sample comprised 53 males (49.1%) and 55 females (50.9%). The majority were married (62%), lived with family or relatives (97.2%), and the primary caregiver was the spouse (55.6%). Moreover, 31.5% had a smoking history, 46.3% used biomass fuel, and 23.1% had inadequate ventilation levels in the kitchen.

The sample consisted of 48.1% with mild and 51.9% with moderate levels of COPD. The majority had more breathlessness (mMRC value ≥2) (53.7%), an exacerbation history (80.6%), no co-morbidities (56.5%), and no participation in pulmonary rehabilitation (67.6%). Even though the majority had taken the COVID-19 vaccine, only 21.3% and 13.9% had taken the pneumococcal and Influenza vaccines, respectively (**Table 1**).

Description of the Dependent and Independent Variables

The overall COPD self-management mean score was 3.04 (SD = 0.35), which indicated a moderate level. For subscales, emotion management had the highest mean score of 3.19 (SD = 0.39), and information management had the lowest mean score of 2.79 (SD = 0.49). Dyspnea, perceived stress, COPD knowledge, and perceived social support were independent variables in this study. The participants showed that they had a high level of family support (see **Table 2**).

Factors Influencing COPD Self-Management Behaviors

The multiple regression test (ENTER method) revealed that all factors (dyspnea, perceived stress, COPD knowledge, and social support) were significantly predicted and explained 41.7% of the variance in self-management among adults with mild to moderate COPD in Colombo, Sri Lanka ($F_{(4,103)}$ = 20.169, p <0.01), as shown in **Table 3**. Variables were indicative of a small to medium effect size. However, demographic or clinical factors were not included in the regression analysis because they were not included in the objectives of this study.

Table 1 Health-related information (*N* = 108)

Health Information	*f*		%
Diagnosis duration			
(M = 5.85, SD = 4.59, Min = 1, Max = 20)			
1-5 years	70		64.8
6-10 years	24		22.2
More than 10 years	14		13
COPD severity			
Mild	52		48.1
Moderate	56		51.9
Dyspnea score (mMRC value)			
Less than 2 (less breathlessness)	50		46.3
More than 2 (more breathlessness)	58		53.7
History of exacerbation (past 12 months)			
No	21		19.4
Yes‡ (n =109)	87		80.6
Hospital admission		65	59.6
Emergency room visits		44	40.4
Exacerbation frequency within the past 12 months			
1	23		21.3
2	23		21.3
3	24		22.2
4	12		11.1
5	3		2.8
6	2		1.9
Co-morbidities			
None	61		56.5
Yes‡ (n = 81)	47		43.5
Hypertension		31	38.3
Diabetes		18	22.2
Dyslipidemia		16	19.8
Cardiovascular disease		7	8.6
Arthritis		8	9.9
Osteoporosis		1	1.2
History of vaccination			
None	14		13
Yes‡ (n =132)	94		87
Pneumococcal		23	17.4
Influenza		15	11.4
Covid-19		94	71.2
Pulmonary rehabilitation participation			
No	73		67.6
Yes	35		32.4

Note: ‡ Can answer more than 1 item

Table 2 Possible score, actual score, mean, and standard deviation of variables (*N* = 108)

Variable	Possible score	Actual score	*M*	*SD*
COPD self-management	1-5	2.2-3.9	3.04	0.35
Symptom management	1-5	2.2-4.5	3	0.42
Daily life management	1-5	1.7-4.2	3.07	0.51
Emotion management	1-5	2.3-4.1	3.19	0.39
Information management	1-5	1.5-4.0	2.79	0.49
Dyspnea	0-4	1-4	2.49	0.89
Perceived stress	0-40	6-32	18.94	6.21
COPD knowledge	0-13	3-13	7.46	2.36
Perceived social support	1-7	2.3-6.7	4.86	0.95
Family support	1-7	2-7	5.23	1.07
Friend support	1-7	1-6	4.08	1.31
Other support	1-7	2-7	5.26	1.02

Discussion

The present finding showed that adults diagnosed with mild to moderate severity COPD had a moderate level of self-management. Compared with some previous studies, the present study's findings were slightly higher than those of the previous ones (Sheng et al., 2023; Yang et al., 2019). The highest mean score was shown in emotion management, which was quite similar to the research of Yang et al. (2019). The lowest mean score in the information management subscale is consistent with previous research findings (Sheng

et al., 2023; Yang et al., 2019). However, all subscales were at a moderate level.

When attempting to explain results according to IFSMT (Ryan & Sawin, 2009), which shows that condition-specific such as complexity condition and treatment, not only social, environmental, and physical factors but also individual factors (age, gender, education, marital status) and family factors are also related to the outcome of self-management practices (Ryan & Sawin, 2009). Compared with other studies, the self-management level is a little high. This result can be explained by the fact that the previous studies included the majority of male participants (Korpershoek et al., 2016; Sheng et al., 2023; Yang et al., 2019), but this study consisted of almost equal proportions of males and females. Women are more actively engaged in self-management than men (Bringsvor et al., 2018). Moreover, the participants ranged from 19 to 64 years of age, while the mean was 54.6 years of age (SD =

9.83). They had no physical limitations and no cognitive impairment; thus, they could perform self-management activities. In addition, adults can actively be involved in managing their disease condition by taking responsibility, making decisions, having sufficient information, and having the ability to find health information (Bringsvor et al., 2018; Yadav et al., 2020).

Additionally, according to the literature, disease severity is vital in COPD self-management (Jolly et al., 2018), and the presence of more than one co-morbidity shows negative associations with self-management practices (Bringsvor et al., 2018; Yadav et al., 2020). In this study, all participants had mild and moderate levels of COPD, and 56.5% of participants reported having no co-morbidities. These could also be reasons for the moderate level of COPD self-management in this study.

Table 3 Predictors of COPD self-management behaviors among adults with mild to moderate COPD ($N = 108$)

Predicting variables	B	SE	β	t	p-value
Dyspnea	0.208	0.075	0.212	2.785	0.006
Perceived Stress	-0.011	0.005	-0.195	-2.397	0.018
COPD knowledge	0.039	0.012	0.263	3.304	0.001
Perceived Social support	0.135	0.030	0.366	4.473	<0.001
Constant = 2.129, R^2 = .439, Adj R^2 = 41.7%, $F_{(4,103)}$ = 20.169, $p < 0.01$					

Furthermore, Ryan and Sawin (2009) showed disease complexity can affect the individual's and family's practices of self-management and families' responsibilities increase in parallel with patients' disease trajectory. In this study, 97.2% of participants had a main caregiver, while half of the participants' main caregiver was a spouse (55.6%). Therefore, they may have good emotional and social support for their disease management. These are also other possible reasons for the moderate level of COPD self-management in this study.

In addition, 78.7% and 86.1% of participants had not received pneumococcal and Influenza vaccines, respectively, and 67.6% had not participated in a pulmonary rehabilitation program. Moreover, participants demonstrated a low level of disease-related knowledge. Disease knowledge is essential in managing one's condition (Maples et al., 2010). Therefore, healthcare providers should focus on improving patients' knowledge of diseases.

Study results indicated that dyspnea can predict COPD self-management ($β = 0.212$, $p = 0.006$), which reflects that increases in dyspnea severity led to an increase in self-management behaviors. Based on IFSMT, disease conditions can affect the process dimension and, ultimately, the outcome dimension (Ryan & Sawin, 2009). Dyspnea belongs to disease conditions, and COPD self-management belongs to the outcome dimension in this theory. Reviewed literature showed that a lack of clinical symptoms may induce some patients to take therapy episodically rather than daily self-care management (Aredano et al., 2020). Levels of dyspnea and self-management showed a statistically significant association ($r = 0.14$, $p < 0.05$) (Kilic et al., 2021). Moreover, dyspnea can influence adherence to COPD therapy (OR 3.318, 95% CI 1.050-9.892, $p < 0.05$) (Aredano et al., 2020). However, contradictory results showed that higher dyspnea levels could influence emotional distress ($β = 0.15$, $p < 0.05$), resulting in

poor self-management among COPD patients (Bringsvor et al., 2018).

The current findings complied with previous studies and IFSMT, which revealed that perceived stress can influence COPD self-management behaviors ($β = -0.195$, $p = 0.018$). Perceived stress belongs to individual and family perception in IFSMT, and individual cognitive status, perspectives, and information processing can enhance or diminish self-management behaviors (Ryan & Sawin, 2009). A study revealed that perceived stress could influence quitting smoking in adults ($β = -0.0164$, $p < 0.01$) (Barroso-Hurtado et al., 2023), which plays a vital role in daily life management among COPD patients. Furthermore, high stress had increased COPD-related emergency department visits (OR 2.51, 95% CI 1.06-5.98, $p = 0.04$) (Parekh et al., 2020). In addition, perceived stress was a significant predictor for disease management among COPD patients ($R^2 = 0.256$, $p < 0.05$) (Hansen et al., 2023).

The study revealed that COPD knowledge could predict COPD self-management behaviors ($β = 0.263$, $p = 0.001$). The IFSMT explains that knowledge must be improved to improve understanding of self-management practices. It notes that improving health-specific knowledge and beliefs is positively associated with self-care and self-management practices (Ryan & Sawin, 2009). Consistent with previous studies, COPD knowledge strongly predicted COPD self-management in multiple countries, settings, and disease stages (Lim et al., 2022; Yadav et al., 2020; Yang et al., 2019).

In par with IFSMT by Ryan and Sawin (2009), the study showed a positive predictive value with social support perceived and self-management ($β = 0.366$, $p = <0.001$). Ryan and Sawin (2009) explained that social support could help improve knowledge, self-regulation skills, and self-efficacy, thereby increasing self-management behaviors. In addition, positive social support is associated with improved COPD

disease management behaviors, and psychological support from families and close relationships is needed to manage feelings and worries (Lan et al., 2022). The results are on par with other international studies, highlighting that social support positively predicts COPD self-management (Lim et al., 2022; Zhao et al., 2023).

Increases in dyspnea and decreases in perceived stress in one unit lead to increased self-management in double. In addition, increases in COPD knowledge and social support in one unit result in increased self-management by approximately three to four units. These results provide clearer insights into priorities for interventions aimed at enhancing self-management by targeting the above factors.

Limitations

According to our knowledge, this was the first study providing insight into self-management practices and influencing factors among adults with mild to moderate COPD in Sri Lanka. However, there were some limitations. Even though the central chest clinic is the end referral station for chest diseases in the country, receiving referrals from all over the country, the data that has been collected belongs to one center. This might include some inequality in generalization to remote areas with no available pulmonary rehabilitation program. Moreover, all participants had mild and moderate levels of COPD, and we did not consider clinical differences among older adults. Hence, it may not describe the complete picture of self-management behavior among patients with COPD in Sri Lanka.

Implications to Nursing Practice

Based on the findings, nursing interventions should focus on improving COPD knowledge (e.g., conducting COPD awareness programs), improving family engagement in disease management, and reducing dyspnea and perceived stress (e.g., initiating family group discussions, teaching environmental arrangements for reducing air pollution, and encouraging breathing exercises). Moreover, nursing interventions can suggest a more personalized approach to managing the personal and social factors of patients diagnosed with COPD of mild to moderate severity.

Conclusion

The study found that a moderate level of self-management behavior and dyspnea, perceived stress, COPD knowledge, and social support can predict self-management behavior in the diagnosed COPD population of Sri Lanka. Therefore, intervention targets reducing perceived stress and dyspnea and promoting COPD knowledge and social support, which can help COPD people develop good self-management behavior, reduce COPD exacerbations and complications, delay the progress of the disease, and enhance their health-related quality of life.

Declaration of Conflicting Interest

All contributing authors declare no conflicts of interest.

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Authors' Contributions

All authors contributed substantially to the conception or design of the manuscript, acquisition, analysis, or interpretation of data. Additionally, all drafted the manuscript, critically revised it, and approved the final version for publication. They also agreed to be accountable for all aspects of the work, ensuring that questions related to the accuracy or integrity of any part are appropriately investigated and resolved.

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Data Availability

The datasets generated during and analyzed for the current study results are available from the first and corresponding authors upon reasonable request.

Declaration of Use of AI in Scientific Writing

There is nothing to declare.

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