

Symptom Distress, Cluster, and Management in Thais with COPD

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Abstract : This study explored symptom distress, symptom cluster and effective symptom management strategies used for each symptom cluster among persons with chronic obstructive pulmonary disease. Thai participants (n=250) with chronic obstructive pulmonary disease were purposively selected to complete three questionnaires: the Personal Information Form, the Bronchitis Emphysema Symptom Checklist, and the Symptom Management Strategies Questionnaire. Descriptive statistics was used to determine symptom distress and effectiveness of management strategies, and a Principal Component Factor with a Varimax rotation was used to analyze cluster.

The results revealed that the participants experienced multiple symptoms. Seven clusters of symptom distress which ran from the highest level of distress were: respiration difficulty, fatigue-related disease, sleep alteration, pain and unpleasant sensation, emotional problems, memory function decline, and respiratory muscle weakness. The most effective strategies used in each cluster were as follows: For respiration difficulty, taking bronchodilator and mucolytic drugs, inhaling corticosteroid, using the pursed lip technique, effective coughing, and deep breathing exercise. For fatigue-related disease, taking a bronchodilator, reducing activities, shortening of distance and general exercise. For sleep alteration, taking alprazolam, listening to songs or music, practicing meditation or praying or performing religious activities, and reading books. For pain and unpleasant sensation, taking non-steroidal inflammatory drugs (NSAID) and paracetamol. For emotional problems, taking amitriptyline, accepting their fate and getting used to symptoms, receiving family support and practicing meditation or praying or performing religious activities.

Our findings suggested that nurses should enhance patients' various skills, both in adherence to medical regimens and non-pharmacological strategies in managing multiple symptom distress among persons with chronic obstructive pulmonary disease. Further study should address the development and testing of a nursing intervention that combines various strategies for relieving symptom clusters.

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Introduction

The incidence of chronic obstructive pulmonary disease (COPD) is rising throughout the world. Approximately 11.4 million people in the United States and millions more throughout the world are affected.¹ In Thailand it was ranked as the fifth leading cause of death with a mortality rate of 42.9 per 100,000.² Persons with COPD always suffer from multiple concurrent symptoms that are caused by the narrowing of the airways, which is a potentially fatal

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progression.^{3,4} This suffering takes a longer time than for persons with other chronic diseases, even cancer.⁵ Furthermore, persons with COPD have a high rate of visiting emergency rooms after discharge from hospital mostly due to the distress of symptom exacerbation, especially respiratory difficulty.⁶ Distress from symptoms has a high negative impact on the quality of life.^{3,7} Thus, helping persons to manage various symptoms at home is essential to reduce the cost of care and increase the quality of life. To achieve this goal, an understanding of symptoms distress as a cluster and a set of effectiveness management strategies for each cluster is necessary. Although several prior studies reported the effectiveness of each strategy for each symptom management,⁸⁻¹¹ little is still known regarding the various strategies used for management in each symptom cluster and only one study reported for symptom cluster.¹²

Conceptual framework and related literature

The Symptom Management Model (SMM)¹³ was used to guide this study. This model is composed of three interrelated concepts: symptom experiences, symptom management strategies, and symptom status outcomes. The two major concepts of symptom experience and symptom management strategies were used. Symptom experience is the person's perception and evaluation through the cognitive process and emotional beliefs about the symptom, its cause and influence on their lives, and how to intervene.¹³ Symptom response, one component of symptom experience and described as symptom distress in this study, refers to response to symptom occurrence by changing physical, psychological, emotional, and behaviors which leads to a troublesomeness of individual's life.¹³

COPD refers to a large group of lung diseases characterized by persistent airflow limitation that

interferes with normal breathing that emphysema and chronic bronchitis are the most important conditions develop to COPD and they frequently coexist.¹ Persons with COPD are usually faced with a number of distressing symptoms occurring at the same time,⁴ for instance, dyspnea/breathlessness, fatigue, coughing, sleep difficulty, anxiety, or depressed mood.^{3,4} It appears that these symptoms may cluster together or reciprocally influence each other.¹⁴ Symptom cluster is defined as three or more concurrent symptoms that are related to each other, and may or may not have a common etiology by distributing common variance, or by producing different outcomes than individual symptoms alone.¹³ Various studies revealed an association between multiple symptoms occurring in persons with COPD. For instance, breathlessness was found strongly correlated with fatigue,^{15,16} sleep difficulties,¹⁵ anxiety and pain.¹⁶ Fatigue was also reported to be associated with sleep difficulties.¹⁶ It seems that these concomitant symptoms may group together as a cluster, thus, to identify cluster of symptom distress, exploratory factor analysis can be used to explain the complex relationships of consistent concurrent symptoms based on the matrix of correlation coefficients between the symptoms.¹⁷

Research in relation to symptom cluster in persons with COPD is limited. There is only one study¹² which explored and found three clusters of severity: cluster 1 (pain, feeling nervous, numbness and tingling in the hands and feet, difficulty sleeping, shortness of breath, feeling sad and worrying): cluster 2 (lack of energy, cough, dry mouth, feeling drowsy, feeling bloated, sweats, and dizziness): and cluster 3 (problems with urination and constipation). However, the tool used in this study was not specific for COPD symptoms. In addition, in Thailand, a study of symptom cluster has been found only in persons with cancer.^{18,19}

Symptom management is usually triggered by symptom distress.¹³ This begins when experiencing

symptoms that are troublesome to their persons' lives, thereafter, identifying the appropriate intervention strategies which target to relieve the distress and increase quality of life.¹³ Management strategies in this study included both pharmacological and non-pharmacological methods used by persons with COPD. Several studies reported the effectiveness of each strategy for each symptom management, for example; relieving dyspnea/ breathlessness, strategies such as pulmonary rehabilitation,⁸ yoga therapy,⁹ use of handheld fan.¹⁰ Interventions for reducing fatigue were pulmonary rehabilitation²⁰ or breathing exercises.²¹ Meanwhile, the interventions for preventing psychological symptoms, such as nurse-led minimal psychological intervention²² or the use of sense of humor and laughter¹¹ were applied. It seems that each strategy could be used for many symptoms such as; pulmonary rehabilitation which can be used for management of dyspnea/ breathlessness⁸ and fatigue.²⁰ However, there is no report on various strategies to manage a group of concurrent symptoms at the same time, since there are limited studies related to symptom clusters in persons with COPD. To fill the gaps, this study aims to explore symptom distress, symptom clusters, and effective management strategies used for each cluster in persons with COPD. The findings will benefit individuals and families to effectively manage various symptoms at home to reduce the cost of care and increase persons' quality of life.

Methods

Design: A cross-sectional descriptive design was used in this study.

Ethical Considerations: Approval for conducting this study was obtained from the Institutional Review Board (IRB) of Mahidol University and the research ethics committee of the hospitals used as the study sites. The Protocol number is ID 04-55-33. All participants were informed regarding: the study's

purpose; assurance of privacy and confidentiality; their right to withdraw from the study without penalty or effect on their treatment; and the usefulness of the study outcome. Those agreeing to participate were asked to sign a consent form.

Sample and Setting: The sample size was obtained from the study size for exploratory factor analysis, which was to include five times the number of 54 in the assessment form, thus, the estimated number was approximately 270. Even though 270 potential participants were approached, only 250 were willing to participate in the study. The number of 250 was adequate to determine symptom cluster and showed a high Kaiser-Meyer Olkin (KMO=.904) measure of sampling adequacy.¹⁷ Thus, the sample size used in this study was 250.

The participants, confirmed as having COPD by a physician, and able to follow up at respiratory clinics in one university hospital and one provincial hospital during July 2012 to September 2013. After reviewing medical records, we decided our purposive sample was inclusive of those: (1) aged 35 years or older (since most of COPD start from age 40,²³ thus, we identified the age of 35 as a lowest age which could be possible for this group); (2) willing to participate; (3) and able to speak, read and write in Thai. Such participants were invited into the study by the first author.

Instruments: The instruments for data collection were; 1) Personal Information Questionnaire, 2) The Bronchitis Emphysema Symptom Checklist, and 3) Symptom Management Strategies Questionnaire.

The Personal Information Questionnaire (PIQ) is composed of two parts. The first part requests general information including age, gender, marital status, religion, education level, occupation, household income, adequacy of income and living expenses, eligible medical expenses, number of children, type

of dwelling, history of cigarette smoking and liquor drinking, and the main caregiver in family. The second part is used to obtain information related to the health status recorded in the medical chart, which is composed of weight, height, body mass index (BMI), co-morbidity diseases, duration of being confirmed having COPD, medication use, level of disease severity, and the use of oxygen therapy.

The Bronchitis Emphysema Symptom Checklist (BESC) is a 57-item questionnaire developed by Kinsman and colleagues²⁴ to measure symptoms, sensation, and feeling. This tool is in the public domain and has never been used in Thailand. Thus, it was translated to the Thai language based on the process of translation by the World Health Organization (WHO).²⁵

Firstly, forward translation into Thai language was done by one author and verified by a second author. Secondly, three bilingual nursing instructor panels, one specializing in COPD and two specializing in chronic care, validated the translation. Thirdly, back-translation to English was done by a Thai instructor who earned a doctoral degree in language education in the USA and did not have any knowledge about the BESC. Comparing the back translation and the original version it was found that 50 items of the 57 items matched, whereas, the remaining 7 items of the BESC were quite similar in meaning. Lastly, pre-testing was carried out with 15 Thais with COPD and it was found that the respondents could understand and describe the meaning of symptoms.

Since the original version of the BESC included the dimension of symptom frequency, a dimension of symptom distress was added into this tool by applying a 5-point scale ranging from 1 to 5 (1 = not at all, 2 = a little bit, 3 = somewhat, 4 = quite a bit, and 5 = very much). Higher scores indicate more distress of symptoms. This dimension was verified in content validity by three experts specialized in COPD, who were two nursing instructors and one Advanced

Practice Nurse (APN), and yielded a scale content validity index (S-CVI) of .92. Moreover, two experts suggested removing 4 redundant items, which were: tired, chest congestion, irritable and forgetting things, and added 1 item, which was; pain in other regions. Thus, the total number of this tool is 54 items. The internal consistency reliability testing of the BESC was undertaken in the pilot study with 10 persons with COPD. Cronbach's alpha was .92 and .95 for symptom prevalence and distress, respectively. For this main study, they were .92 and .96, respectively.

The Symptom Management Strategies Questionnaire (SMSQ) was developed by the researchers based on the literature review regarding both pharmacological and non-pharmacological management strategies to relieve or get rid of the distressing symptoms in persons with COPD. Content validity was verified by five experts specialized in COPD and symptom management (three nursing instructors, one COPD APN, and one physician specialized in COPD). The S-CVI was .89.

For the pharmacological management part, most drugs used for persons with COPD consisted of; bronchodilators, inhaled corticosteroids, tricyclic antidepressants (amitriptyline), minor tranquilizer (aplazoram), analgesic drugs (e.g. paracetamol, NSAID), and mucolytic. In this part, data was initially obtained from medical records as basic information and then the participants were asked what drug prescribed by physicians they actually used. Moreover, a blank space was provided which could be filled in by the participants for other medications used, which were not included in the list.

In the non-pharmacological part of management, the strategies included lists of: respiratory muscle strengthening, oxygen supplementation, nutritional management, reducing risk factors, adjusting lifestyle, relaxation methods, psychological enhancement, and support from families. As in

medication management, other non-pharmacological methods could be added apart from the lists.

To obtain management strategies used and their effectiveness for each symptom cluster, the researchers carried out the following steps: 1) The participants were asked the type of action in the questionnaire they used, and for what symptom distress. 2) After that, the participants rated the effectiveness of reported management strategies by using 5 responding choices (getting rid of symptoms=5, relieved symptoms=4, remaining symptoms=3, uninterpretable=2, and worsen symptoms=1) for each symptom. 3) If they used one management strategy for more than one symptom, they also rated the effectiveness for other symptoms. 4) If they listed other symptoms outside the listed, they would also be asked the same as the symptom on the listed. 5) The researcher calculated the score of effectiveness of one strategy for one symptom by summing up total score dividing by the number of participants. A higher score means higher effectiveness. 6) Then, all strategies were grouped according to each symptom distress cluster.

Data Collection: Before approaching the participants, the researcher collected information regarding their health status in their medical record. Those willing to participate in the study were invited to a private room near the respiratory clinics, and the purposes and methods of the study were explained including ethical considerations. Informed consent was then gained from all participants and they were asked to fill in the general data in the PIQ. They completed the BESC and SMSQ by themselves over \approx 30–45 minutes. In case the participants needed assistance due illiteracy, visual problems or other reasons, the questionnaires were read to them, and verbal response obtained and written by the researcher on the tools. One-hundred and sixteen persons (46.4%) required this assistance. All questionnaires were examined carefully to ascertain data completeness and

then coded with a number and kept in a locked cupboard.

Data Analysis: Descriptive statistics were used to determine symptom prevalence, and distress including type of actions and effectiveness of management strategies for each symptom cluster. A Principal Component Factor (PCF) with a Varimax (orthogonal) rotation was carried out to investigate symptom cluster.

Results

Demographic characteristics: Participants ranged in age from 51–91 years, with a mean of 71.03 (SD=7.06). Two-thirds of them were male (67.2%). Most were Buddhist (n=231; 92.4%); 63.2% (n=158) had primary school education; 75.6% (n=189) had adequate income for their living expenses; and 48.0% (n=120) had a monthly income of approximately 5,000–10,000 Baht. As for the health care cost, the Thai universal health coverage scheme was used by 61.6% (n=154). There were 32.4% (n=81) participants living with a spouse, and about 20.4% (n=51) needed a main caregiver. For clinical characteristics, almost half of the participants were underweight, and 45.6% had no history of drinking alcohol, but 88.0% (n=220) were past smokers and 4.00% (n=10) still smoked. Half of them had co morbidity diseases and hypertension. Regarding the severity of COPD based on GOLD criteria, the majority were in stage II: 45.6% having an $FEV_1/FVC < 0.7$; 50% $\leq FEV_1 < 80\%$ predicted with shortness of breath typically developing on exertion, or in stage III (43.2%) having an $FEV_1/FVC < 0.7$; 30% $\leq FEV_1 < 50\%$ predicted with greater shortness of breath and reduced exercise capacity. And 24.40% (n=61) of the participants needed oxygen therapy at home. The details of characteristics are shown in Table 1.

Table 1 Demographic and clinical characteristics of the participants (n=250)

Demographic		N	%	Clinical		N	%
Gender				Body Mass Index (BMI) (kg/m²)			
Male		168	67.20	Range	12.91-26.14		
Female		82	32.80	Mean	18.72		
Age (years)				S.D.	2.12		
Range	51-91			Underweight (< 18.50)		125	50.00
Mean	71.03			Normal (18.50-24.99)		119	47.60
S.D.	7.16			Overweight (25.00-29.99)		6	2.40
Marital Status				Obese (> 30.00)		0	0
Single		11	4.40	History of cigarette smoking			
Married		148	59.20	Never		20	8.00
Widow/Divorced/Separate		91	36.40	Past smoker		220	88.00
Religion				Current smoker		10	4.00
Buddhist		231	92.40	Co-morbid Conditions			
Christian		9	3.60	None		108	43.20
Others		10	4.00	Yes		142	56.80
Education				Hypertension		84	33.60
Uneducated		29	11.60	Ischemic Heart Disease		61	24.40
Primary school		158	63.20	Diabetes Mellitus		42	16.80
High school		32	12.80	Gouty arthritis		56	22.40
Vocational school		18	7.20	Osteoporosis		10	4.00
Bachelor's degree		13	5.20	GI Ulcer		36	14.40
Occupation				GOLD disease severity			
Unemployed		115	46.00	Stage I		19	7.60
Merchant		24	9.60	Stage II		114	45.60
Farmer		38	15.20	Stage III		108	43.20
General employee		33	13.20	Stage IV		9	3.60
Civil servant/state enterprise		8	3.20	Oxygen Therapy at home			
Company /private officer		3	1.20	Not used		189	75.60
Others		29	11.60				

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Symptom prevalence and distress: The participants reported a number of symptoms from 13 up to 51. The most common of those occurring in all participants were: fatigue, short of breath, shallow breathing, exhaustion, mucous congestion, coughing, worried about getting air, and ‘feeling like I need air’

(100%). Meanwhile, they experienced a high level of distress in many symptoms, including: finding it hard to breathe, fatigue, being short of breath, shallow breathing, and exhaustion. These were rated as the most distressful symptoms. Symptom prevalence and distress in ranked order are shown in Table2.

Table 2 Rank of frequency in symptom prevalence, and means of symptom distress (n=250)

Symptom	Prevalence N (%)	Distress Mean
Fatigue	250(100.0)¹	4.32 (SD=0.55) ²
Short of breath	250(100.0)¹	4.28 (SD=0.47) ³
Shallow breathing	250(100.0)¹	4.28 (SD=0.46) ³
Exhaustion	250(100.0)¹	4.28 (SD=0.53) ³
Feel like I need air	250(100.0)¹	3.89 (SD=0.69) ⁷
Mucous congestion	250(100.0)¹	3.84 (SD=0.46) ⁸
Coughing	250(100.0)¹	3.49 (SD=0.54) ¹⁰
Worried about getting air	250(100.0)¹	3.04 (SD=0.63) ¹⁴
Hard to breath	249(99.60) ⁹	4.56 (SD=0.59)¹
Chest filled up	248(99.20) ¹⁰	3.91 (SD=0.58) ⁶
Chest tightness	246(98.40) ¹¹	3.82 (SD=0.66) ⁹
Poor Sleep	235(94.00) ¹²	3.15 (SD=0.98) ¹¹
Leg aches	234(93.60) ¹³	3.10 (SD=1.02) ¹³
No energy	229(91.60) ¹⁴	2.73 (SD=1.03) ¹⁷
Disturbed sleep	227(90.80) ¹⁵	2.94 (SD=1.06) ¹⁶
Trouble falling asleep	227(90.80) ¹⁶	3.00 (SD=1.12) ¹⁵
Numbness	212(84.80) ¹⁷	1.78 (SD=0.99) ²¹
Cramps	201(80.40) ¹⁸	2.32 (SD=1.25) ¹⁸
Edgy	189(75.60) ¹⁹	1.30 (SD=0.97) ²³
Wheezing	188(75.20) ²⁰	3.14 (SD=1.84) ¹²
Weak	182(72.80) ²¹	1.97 (SD=1.47) ²⁰
Poor appetite	166(66.40) ²²	1.60 (SD=1.22) ²²
Forgetful	152(60.80) ²³	1.13 (SD=1.02) ²⁶
Upset	145(58.00) ²⁴	1.14 (SD=1.11) ²⁵
Lonely	137(54.80) ²⁵	1.06 (SD=1.18) ²⁹
Pins and needles feeling	134(53.60) ²⁶	1.14 (SD=1.12) ²⁴
Difficulty remembering	133(53.20) ²⁷	1.08 (SD=1.09) ²⁸
Gasping for breath	115(46.00) ²⁸	2.04 (SD=2.24) ¹⁹
Forget recent things	110(44.00) ²⁹	0.68 (SD=0.89) ³⁶
Poor memory	108(43.20) ³⁰	1.04 (SD=1.26) ³⁰

¹⁻³⁰ = ranking of symptom prevalence and distress, the first ranking of two dimensions are bolded

Symptom cluster: the Kaiser–Meyer Olkin measure of sampling adequacy showed a factorable (KMO= .904). Clusters of symptom distress were formed into seven clusters, labeled as: emotional problems, memory function decline, respiration difficulty, fatigue related disease, sleep alteration,

pain and unpleasant sensation, and respiratory muscle weakness. The three remainder clusters could not be detected in the interrelationship between symptoms since they included less than three symptoms within their clusters. The detail is presented in Table 3.

Table 3 Orthogonal rotated component loadings for symptom cluster in distress

Component	Cluster Label	Symptom	Factor loading	Eigen values	Percentage of total variance
1	Emotional problems (24 symptoms)	Feel like a cripple	.929	20.94	38.78
		Panicky	.928		
		Anxious	.883		
		Feel guilty	.876		
		Feel like an invalid	.873		
		Want to die	.872		
		Feel like giving up	.855		
		Feel helpless	.845		
		Feel hopeless	.832		
		Disinterested in things	.829		
		Unable to enjoy others	.820		
		Things smell differently	.788		
		Frightened	.774		
		Disinterested in food	.751		
		Touchy	.750		
		Embarrassed	.748		
		Scared	.712		
		Lonely	.698		
		Short tempered	.695		
		Edgy	.667		
		Upset	.660		
		Worried about getting air	.585		
		Feel like I need air	.445		
		Poor appetite	.416		

Table 3 Orthogonal rotated component loadings for symptom cluster in distress (Continued)

Component	Cluster Label	Symptom	Factor loading	Eigen values	Percentage of total variance
2	Memory function decline (7 symptoms)	Forget recent things	.851	4.55	7.881
		Poor memory	.808		
		Forgetful	.794		
		Difficulty remembering	.791		
		Coughing	.578		
		Get confused	.520		
		Sleep heavily	.363		
3	Respiration difficulty (6 symptoms)	Short of breath	.794	3.137	5.180
		Shallow breathing	.787		
		Hard to breathe	.593		
		Gasping for breath	.471		
		Numbness	.448		
		Mucous congestion	.442		
4	Fatigue related disease (3 symptoms)	Exhaustion	.790	2.671	4.947
		Fatigue	.753		
		No energy	.587		
5	Sleep Alteration (3 symptoms)	Trouble falling asleep	.838	2.084	3.859
		Poor sleep	.835		
		Disturbed sleep	.741		
6	Pain and Unpleasant Sensation (4 symptoms)	Pins and needles feeling	.773	1.920	3.556
		Cramps	.744		
		Leg aches	.540		
		Pain in other region	.525		
7	Respiratory Muscle Weakness (3 symptoms)	Weak	.742	1.237	2.291
		Tingling in arms and legs	.436		
		Chest filled up	.426		

The most distressful symptoms in each of symptom cluster: Table 4 presents the first five cluster of symptom distress having a high level of distress, which were a cluster of respiration difficulty, fatigue

related disease, sleep alteration, pain and unpleasant sensation and emotional problems. Also, in each cluster demonstrated the symptoms which had a mean high score of distress level.

Table 4 The most distressing symptom in each symptom cluster ranked by the participants

Symptom	Rank	N	Mean of distress level	SD.
Cluster 1: Respiration Difficulty				
Hard to breathe	1	249	4.56	0.58
Short of breath	3	250	4.28	0.47
Shallow breathing	3	250	4.28	0.46
Mucous congestion	8	250	3.84	0.45
Gasping for breath	19	115	2.04	2.24
Cluster2: Fatigue Related Disease				
Fatigue	2	250	4.32	0.55
Exhaustion	3	250	4.28	0.52
No energy	17	229	2.73	1.03
Cluster 3: Sleep Alteration				
Poor sleep	11	235	3.15	0.98
Trouble falling asleep	15	227	3.00	1.12
Disturbed sleep	16	227	2.94	1.05
Cluster 4: Pain and Unpleasant Sensation				
Leg aches	13	234	3.15	1.02
Cramps	18	201	2.32	1.25
Pins and needles feeling	24	134	1.14	1.12
Pain in other region	27	83	1.09	1.57
Cluster 5: Emotional Problems				
Feel like I need air	7	250	3.89	0.69
Worried about getting air	14	250	3.04	0.63
Edgy	23	189	1.30	0.97
Upset	25	145	1.14	1.11
Lonely	29	136	1.06	1.18
Feel hopeless	31	73	0.91	1.48
Feel helpless	32	78	0.87	1.42

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Management strategy and effectiveness:
Various symptom management strategies, both pharmacological and non-pharmacological were used by the participants in each symptom cluster. The most effective strategies to manage cluster of respiration

difficulty were bronchodilator and the pursed lip technique. While, reducing activities and shortening of distance were the most effective to manage cluster of fatigue related disease. The overall detail is displayed in Table 5.

Table 5 Management strategy and effectiveness classified in each of symptom cluster

Management strategy used	N	Percent	Mean	SD.
Cluster 1: Respiration Difficulty				
(hard to breathe, short of breath, shallow breathing, mucous congestion, gasping for breath)				
Pharmacological strategy				
1. Brochodilator	250	100.0	3.78	0.71
2. Inhaled corticosteroid	240	96.00	3.32	0.72
3. Mucolytic	161	64.40	3.33	0.45
Nonpharmacological strategy				
1. Pursed lip technique	235	94.00	3.70	0.47
2. Effective cough training	42	16.80	3.50	0.58
3. Deep breathing exercise	164	65.60	3.21	0.47
4. Receiving influenza vaccination	129	51.60	3.14	0.78
5. Quitting cigarette smoking	218	87.20	3.01	0.68
6. Avoid inhaling smoke from garbage burning	242	96.80	3.01	0.76
7. Yoga exercise	7	2.80	3.00	0.46
8. Use handheld fan to cool face	20	8.00	3.00	0.86
9. Not contacting with heat and smoke from stove	188	75.20	2.95	0.64
10. Upper extremities exercise	110	44.00	2.91	0.58
Cluster 2: Fatigue Related Disease				
(fatigue, exhaustion, no energy)				
Pharmacological strategy				
1. Brochodilator	7	2.80	2.85	0.86
Nonpharmacological strategy				
1. Reducing activities	247	98.80	2.94	0.69
2. Shortening of distance	245	98.00	2.93	0.98
3. General exercise training	45	18.00	2.86	0.64
4. Chewing with slower, small piece	177	70.80	2.84	0.74
5. Shift from active to sedentary lifestyle	112	44.80	2.84	0.56

Table 5 Management strategy and effectiveness classified in each of symptom cluster (Continued)

Management strategy used	N	Percent	Mean	SD.
Cluster 3: Sleep Alteration				
(poor sleep, trouble falling asleep, disturbed sleep)				
<i>Pharmacological strategy</i>				
1. Alprazolam	30	12.00	3.26	0.47
<i>Nonpharmacological strategy</i>				
1. Listening songs or music	65	26.00	2.31	0.73
2. Meditation or prayer or performing religious activities	210	84.00	2.02	0.45
3. Reading books	85	34.00	1.95	0.97
Cluster 4: Pain and Unpleasant Sensation				
(leg aches, cramps, pins and needles feeling, pain at other regions)				
<i>Pharmacological strategy</i>				
1. NSAID	30	12.00	2.34	0.98
2. Paracetamol	30	12.00	2.21	0.87
<i>Nonpharmacological strategy</i>				
None				
Cluster 5: Emotional Problems				
(feel like I need air, worried about getting air, edgy, upset, lonely, feel hopeless, feel helpless)				
<i>Pharmacological strategy</i>				
1. Amitriptyline	25	10.00	2.00	0.76
<i>Nonpharmacological strategy</i>				
1. Fate acceptance and getting used to symptoms	220	88.00	3.17	0.57
2. Family support an emotional feeling	114	45.60	3.11	0.54
3. Meditation or prayer or performing religious activities	229	91.60	3.09	0.68
4. Self-talk	116	46.40	2.99	0.56
5. Listening songs or music	221	88.40	2.92	0.86

Discussion

With regard to the characteristics of the participants with COPD, the average age was 71.03, which is older adult. This result is consistent with the study by Oh and colleagues²⁶ which found the mean age of 68.2 year in individuals with COPD at the pulmonary clinics of seven Asian cities. For the clinical characteristics, most participants were ex-smokers (88.0%), as it is known that cigarette smoking is the major cause of COPD due to an exposure with the various harmful chemical agents in airways for a long period that gradually destroy them.¹ In addition, being underweight, which means a BMI of less than 18.5, was found in almost half of participants. This may be the consequence of an imbalance between increased energy expenditure and inadequate dietary intake in persons with COPD.²⁷ According to the GOLD criteria of severity, most were in grade II and III 45.6% and 43.2%, respectively. However, there were a few numbers of the participants, who were in stage IV, due to the study undertaken at the outpatient clinic, where the persons with stable condition were following up.

It is noteworthy that these factors (e.g. age, smoking, and underweight) may pose risks for persons with COPD being faced with multiple symptoms. From the Symptom Management Model, Dodd and associates⁸ stated that personal characteristics, such as older age, may affect the symptom experiences. Also, health and illness, one domain of nursing science, have related to the symptom experiences from persons' view. This study confirmed that smoking, severity of disease, and being underweight may have an impact on symptoms of difficulty breathing and fatigue.

The findings showed that persons with COPD experienced a vast number of both physical and psychological symptoms. Short of breath, shallow breathing, mucous congestion, coughing, fatigue, exhaustion, worried about getting air, and feel like I need air were symptoms that occurred in all participants

(100%). This was congruent with several studies conducted previously in various cultures which revealed that dyspnea/ shortness of breath/ breathlessness was the first ranking of symptom occurrence, following by fatigue/ lack of energy considered as the second order.^{3, 4}

For symptom distress, finding it hard to breathe, fatigue, shortness of breath, shallow breathing and exhaustion were the most distressful. The most distressing symptoms from this study were consistent with several prior studies.^{3,4} As expected, the most distressing symptoms occurring in these persons were symptoms regarding respiration difficulty. A possible explanation may be the pathophysiological mechanisms in COPD due to an inflammation for a long period that contribute to damage the airways and alveolar sacs, moreover, it can be prone to an exacerbation unexpectedly, which is triggered by a variety of factors.²⁸ Hence, an assessment of symptom distress should be emphasized primarily in consequence of its negative impacts contributing to substantially functional impairment and poor quality of life.³

The result showed a tenth-factor solution in clustering of symptom distress that accounted for 74.03% of variance. The first cluster had 38.42% of variance, which composed of 22 symptoms labeled as "emotional problems". This apparently pointed to emotional or psychological distress (e.g. want to die, feel helpless, feel hopeless, lonely, and fear) owing to being faced with an adverse effect from COPD progression that could contribute amply to decrease functional capacity, social isolation and impaired quality of life.²⁹

Cluster of memory function decline included forgetting recent events, poor memory, difficulty remembering, forgetful and getting confused. One possible explanation of memory dysfunction is hypoxemia in persons with COPD, which causes neuronal damage and affects an oxygen-dependent enzyme that plays a vital role in neurotransmitter

synthesis.³⁰ However, this may overlap with the aging process that also causes a gradual decline in cognitive function.

The third cluster is respiration difficulty, a major concern due to its powerful distress. As expected, COPD causes inflammation in airways and lung function impairment resulting in an abnormality of breathing pattern that presents with hard to breath or shallow breathing or short of breath or gasping for breath. This finding is different from another study⁷ in that multiple symptoms were grouped across clusters. Differences in dimension, statistical method selected to cluster and use of various instruments may account for this disparity.

The fourth cluster labeled as fatigue related disease, included exhaustion, fatigue, upset and no energy. These symptoms were closely related to each other and were rated by the participants as a high level of distress. This finding is similar to a prior study, which found a higher prevalence, more distress than in normal subjects and which lead to decreased exercise capacity and functional limitation.³¹

The mechanisms of fatigue in persons with COPD are very complex and may arise from energy imbalances, which are excessive energy demand and insufficient energy supply.^{31,32} Due to a bronchospasm, reduction of bronchial diameter, and hyperinflation with bronchial compression at expiration, these lead to excessive bronchopulmonary resistance and increase in work of respiratory muscle resulting in ultimately more need of energy consumption.³² Insufficient energy supply may arise from three steps, which are impairment of oxygen supply, decreasing of blood supply to muscle fiber, and muscle incompetence of energy utilization.³² Moreover, COPD may induce an elevation of c-reactive protein, fibrinogen, circulating leukocytes and pro-inflammatory cytokines, including tumor necrosis factor- α (TNF α), interleukin-8 (IL8), IL6, soluble TNF receptors 55 (sTNF-R55) and 72 (sTNF-R75) in blood circulation, which

contributes to negative impacts on dietary intake and mainly takes a role in decreasing of muscle protein synthesis and increasing of protein degradation in skeletal muscle mass, in particular respiratory muscle, until weight is lost.²⁷ This can help explain that the participants suffer from not only respiratory symptoms but also fatigue, malnutrition and finally weight loss, and that is confirmed by the finding of this study where almost a half participants were underweight and had a high level of distress in the fatigue cluster.

The fifth cluster was sleep alteration in persons with COPD, which included: poor sleep, trouble falling asleep, and disturbed sleep. Considerable factors relating to this alteration were: cough, dyspnea, nocturnal oxygen desaturation, hypercapnia, degree of airway obstruction and medication side effect.³³ A high prevalence of sleep problems among persons with COPD is also associated with severity of dyspnea, poorer health status, and poor quality of life.³³

Pain and unpleasant sensation (pins and needles feeling, cramps, leg aches and pain at other regions) is a symptom cluster that also includes an unusual prickling sensation that can happen in any part of body. The cause of pain in persons with COPD may be due to systemic inflammation, central adaptations related to pain and dyspnea and respiratory muscle impairment due to hyperinflation.³⁴ Such pain in COPD is likely to increase in prevalence and distress leading to disturbance of functional ability, however, this pain is still overlooked and underestimated by health care professionals.^{9,11} It may be explained within the mechanism of peripheral neuropathy. The prolongation of airway obstruction causes ventilation-perfusion mismatch and hyperventilation contributing to hypoxia and resulting in reduced transport of oxygen to peripheral nerve tissue, finally, nerve fiber damage and impairment in the nerve conduction.³⁵ Moreover, cigarette smoking and malnutrition are also claimed as the cause of neuropathy in persons with COPD.³⁵

The last clustering of respiratory muscle weakness is composed of three symptoms, weakness, tingling in the arms and legs, and chest filling that seem not related to each other. However, this phenomenon may be explained by the pathophysiology of COPD disease progression. As a consequence of airflow limitation due to narrowed-airway and abundant mucous production, and loss of lungs elastic recoil, there is an increase in airway resistance and lung hyperinflation, causing incomplete expiration.³⁶ From these mechanisms, the persons with COPD may develop a feeling of their chest being filled up or tightness, and must generate a higher workload for the respiratory muscles during each expiration.

It can be seen that all symptom clusters found in this study consisted of multiple symptoms which are closely related each other. This may be due to the symptom assessment tool, the BESC. Although it was developed with the persons with COPD, some items are somewhat similar as well as ambiguous in meaning. Thus, it should be refined to accurately measure symptom occurrence in a further study.

Since the potentially negative impact of the distressing symptoms leads to a lower quality of patients' life³, this should be primarily addressed for effective management. Both drug and nondrug management strategies were used in the cluster of respiration difficulty which showed the highest level of distress. The most effective strategies included bronchodilator, purse lip technique and effective cough, inhaled corticosteroid and mucolytic management. Bronchodilators act by relaxing airway smooth muscle tone together with preventing smooth muscle contractions.³⁷ Also, inhaled corticosteroid was used to reduce an inflammation in airway

The most effective of nondrug methods used included the pursed lip technique and effective cough training. The pursed lip technique provides improvement in dyspnea and increases walking endurance.³⁸ This method results in protection of airway collapse by increasing positive expiratory pressure. Also,

effective cough training can help expel abundant phlegm. Other strategies rated effective at a moderate level included deep breathing exercise, receiving vaccination for influenza, and quitting smoking. These techniques are recommended to nursing and medical practice, in particular, smoking cessation, as this has been confirmed as effective in respiratory symptom relief and prevent lung function impairment.³⁹

Due to a close association between clusters of respiration difficulty and fatigue related-disease, management strategies were also rated resembling a score of effectiveness. The participants reported strategies used to eliminate or alleviate both symptom clusters simultaneously: reducing activities, shortening walking distance, and shifting from active to sedentary lifestyle, could be regarded as an energy conservation technique in order to decrease unessential oxygen consumption through body due to gas exchange impairment.⁴⁰

Taking alprazolam was rated as the most effective for the cluster of sleep alteration, whereas the non-drug strategies showed a rather low score of effectiveness. One possible explanation might be due to factors associated with sleep alteration, such as cough, dyspnea, and hypercapnia, which may not be adequately and directly managed. Only non-drug strategies did not improve sleep problems in ways to manage associated factors. Another possible explanation might be that the sleep problem was paid less attention due to considering its impact, from participants' and health care providers' views.

For clustering pain and unpleasant sensation, management strategies used were taking NSAID and paracetamol with moderate effectiveness. Interestingly, only 30 participants reported taking medication, while the non-drug strategy was not used. Although, a finding of this study showed a high prevalence of pain symptoms with moderate distress level, symptom management seems to be inadequate to control or alleviate pain. Thus, there should be a greater concern for pain assessment and management.

Non-drug methods were more effective than taking medication in relieving the cluster of emotional problems. The most effective strategies were: acceptance of fate and getting used to symptoms, emotional support from family, and prayer or performing religious activities. It may be explained that fate acceptance and getting used to symptoms refers in the Thai language to *Tham Jai* [have to accept a symptom occurrence and move on] or *Plong* [to take it on the chin and decide to face it], in which participants tried to cope and live with their disease in an inevitable fashion, and do the best for themselves. This was a simple method that helped the participants feel better. Also, emotional support from family was an important resource. Prayer or performing religious activities were also used to relax and create a peaceful mind.

Limitations

This study has several limitations related to the study population, methodology and measurement tool that needs to be taken into consideration. Firstly, the findings may not be generalizable to Thais with COPD in other regions of the country, since all participants came from only one province in the north of Thailand. As well those participants with a high level of disease severity did not attend at COPD clinics. Secondly, it took approximately 30–45 minutes to complete questionnaires, which might be too long for some persons who were elderly and more likely to be fatigued.

Conclusions and Implications for Nursing Practice

The findings from this study revealed that persons with COPD experienced multiple co-existing symptoms which were grouped together as a cluster with a high level of distress. In addition, they used a variety of management strategies to relieve the distressing from clusters of symptoms. Nevertheless,

there are some recommendations for implications for both practice and future research.

For nursing practice, nurses should pay more attention to symptom assessment, management of pain and sleep problems together with other symptoms as a cluster, although, respiration difficulty is a major group of distressing symptoms and usually received more attention in this study. Also, many pharmacological and non-pharmacological strategies were found to be effective in symptom management; however, these are very complex in techniques and needed to be practiced continuously. Thus, APN may be appropriate for case management in Thailand to enhance patients' skills in both adherence to medical regimen and non-pharmacological strategies in management of multiple distressing symptoms. These contribute to reducing in health care cost of readmissions as well as increasing quality of persons' life. Moreover, the issue of improvement in nutritional status should be emphasized since almost a half of the participants were underweight.

For future nursing research, based on the preliminary data in which a group of management for each of distressing cluster, a study should emphasize on the development and testing the effectiveness of the combination of management strategies for symptom cluster. This practical intervention helps persons and their families to effectively and comprehensively manage co-existing distressing symptoms. It seems that the duration of being COPD and severity of disease may influence symptom experiences, thus, studying these factors associated with symptoms should be done. Symptom assessment among Thais with COPD should be refined more specifically to measure accurately and appropriately within this context. Lastly, studying the relationship between nutritional status and symptom distress needs to be explored. Basic knowledge may provide a better understanding of this phenomenon that can contribute to developing an intervention to improve nutritional status and alleviate symptom distress among person with COPD.

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อาการที่ทุกข์ทรมาน กลุ่มอาการ และวิธีการจัดการในผู้ป่วยโรคปอดอุดกั้นเรื้อรัง

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บทคัดย่อ: การศึกษาเชิงบรรยายครั้งนี้วัตถุประสงค์เพื่อสำรวจอาการที่ทุกข์ทรมาน กลุ่มอาการและวิธีการจัดการกับกลุ่มอาการของผู้ป่วยโรคปอดอุดกั้นเรื้อรัง กลุ่มตัวอย่างเป็นผู้ป่วยโรคปอดอุดกั้นเรื้อรังจำนวน 250 คนที่มีคุณสมบัติตามเกณฑ์ที่กำหนด เครื่องมือที่ใช้ได้แก่ แบบบันทึกข้อมูลส่วนบุคคล แบบประเมินอาการ และแบบบันทึกวิธีการจัดการกับอาการและประสิทธิภาพ

ผลการศึกษาพบว่ากลุ่มตัวอย่างมีประสบการณ์การเผชิญในหลายอาการ กลุ่มอาการที่ทำให้เกิดความทุกข์ทรมานเรียงตามลำดับเกิดขึ้น 7 กลุ่มได้แก่ 1) ความลำบากในการหายใจ 2) ความอ่อนล้า 3) การนอนหลับเปลี่ยนแปลง 4) กลุ่มอาการปวดและเปลี่ยนแปลงการรับรู้ความรู้สึก 5) ความเจ็บปวดทางอารมณ์ 6) ความจำลดลง และ 7) กล้ามเนื้อหายใจอ่อนแรง การจัดการที่มีประสิทธิภาพกับกลุ่มอาการที่มีความทุกข์ทรมาน มีดังนี้ กลุ่มอาการหายใจลำบาก: การใช้ยาขยายหลอดลมมีประสิทธิภาพมากที่สุด ตามมาด้วยการ เป่าปากหายใจ ไออย่างมีประสิทธิภาพ และการหายใจเข้าออกลึกช้า สำหรับกลุ่มอาการเหนื่อยล้า: การใช้ยาขยายหลอดลม เทคนิคสงวนพลังงานและการออกกำลังกายทั่วไปเป็นวิธีการที่ช่วยลดความทุกข์ทรมานได้ การใช้นอนหลับ ฟังเพลง การสวดมนต์และปฏิบัติกิจกรรมทางศาสนา และอ่านหนังสือ ช่วยลดความทุกข์ทรมานสำหรับกลุ่มอาการการนอนหลับ การใช้ยาแก้ปวดช่วยลดความทุกข์ทรมานได้ในกลุ่มอาการปวดและเปลี่ยนแปลงการรับรู้ความรู้สึก สำหรับกลุ่มอาการเจ็บปวดทางอารมณ์ วิธีการที่ใช้ ได้แก่ การใช้ยาคลายกังวล การยอมรับในโชคชะตาและทำความเข้าใจกับอาการ ได้รับกำลังใจจากครอบครัว การสวดมนต์และปฏิบัติกิจกรรมทางศาสนา

ผลการศึกษานี้มีข้อเสนอแนะให้พยาบาลส่งเสริมผู้ป่วยมีทักษะในการใช้ยาได้อย่างถูกต้อง และต่อเนื่องร่วมกับการใช้วิธีการที่ไม่ใช้ยาเพื่อจัดการกลุ่มอาการที่ทุกข์ทรมานได้อย่างมีประสิทธิภาพ การศึกษาครั้งต่อไปควรเน้นการพัฒนาและทดสอบโปรแกรมที่ผสมผสานระหว่างวิธีการที่หลากหลายในการจัดการกลุ่มอาการที่ก่อให้เกิดความทุกข์ทรมานให้มีประสิทธิภาพสำหรับผู้ป่วยโรคปอดอุดกั้นเรื้อรัง

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คำสำคัญ: อาการที่ทุกข์ทรมาน, กลุ่มอาการ, วิธีการจัดการ, โรคปอดอุดกั้นเรื้อรัง

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