Factors associated with awareness of palliative care among patients with chronic obstructive pulmonary disease

Supinya Sono[1], Orapan Fumaneeshoat[1], Thammasin Ingviya[1]

ABSTRACT

INTRODUCTION Chronic obstructive pulmonary disease (COPD) leads to respiratory morbidities and mortalities. Despite its importance in alleviating respiratory consequences, palliative services and awareness in COPD patients worldwide is currently limited. The objectives of this study were to measure the prevalence of COPD patients with an awareness that palliative care (PC) is part of COPD care, and to evaluate factors associated with patients' PC awareness.
METHODS A cross-sectional study was conducted on COPD patients visiting 2 tertiary hospitals from July to December 2018. A questionnaire containing demographic factors, the severity of COPD, and questions on PC perceptions was developed. Patients who met the inclusion criteria were recruited. Factors associated with PC awareness were assessed by multivariate logistic regression analysis.
RESULTS A total of 280 patients were recruited (91.1% male) with median age of 73 years (IQR: 65–78), median FEV1% predicted was 62 (IQR: 47–80), and 22.6% were aware of PC. Only 19 patients (6.8%) were advised by their doctor about advanced care planning (ACP). Factors associated with PC awareness were: age (p=0.014), mMRC score (p=0.01), knowing the term PC (p<0.001), knowing the term CPR (p=0.004), having an ACP (p=0.049), knowing the term 'living will' (p<0.001) and having had discussions with their healthcare providers on PC issues (p=0.037). Multivariate regression analysis showed that the only factor associated with PC awareness was a lower mMRC score (AOR=0.67; 95% CI: 0.51–0.87).
CONCLUSIONS PC awareness in COPD patients was low. Discussions on PC issues between healthcare providers and patients were not widespread. Suggestions for policy implications and future research are needed.

AFFILIATION
1 Department of Family and Preventive Medicine, Faculty of Medicine, Prince of Songkla University, Songkhla, Thailand

CORRESPONDENCE TO
Orapan Fumaneeshoat. Department of Family and Preventive Medicine, Faculty of Medicine, Prince of Songkla University, 15 Kanjanavanich Road, Hat Yai, Songkhla, 90110, Thailand.
E-mail: orfp_1187@hotmail.com
ORCID ID: https://orcid.org/0000-0002-1084-1837

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a leading cause of morbidity and mortality worldwide, resulting in an economic and social burden. Its prevalence, morbidity, and mortality vary across countries and different groups within countries[1]. The World Health Organization (WHO) predicted that COPD will become the third leading cause of death worldwide by 2030[2]. Persistent respiratory symptoms and airflow limitation characterize COPD. The nature of the disease is that patients' lung function will gradually decrease over time; even with the best available care, other unwanted symptoms, including fatigue, dyspnea, depression, anxiety, and insomnia, may occur as the disease progresses. Symptom-based palliative care treatment is required to maintain a good quality of life among these patients[1].

Palliative care is an approach to improving patients' quality of life for those who face problems associated with a life-threatening illness and their families. It prevents and relieves suffering through early identification, valid assessment, and treatment of pain and other physical, psychosocial, or spiritual problems[3,4]. Early palliative care in cancer patients can improve quality of life and reduce unnecessary hospitalizations and healthcare utilization[3,5]. WHO reported that only 14% of patients who need palliative care worldwide could access the services[3]. According to WHO, diseases requiring palliative care for adults are Alzheimer's and other dementias, cancer, cardiovascular diseases, cirrhosis of the liver, chronic obstructive pulmonary diseases, diabetes, HIV/AIDS, kidney failure, multiple sclerosis, Parkinson's disease, rheumatoid arthritis, and drug-resistant tuberculosis[3,6]. Even though terminal symptoms, especially dyspnea, fatigue, and restlessness, are presented in both COPD and cancer patients, COPD patients have less accessibility to palliative care compared with cancer patients[4,7-12].

The global strategy for diagnosing, managing, and preventing chronic obstructive pulmonary disease, GOLD 2018 Report suggested physicians be aware of palliative care approaches for symptoms in their practice[1]. The guideline also suggested that physicians discuss their views of resuscitation, advance directives, and place of death with patients and their families[1]. However, the appropriate time to introduce palliative care to COPD patients is unclear. Currently, no tools can be used to predict how long COPD patients will survive[13,14]. Many physicians may find it hard, especially when discussing end-of-life decisions[4,14-16]. The current evidence supports that good palliative symptom management helps increase patients' quality of life[13,15]. Vulnerability in the health system, such as lack of resources, low health literacy, and no supporting policy, may make the patients unaware of palliative care. Moreover, without palliative care services, the patients may undergo unnecessary life-prolonging aggressive treatments or interventions[10,15,17].

This study aims to measure the prevalence of palliative care awareness in COPD patients and explore factors associated with patients' palliative care perceptions.

METHODS

Questionnaire

A newly developed paperless questionnaire to collect demographic data, disease severity, previous experience with treatment, and questions on palliative care perception was developed. Three experts evaluated content validity: one pulmonologist and two palliative care specialists. After generating the questionnaire, a pilot study was done on 30 COPD patients in a general hospital for reliability testing, which resulted in Cronbach's α=0.78–0.82.

Disease severity was evaluated using the COPD assessment test (CAT) score and modified Medical Research Council dyspnea scale (mMRC) score. Participants' latest percent predicted forced expiratory volume in one second (% predicted FEV1) were the only spirometric data collected from medical records and used as one of the severity assessment tools.

CAT is a questionnaire developed by COPD experts from many countries, consisting of 8 questions, including patients' symptoms and quality of life. Each question has a rating scale ranging 0–5. Patients with scores ≥10 should manage their symptoms. Cronbach's α for the Thai version's reliability was 0.853[18.]

The mMRC dyspnea scale score ranging 0–4, is used to measure the patient's dyspnea, where 0 suggests no breathlessness except during vigorous exercise, and 4 corresponds to breathlessness on minimal exertion. A score ≥2 indicates that the patient suffers from dyspnea[19]. The percent predicted forced expiratory volume in one second (% predicted FEV1) is used as COPD severity evaluation. The severity is classified into four levels regarding airflow limitation severity: mild (% predicted FEV1 ≥80), moderate (50≤ %

predicted FEV1 <80), severe (30≤ % predicted FEV1 <50), and very severe (% predicted FEV1 <30).

Previous treatments mentioned the history of emergency department visits or hospitalization due to COPD exacerbation. In this part, we also asked about the experience of using respiratory support, including home oxygen therapy, ventilatory support, and non-invasive mechanical ventilation. Moreover, in this part, we supplemented patients' disease perception questions, asking them if they knew they were now suffering from an incurable disease.

We used the following question to measure participants' perception of palliative care: 'Have you ever heard the term palliative care?'. Then, the question: 'Do you know that palliative care is a part of COPD care?' was used to measure COPD patients' palliative care awareness.

The question: 'How do you score your palliative care understanding?' with a score of 1 indicating no palliative care knowledge, and 10 high level of knowledge.

Participants' knowledge about the advanced care plan, 'living will', and end-of-life issues were evaluated directly. However, we used the simulated scenarios to explore participants' end-of-life decisions regarding life-prolonging procedures, including cardiopulmonary resuscitation (CPR), endotracheal intubation, and ventilatory support, to prevent any discomfort caused by posting direct questions about end-of-life.

Study design and patient recruitment

Our study design was a cross-sectional study conducted on 280 COPD patients visiting outpatient pulmonology clinics in 2 tertiary hospitals, one university hospital, and another regional hospital, from 1 July to 28 December 2018.

The inclusion criteria for patients to participate were: aged ≥40 years, had been diagnosed with COPD by internists or pulmonologists for at least one year, and had their pulmonary function tests done no more than five years. Information and consent forms were given to every patient who met the criteria. Patients with cognitive impairment were excluded from the study.

Ethical considerations

The content of the questionnaire contained death and dying issues. Therefore, we carefully developed the interview script using gentle words but could keep the content we aimed to access. We also thoroughly trained our research assistant to use appropriate words and comforting body language throughout the interview. If any patients felt uncomfortable, a distress protocol would be activated. The protocol included stopping the interview process, and the primary investigator would be promptly notified to give immediate support. The patient would be escorted to a safe and quiet area. The primary investigator would primarily evaluate the patients and then be given appropriate counseling or referral to a psychiatrist depending on the severity of the distress. In addition, all participants were informed that they

had the right to stop the interview process whenever they felt uncomfortable. However, the distress protocol was not activated throughout the study.

This study was approved by the Human Research Ethics Committee of Prince of Songkla University, Hatyai, Thailand (Approval number: 61-022-9-4). Written informed consent forms were signed before each interview.

Statistical analysis

The sample size was calculated using the one-sample proportion equation, according to a prevalence of 13% of COPD patients who knew that palliative care was part of COPD care[9]. The margin of error was set at 0.03–0.05, resulting in the appropriate sample size of 154–354. Therefore, according to the sample size calculation, this study included 280 participants, which was adequate according to the sample size calculation.

Statistical analysis was performed by Program R Version 3.4.2. Continuous data are presented using mean and standard deviation, or median with interquartile range (IQR), depending on the distribution. Percentages were used to describe qualitative data. Associated factors to palliative care perceptions were assessed by either Wilcoxon's or Fisher's exact test. A value of $p<0.05$ was considered statistically significant. A backward stepwise based on the Akaike information criterion (AIC) was used for variable selection for multivariate logistic regression.

RESULTS

Of 280 participants, the proportions of participants receiving services at university hospitals to center hospitals were 77.1% and 22.9%, respectively. Male participants were predominant (91.1%). The average age of the group was 73 years. Most participants had an education level lower than the diploma level (86%). Most of the participants were Buddhists (82.1%). More than half of the participants (54.3%) were unemployed, and 63.8% of the participant reported no comorbidity. Almost three-quarters (73.2%) reported their financial status as low-income. There were 12% of current smokers in the study. The median of % predicted FEV1, CAT, and mMRC scores were 62, 11, and 2, respectively (Table 1).

Table 1. Baseline characteristics of participants (N=280)

Characteristics	n	%
Place of study		
University hospital	216	77.1
Regional hospital	64	22.9
Sex		
Male	255	91.1
Age (years), median (IQR)	73 (65–78)	
Education level		

Continued

Table 1. Continued

Characteristics	n	%
Lower than primary school	17	6.1
Primary school	169	60.4
Secondary school	57	20.4
Diploma	14	5.0
Bachelor's degree or higher	23	8.2
Religion		
Buddhism	230	82.1
Islam	49	17.5
Other	1	0.4
Career		
Unemployed	152	54.3
General worker	11	3.9
Merchant	9	3.2
Businessperson	7	2.5
Government officer	11	3.9
Retired government officer	48	17.1
Worker in agriculture	38	13.6
Other	4	1.4
Comorbidity		
Cancer (all types and stages)	18	6.5
Heart disease (all types)	57	20.4
Cirrhosis	4	1.4
Diabetes mellitus	36	12.9
HIV infection	3	1.1
Chronic kidney disease currently on hemodialysis	1	0.4
Parkinson's disease	2	0.7
Drug-resistant tuberculosis	1	0.4
None of the above	178	63.8
Economic status		
Low	205	73.2
Middle or higher	75	26.8
Smoking status		
Current smoker	34	12.1
Disease severity	**Median (IQR)**	
% predicted FEV1	62 (47–80)	
CAT score	11 (6–16)	
mMRC score	2 (1–3)	
Number of years since diagnosis	3 (2–5)	
Number of days in the longest period of hospitalization due to exacerbation	3 (0–7)	
Number of hospital admissions within the recent year due to exacerbation	0 (0–1)	
Number of emergency room visits within one year due to exacerbation	0 (0–1)	

Table 2. Participants' disease perceptions, previous COPD treatments, palliative care decisions, and end-of-life decisions (N=280)

	n	%
Perceptions		
Knowing that they had COPD	249	88.9
Knowing that COPD is an incurable disease	161	57.7
Previous treatments		
Having been admitted due to COPD exacerbation	166	59.3
Having visited an emergency room due to COPD exacerbation	138	49.5
Having experienced endotracheal intubation	85	30.4
Having experienced non-invasive ventilator support (Bi-PAP)	56	20.0
Having home oxygen	27	9.6
Palliative related contents		
Knowing the term palliative care	76	27.1
Knowing that palliative care is part of COPD care	63	22.6
Knowing the term CPR	139	49.6
Knowing endotracheal intubation	179	63.9

Continued

Table 2. Continued

	n	%
Knowing non-invasive ventilator support (Bi-PAP)	80	28.7
Having an advanced care plan	70	25.0
Knowing the term 'living will'	34	12.1
Feeling worried while talking about palliative care	42	15.0
Having discussed with healthcare providers about palliative care and/or advanced care plan issues	19	6.8
Self-evaluating palliative care knowledge score range 1–10, median (IQR) 1 (1–4)		
End-of-life decisions		
Cardiopulmonary resuscitation (CPR)		
Do not resuscitate	202	72.1
Endotracheal intubation		
Do not intubate	226	80.7
Non-invasive ventilator support (Bi-PAP)		
Do not use Bi-PAP	179	63.9

Table 3. Participants' palliative care perceptions compared with various factors*

Factors	Have perception n (%)	Do not have perception n (%)	p
Sex			1.000[a]
Male	69 (90.8)	186 (91.2)	
Female	7 (9.2)	18 (8.8)	
Age (years), median (IQR)	70 (61–76.2)	74 (67–79)	**0.003**[b]
% predicted FEV1, median (IQR)	62.5 (44.8–79)	62 (47–80)	0.660[b]
CAT score, median (IQR)	9.5 (5–15)	11.5 (7–16)	0.160[b]
mMRC score, median (IQR)	1 (1–3)	2 (1–3)	0.129[b]
Knowing that they had COPD			1.000[a]
Yes	68 (89.5)	181 (88.7)	
No	8 (10.5)	23 (11.3)	
Knowing about endotracheal intubation			**0.027**[a]
Yes	57 (75)	122 (59.8)	
No	19 (25)	82 (40.2)	

Continued

Table 3. Continued

Factors	Have perception n (%)	Do not have perception n (%)	p
Having experienced endotracheal intubation			0.478[a]
Yes	26 (34.2)	59 (28.9)	
No	50 (65.8)	145 (71.1)	
Having home oxygen			0.323[a]
Yes	10 (13.2)	17 (8.3)	
No	66 (86.8)	187 (91.7)	
Knowing the term CPR			**<0.001[a]**
Yes	52 (68.4)	87 (42.6)	
No	24 (31.6)	117 (57.4)	
Having an advanced care plan			**0.003[a]**
Yes	29 (38.2)	41 (20.1)	
No	47 (61.8)	163 (79.9)	
Knowing the term 'living will'			**<0.001[c]**
Yes	20 (26.3)	14 (6.9)	
No	56 (73.7)	190 (93.1)	
Having 'living will'			1.000[c]
Yes	1 (1.3)	3 (1.5)	
No	75 (98.7)	201 (98.5)	
Having discussed with healthcare providers about palliative care and/or advanced care plan issues			0.211[a]
Yes	8 (10.5)	11 (5.4)	
No	68 (89.5)	193 (94.6)	
Feeling worried while talking about palliative care			1.000[a]
Yes	11 (14.5)	31 (15.2)	
No	65 (85.5)	173 (84.4)	
End-of-life decisions			
Cardiopulmonary resuscitation			0.616[a]
Do not resuscitate	57 (75)	145 (71.1)	
Endotracheal intubation			0.957[a]
Do not intubate	62 (81.6)	164 (80.4)	
Non-invasive ventilator support (Bi-PAP)			**0.047[a]**
Do not use Bi-PAP	41 (53.9)	138 (67.6)	

*Measured by answering the question: 'Have you ever heard the term palliative care?'. **a** Chi-squared test. **b** Wilcoxon rank sum test. **c** Fisher's exact test.

Participants' disease perception and palliative care awareness are shown in Table 2. In all, 11.1% of the participants did not know they had COPD. Almost half of them (42.3%) did not realize that COPD was incurable. Three-fifths (59.3%) had been hospitalized due to disease exacerbation. Approximately one-third (30.4%) experienced endotracheal intubation, and 20% experienced non-invasive ventilator support (Bi-PAP).

Table 4. Multivariate logistic regression analysis of factors associated with palliative care perception

Factor	AOR	95% CI	p
Knowing that they have COPD	0.80	0.33–2.07	0.625
Having been admitted due to exacerbation	0.94	0.49–1.82	0.865
Having experienced endotracheal intubation	1.27	0.65–2.47	0.478
End-of-life decision of using Bi-PAP	0.51	0.29–0.91	0.023
Having home oxygen	1.82	0.65–4.99	0.246
Having advance care plan	2.54	1.39–4.66	0.003
% predicted FEV1	1.00	0.99–1.01	0.747
CAT score	0.98	0.91–1.06	0.679

AOR: adjusted odds ratio.

The prevalence of participants who knew the term palliative care was 27.1%, and 22.6% knew that palliative care was part of COPD care. The average self-assessment of palliative care knowledge was 1 out of 10. Only 19 participants (6.8%) had discussed palliative care or advanced care plan issues with their doctors or healthcare providers (Table 2).

The exploratory analysis showed that factors significantly associated with COPD patients' palliative care perception (knowing the term palliative care) were a younger age (p=0.003), knowing the term endotracheal intubation (p=0.027), knowing the term CPR (p<0.001), having advanced care plan (p=0.003), knowing the term 'living will' (p<0.001) and end-of-life decision of using non-invasive ventilator support (p=0.047) (Table 3).

The multivariate logistic regression analysis showed only two factors associated with palliative care perception: the end-of-life decision to use non-invasive ventilator support (AOR=0.51; 95% CI: 0.29–0.91) and having an advance care plan (AOR=2.54; 95% CI: 1.39–4.66) (Table 4). Factors

Table 5. Participants' palliative care awareness compared with various factors*

Factors	Have palliative care awareness n (%)	Do not have palliative care awareness n (%)	p
Sex			0.942[a]
Male	58 (92.1)	196 (90.7)	
Female	5 (7.9)	20 (9.3)	
Age (years), median (IQR)	70 (60.5–76.5)	73 (67–79)	**0.014[b]**
% predicted FEV1, median (IQR)	65 (49.5–79.5)	61 (46–79.2)	0.677[b]
CAT score, median (IQR)	9 (5–14.5)	12 (7–16.2)	0.058[b]
mMRC score, median (IQR)	1 (1–2)	2 (1–3)	**0.010[b]**
Knowing that they had COPD			0.820[a]
Yes	57 (90.5)	191 (88.4)	
No	6 (9.5)	25 (11.6)	
Knowing about endotracheal intubation			0.114[a]
Yes	46 (73)	132 (61.1)	
No	17 (27)	84 (38.9)	
Having experienced endotracheal intubation			0.180[a]
Yes	24 (38.1)	61 (28.2)	
No	39 (61.9)	155 (71.8)	
Having home oxygen			0.845[a]
Yes	7 (11.1)	20 (9.3)	
No	56 (88.9)	196 (90.7)	
Knowing the term palliative care			**<0.001[a]**
Yes	52 (82.5)	23 (10.6)	
No	11 (17.5)	193 (89.4)	

Continued

Table 5. Continued

Factors	Have palliative care awareness n (%)	Do not have palliative care awareness n (%)	p
Knowing the term CPR			**0.004ᵃ**
Yes	42 (66.7)	97 (44.9)	
No	21 (33.3)	119 (55.1)	
Having an advanced care plan			**0.049ᵃ**
Yes	22 (34.9)	47 (21.8)	
No	41 (65.1)	169 (78.2)	
Knowing the term 'living will'			**<0.001ᵃ**
Yes	18 (28.6)	16 (7.4)	
No	45 (71.4)	200 (92.6)	
Having 'living will'			0.221ᵃ
Yes	2 (3.2)	2 (0.9)	
No	61 (96.8)	214 (99.1)	
Feeling worried while talking about palliative care			1.000ᵃ
Yes	9 (14.3)	33. (15.3)	
No	54 (85.7)	183 (84.7)	
Having discussed with healthcare providers about palliative care and/or advanced care plan issues			**0.037ᶜ**
Yes	8 (12.7)	10 (4.6)	
No	55 (87.3)	206 (95.4)	
End-of-life decisions			
Cardiopulmonary resuscitation			0.321ᵃ
Do not resuscitate	49 (77.8)	152 (70.4)	
Endotracheal intubation			0.119ᵃ
Do not intubate	46 (73)	179 (82.9)	
Non-invasive ventilator support (Bi-PAP)			0.784ᵃ
Do not use Bi-PAP	39 (61.9)	140 (64.8)	

a Chi-squared test. **b** Wilcoxon rank sum test. **c** Fisher's exact test. *Measured by answering the question: 'Do you know that palliative care is part of COPD care?'.

Table 6. Multivariate logistic regression analysis of factors associated with palliative care awareness

Factors	AOR	95% CI	p
Sex: Male	2.13	0.65–10.01	0.262
mMRC score	0.67	0.51–0.87	0.004
Longest admission due to disease exacerbation	1.03	1.00–1.07	0.052
Having 'living will'	8.87	0.74–217.96	0.097

AOR: adjusted odds ratio.

associated with palliative care awareness (knowing that palliative care is part of COPD care) among COPD patients were younger age (p=0.014), lower mMRC score (p=0.01), knowing the term palliative care (p<0.001), knowing the term CPR (p=0.004), having an advanced care plan (p=0.049), knowing the term 'living will' (p<0.001) and having a discussion with healthcare providers on palliative care issues (p=0.037) (Table 5). The multivariate logistic regression analysis showed that a lower mMRC score was the only factor associated with palliative care awareness (AOR=0.67; 95% CI: 0.51–0.87) (Table 6).

DISCUSSION

Approximately one-quarter of COPD patients knew the term palliative care and knew that palliative care was part of COPD care (27.1% and 22.6%, respectively). This number is higher than in the study of Fahim et al.[9] in 2013 from the UK, whose prevalence of COPD patients who knew palliative care as a choice of COPD care was 13%. However, palliative care perception in our setting was still lower than the study conducted on the Taiwanese healthy elderly population in 2012, which reported 57% recognized the term hospice and palliative care[20].

In this study, the lower mMRC (less dyspnea) score was the only factor associated with palliative care awareness or knowing that palliative care is part of COPD care, in contrast with previous studies which reported that palliative care awareness was associated with higher disease severity[9]. Moreover, other factors such as age, sex, income, and previous treatments had no association with palliative care perception or palliative care awareness, according to multivariate logistic regression analysis in our study. In contrast, some studies reported that those factors were associated with palliative care knowledge[15,20-22]. The explanation for this phenomenon could be that the prevalence of COPD patients with disease perception was still low. In our study, 11.1% of participants did not know they had COPD. Only 57.7% of the participants knew that COPD was incurable, indicating disease unawareness. According to previous studies, the other explanation for this result was that as much as 60% of the participants received only primary education, which could affect their disease awareness and health literacy levels, palliative care perception, and palliative care awareness[21,23]. Therefore, health education should be provided more to increase health literacy levels among those patients. However, palliative care is a relatively new concept among the Thai population. There is still a large gap to fill to provide better care to COPD patients.

Our study revealed that 15% of the participants felt worried while discussing palliative care issues, which was unsurprising. In Asian culture, some people believe that talking about death can bring bad luck or accelerate their death. Hence, many people avoid discussing palliative and end-of-life care as they contain death issues[24], which could be considered a roadblock in initiating palliative care discussions, especially in the non-terminal stage of disease among Thai and other Asian populations.

We also found a lack of palliative care communication between patients and healthcare providers. Only 6.8% of participants in our study reported ever discussing with healthcare providers about palliative care issues, while the study from Taiwan and the USA reported 11.7% of general population and 14.6% of COPD patients had heard about palliative care from their healthcare providers[20,25]. This phenomenon occurs widely as current practices do not facilitate conversations about palliative care between COPD patients and clinicians[14]. However, initiating the discussion of palliative care issues with COPD patients could be difficult, as there is no formal standardized guidance of when and how to start[26].

In Thailand, the concept of palliative care was introduced to the Thai healthcare system in the late 1990s. The endorsement of terminally ill patients' rights to refuse medical interventions or to discontinue any life-prolonging, by writing a 'living will' or advanced care plan was first available in 2007[27] and has been included in the national health policy since 2014[28]. However, the resources have been scarce, making accessing palliative care services difficult[27,28]. Like many places, cancer patients were always the priority of palliative care. Patients who have other chronic or incurable diseases remain the minorities[7,10,11,27,28].

Strengths and limitations

To our knowledge, this is the first study on palliative care awareness among COPD patients in Thailand. However, there were some limitations in this study. First, this study was done in outpatient clinics. Thus, the patients were healthier than hospitalized or homebound patients with more severe disease stages, which could affect their palliative care perception and awareness. Second, we included the latest pulmonary function tests done in the past five years as one of the inclusion criteria. However, the re-evaluation of pulmonary function tests (PFTs) was not done at the same frequency in each patient, limiting further evaluation, especially survival prediction using the BODE and ADO indices, essential tools to predict survival among COPD patients[29-31]. Moreover, in the study, there were some patients whose latest %FEV1 was >80, which could be explained by the fact that the PFTs we had collected were not the 'initial' PFTs but the latest ones. Therefore, those numbers should have increased if the patients were treated correctly, resulting in %FEV1> 80[32]. Finally, this study is a cross-sectional study. Thus, a limitation was the ability to conclude the causal effects, even though the multivariate regression analysis was performed.

CONCLUSIONS

Our study results showed that the prevalence of palliative care awareness among COPD patients and the perception of palliative care was low. Moreover, communication between patients and healthcare providers about palliative care issues was still lacking. For this reason, both COPD patients and healthcare providers should receive adequate information on palliative care to create an adequate perception of palliative care and be aware that palliative care is a part of COPD care. Moreover, according to this study, the health literacy level among COPD patients was low. Therefore, patient education should be provided to all COPD patients as early as the diagnosis is made. Further research about this issue should include inpatients or homebound patients and focus on the intervention to enhance palliative care awareness among patients and caregivers of COPD and other non-cancer patients.

CONFLICTS OF INTEREST

FUNDING

ETHICAL APPROVAL AND INFORMED CONSENT

DATA AVAILABILITY

Data sharing is not applicable to this article as no new data were created.

PROVENANCE AND PEER REVIEW

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