Improving breathlessness and fatigue in patient with COPD

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ABSTRACT: Dyspnea (shortness of breathing) and fatigue are the two most common symptoms experienced by patients with COPD. **Aims:** The aim of this study was to assess the effect of breathlessness and fatigue management guidelines on breathlessness and fatigue among the patients suffering from COPD**. Subjects and Methods:** A purposeful sample of 50 adult patients was selected from the respiratory disease clinic at Ain Shams University Hospital. **Tools for data collection:** Patient's assessment and clinical data sheet, patient's breathlessness and fatigue knowledge questionnaire, Patients' practices observational checklists, Modified Borg Scale (MBS), Medical Research Council (MRC) breathlessness scale, The Multidimensional Fatigue Symptom Inventory Short Form (MFSI-SF) and Hospital anxiety and depression scale (HADS) were used to collect data. **Results:** All of the studied patients had unsatisfactory knowledge and the minority of them had unsatisfactory practices regarding dyspnea and fatigue management before educational guidelines intervention, which improved after guideline intervention with a highly significant differences. Also, the breathlessness, fatigue and anxiety improved in patients with COPD who received breathlessness and fatigue management guidelines. **Conclusions:** Implementation of breathlessness and fatigue management guidelines had improved patients' level of knowledge, practices, dyspnea, dimensions of fatigue and anxiety level. **Recommendations:** Conducting comprehensive health education programs for patients with COPD in outpatients' clinics with simplified printed guidelines through leaflets or brochures explaining how to prevent and control breathlessness and fatigue and Further evaluation of the effect of strategies to prevent and ameliorate breathlessness and fatigue intensity and distress responses in larger sample of COPD patients in order to generalize the results.

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Key words: shortness of breath; fatigue; COPD.

1- Introduction

Chronic obstructive pulmonary disease (COPD) is one of the important chronic diseases. COPD is defined as "a disease state characterized by airflow limitation that is not fully reversible. The airflow limitation is usually both progressive and associated with an abnormal inflammatory response of the lungs to noxious particles and gases. It results from the airway narrowing and loss of elastic recoil that result from these pathologic processes. **(The Global Initiative for Chronic Obstructive Lung Disease [GOLD], 2005).** Airflow obstruction usually accompanied with symptoms such as chronic cough, exertion dyspnea, fatigue, expectoration, and wheeze. COPD is a significant disease which affects the individual physically, emotionally, and socially and leads to an increase in the social support needs of the patients **(Aras et al., 2009).**

COPD is a preventable disease. The primary cause of COPD is tobacco smoke (including second-hand or passive exposure). Other risk factors include: indoor air pollution (such as solid fuel used for cooking and heating); outdoor air pollution; occupational dusts and chemicals (vapors, irritants, and fumes); frequent lower respiratory system infections during childhood. Total deaths from COPD are projected to increase by more than 30% in the next 10 years unless urgent action is taken to reduce underlying risk factors, especially tobacco use. COPD was more common in men, but because of increased tobacco use among women in high-income countries, and the higher risk of exposure to indoor air pollution in low-income countries, the disease now affects men and women almost equally.

Almost 90% of COPD deaths occur in low- and middle-income countries, where effective strategies for prevention and control are not always implemented or accessible **(the World Health Organization [WHO], 2013).** The prevalence of COPD in Middle East and North Africa seems to be lower than that reported in industrialized countries. Under reporting and risk factors other than smoking may contribute to this difference **(Tageldin et al. 2012).**

COPD is an international health problem with a worldwide prevalence of at least 9.34/1000 in men and 7.33/1000 in women. It is the fourth leading cause of death worldwide **(WHO, 2011)** and will be the third leading cause of death globally by 2020 and it will be the fifth leading cause of lost disability-adjusted life years **(Tkacova, 2010).** According to **Statistics by Country for COPD, (2013)** the

extrapolation of undiagnosed prevalence rate of COPD in Egypt is 4,197,651 and the diagnosed prevalence rate in Egypt is 3,777,886. It was estimated that 80 million people worldwide have moderate to severe COPD. COPD symptoms and exacerbation are responsible for considerable healthcare consumption, with high levels of physician consultation and hospitalization **(Khattab et al., 2012 & Idrees et al., 2012).**

The diagnosis and definition of COPD severity was established in accordance with the Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines **(Lotte, et al., 2006 as cited in Abdel Raouf, & Al Sebaee, 2011).** GOLD stage 0 (patient at risk) is diagnosed when patients report chronic cough and sputum production whilst their lung function is still normal In GOLD I, Mild COPD, there may be mild airflow limitation but patient may be unaware that lung function has started to decline. Forced expiratory volume in one second (FEV1) will be greater than or equal to 80% of the predicted normal values with an FEV1/FVC (forced vital capacity) that is less than 70 percent. patient may not yet have any COPD symptoms, or may have symptoms of chronic cough and excessive mucus. During GOLD II, Moderate COPD, airflow limitation worsens and patient may start to notice symptoms, particularly shortness of breath upon exertion along with cough and sputum production. FEV1 will be anywhere between 50% and 79% of the predicted normal values and FEV1/FVC will be less than 70 percent. Once the disease has advanced to GOLD III, Severe COPD, limitation of airflow significantly worsens, shortness of breath becomes more evident and COPD exacerbation is common. FEV1 will be between 30% and 49% predicted and FEV1/FVC will be less than 70 percent. In this stage, patient may notice a decrease in activity tolerance and an increase in fatigability. By the time a COPD patient reaches GOLD IV, Very Severe COPD, their quality of life is greatly impaired and COPD exacerbations are life threatening. Airflow limitation is severe (FEV1 less than 30% predicted or less than 50% predicted and FEV1/FVC will be less than 70 percent. Chronic respiratory failure is often present at this stage, and may lead to complications with heart, such as cor pulmonale and/or eventually, death **(Leader, 2013).**

Dyspnea and fatigue are the two most common symptoms experienced by patients with COPD. Dyspnea is identified as a perception or observation of abnormal and disturbing sensation of breathing. Dyspnea also called breathlessness or shortness of breath, in which the patients experience labored, uncomfortable breathing, and may produce secondary physiological, emotional, cognitive, and behavioral responses **(Aras el al., 2009).**

Another accompanying important symptom to dyspnea is fatigue in COPD. Fatigue is a subjective, unpleasant symptom that incorporates total body feelings ranging from tiredness to exhaustion, and interferes with the ability to function at normal capacity **(Swain, 2000).** It has been also defined as "the multidimensional sensation of tiredness that the individual experiences when perceiving the reduced capacity to function normally" **(Kapella et al., 2006).**

Among patients with chronic obstructive pulmonary disease (COPD), fatigue has been identified as one of the most dominant symptoms. It was reported by patients as the second most important symptom of COPD, after dyspnea. Fatigue is "almost always" experienced by 43%–58% of persons with COPD **(Blinderman et al., 2009 & Peters et al., 2010).**

Dyspnea and fatigue are a subjective experiences that can only be measured from the patient's perceptions, because every person have different thresholds for noticing, reporting, and rating the severity of these symptoms **(Victorson et al., 2009).** In several studies, it was found out that, there is a significant correlation between dyspnea, fatigue and physical activity and that fatigue levels increase when dyspnea intensifies and physical activity levels reduce **(Theander et al., 2004).**

When COPD patients start to feel short of breath, they worry that they are not getting enough air, which causes anxiety. Anxiety makes patient breath harder and faster, which makes the dyspnea worse. When people experience this, it can be so distressing that they start to limit their activities in order to avoid anything that may cause them to feel shortness of breath as they get into dyspnea cycle. The dyspnea cycle is not only frightening, but can lead to feelings of sadness and worry. If these feelings become overwhelming, they can start to interfere with daily life **(Talbot, 2012).**

Considering the general therapeutic aims proposed in treatment guidelines for COPD, it is evident that the improvement of inspiratory muscle function should be a target for any therapeutic intervention to improve the sensation of dyspnea. To improve dyspnea and fatigue, several non-pharmacologic approaches have been suggested, with a focus on nutrition, training of inspiratory muscle groups, relaxation techniques and positioning of a patient **(Wong et al., 2010).**

Providing information and education is foundational to enhance the patient and family's ability to cope. Patient's education is a critical component of COPD management and fundamental to increase a patient's ability to self-manage the disease**.** Educational interventions that increase knowledge alone are insufficient; patients must also integrate the

knowledge and tools they learn into their daily lives, and this must lead to behavior modification**.** Education offered in their preferred learning style is more likely to lead to successful learning and increases learner satisfaction **(Knowles et al., 2005).**

Significance of the study:

Living with COPD can be challenging, as the disease dramatically impacts patients' daily life. Individuals with COPD undergo a high amount of activity restriction and dependency due to dyspnea or fatigue or both symptoms **(Akbal, 2003).** Dyspnea may be severe and often interferes with the patient's activities and the patient cannot participate in even mild exercise; as COPD progresses, dyspnea occurs even at rest **(Smeltzer et al., 2010)**. To avoid the distressing sensations of dyspnea and other symptoms, the majority of COPD patients reduce their physical activities. As a result, some patients may lead an extremely sedentary lifestyle that may further decrease their abilities to perform physical activities (**Rabe et al., 2006).** Severe exacerbations of COPD that lead to unscheduled visits/admissions to hospital result in the significant economic burden associated with the disease. These aforementioned reasons emphasize the need for more effective management strategies to improve patients' dyspnea and fatigue.

Aim of the study

The aim of this study was to examine the effect of breathlessness and fatigue management guidelines on improving dyspnea and fatigue among the patients suffering from COPD. This aim was achieved through the following:

- Assessing the grade of breathlessness and fatigue dimension in COPD patients.
- Assessing level of knowledge of COPD patients regarding the breathlessness and fatigue problems and their management.
- Assessing level of COPD patients' self care practices regarding management of dyspnea and fatigue.
- Developing and implementing breathlessness and fatigue management guidelines for patients with COPD.
- Evaluating the effect of the guidelines on COPD patient's knowledge and practices.
- Evaluating the effect of the guidelines on COPD patient's dyspnea, fatigue and anxiety.

Hypothesis of the study:

It was hypothesized that:

- Patients with COPD who receive breathlessness and fatigue management guidelines will have a lower level of dyspnea.
- Patients with COPD who receive breathlessness and fatigue management guidelines will have a lower level of fatigue.
- Patients with COPD who receive breathlessness and fatigue management guidelines will have a lower level of anxiety.

2- Subjects and methods

Research design:

A quasi experimental research design was used to conduct this study.

Research setting

The study was conducted at the respiratory disease clinic at Ain Shams University Hospital.

Subjects

A purposeful sample of 50 adult patients diagnosed as COPD stage II and stage III and clinically stable were included in this study. The diagnosis of COPD was made based on the GOLD criteria **(Lotte, et al., 2006).** Patients who had other causes of airflow limitation such as pulmonary tuberculosis, bronchial asthma, bronchiectasis or heart failure were excluded from the enrolled patients by reviewing their medical histories as well as, patients who are seriously ill and with cognitive impairments.

Tools for data collection:

The following tools were utilized to collect data of this study:

I. Patient's assessment and clinical data sheet: The sheet was designed by the researchers to gather information related to patient's demographic characteristics as age, sex, level of education, smoking history and occupation. It also covered data related to duration of illness, severity of the disease, repeated hospitalization and associated signs and symptoms with.

This tool was revised by a group of three experts in medical surgical nursing and two experts in community health nursing at faculty of nursing, at Ain Shams University for the content validity. No modifications were needed.

2. Patient's breathlessness and fatigue knowledge questionnaire (pre/post guidelines intervention): This tool was developed by the researchers in Arabic language to assess patient' knowledge regarding COPD and management of dyspnea and fatigue (controlling dyspnea and fatigue, energy conservation, breathing exercise, relaxation techniques and respiratory muscles exercise).

The total scores of the questionnaire were 50 scores. Score one was given for each correct answer and zero for incorrect answer. For each area of knowledge, the scores of the items were summed-up and the total score divided by the number of the items, giving a mean score for the area and converted into a percent score. The total patients' knowledge scores were considered satisfactory if the percent score was 70% and more and unsatisfactory if it was less than 70%.

This tool was revised by a group of five experts

in medical surgical nursing and two experts in respiratory diseases at faculty of medicine, Ain Shams University for the content validity. Based on the opinion of the experts, some modifications were done, then the final form was developed. Tool was tested for reliability by test-retest.

3. Patients' practices observational checklists (pre/post guidelines intervention): It was adopted from **Cleary et al. (2012).** It was used to assess the patients' practices pre and post guidelines intervention regarding respiratory muscles exercises, breathing exercises, relaxation techniques, and inhaler uses. For scoring the checklist, one score was given for done items and zero for not done items, and the scores of the items were summed-up and converted into a percent. For every checklist, patients' scores were considered adequate if the percent score was 70% and more and inadequate if it was less than 70%.

4. Assessment of the patients' condition. To assess patient's dyspnea, fatigue and anxiety level (pre/post guidelines intervention). It includes the following scales:

(A)Modified Borg Scale (MBS): This tool is a subjective perception used to assess the severity of breathlessness during various activities using Vertical 0 - 10 item scales with words describing degrees of perceived exertion anchored to numbers. No breathlessness at all (0), very very slight breathlessness (Just Noticeable) (0.5), very slight breathlessness (1), slight breathlessness (2), moderate breathlessness (3), somewhat severe breathlessness (4), severe breathlessness (5), very severe breathlessness (6-7), very very severe breathlessness (Almost Maximum) (8-9) and maximum breathlessness (10). This tool was adopted from **Borg (1982).**

The scores given by each patient were summed-up and divided by the total number of patients, giving a mean score for the scale.

(B)The Medical Research Council (MRC) breathlessness scale: This scale used to assess the dyspnea grades. It grades the effect of breathlessness on daily activities. It was adopted from **(Fletcher et al., 1959).** It comprises five statements that describe almost the entire range of respiratory disability from none (Grade 1) to almost complete incapacity (Grade 5). This tool was self-administered or, administered by the researcher by asking subjects to choose a sentence that best describes their condition. The patients choose the number that best fits their level of activity. A score usually was obtained in a few seconds.

(C) The Multidimensional Fatigue Symptom Inventory Short Form (MFSI-SF): It consists of 30 statements designed to assess the multidimensional nature of fatigue. Patients indicated the extent to which they have experienced each symptom during the preceding one-week period (0 - not at all; 4-extremely). Ratings are summed to obtain scores for 5 subscales (general fatigue, physical fatigue, emotional fatigue, mental fatigue, and vigor fatigue).

- General scale = sum of items 10, 12, 14, 17, 18, and 28.
- Physical scale = sum of items 2, 4, 6, 16, 19, and 26.
- Emotional scale = sum of items 3, 8, 13, 21, 23, and 30.
- Mental scale = sum of items 1, 11, 15, 20, 25, and 27.
- Vigor scale = sum of items 5, 7, 9, 22, 24, and 29
- Total score = (General + Physical + Emotional + Mental) – Vigor.

This tool was adopted from **(Stein et al., 2004)** and translated into Arabic language then retranslated into English to assure its accuracy.

(D) Hospital anxiety and depression scale (HADS): This tool is a valid and reliable tool to assess anxiety and depression state associated with dyspnea among COPD patients. It was adopted from **Zigmond et al. (1983).** It is used only to assess patient's level of anxiety. It included 14-items questionnaire measuring anxiety and depression in two separate subscales, of which seven items measure symptoms of depression occurring in the past week, while the remainder measure symptoms of anxiety occurring in the past week. Each item is rated on a four-point scale; (0=No, not at all, 1=No, not much, 2=Yes sometimes and 3 =Yes definitely). Item scores are summed to give sub-scores for anxiety and depression. Scores can range between 0 and 21 for every subscale.

HADS scoring system:

- Anxiety 2, 4, 6, 8, 11, 12, 14
- Depression 1, 3, 5, 7, 9, 10, 13
- Scoring 3, 2, 1, 0 (For items 7 & 10 the scoring is reversed)

Grading for every subscale:

- 0-7 respective subscale are considered normal
- 8-10 considered mild
- 11-14 indicate moderate
- 15+ considered severe

Pilot study:

Applicability of the study tools was tested through a pilot study that was carried out on 10% of patients to ensure clarity, and understandability of tools, and to estimate the time needed to fill in each tool. Those who participated in the pilot study were included in the main study sample as there were no modifications required for the study tools.

Procedures:

- The study started from December 2012 to May 2013. It was designed in three phases; assessment, implementation and evaluation.
- ***Assessment phase:*** During this phase, an official approval was obtained to conduct the study from the director of Ain Shams University hospitals and head of the respiratory disease clinic.

- An exploratory visit was done to respiratory outpatients' clinic in order to estimate the rate of admission and suitable time for collecting data. Besides, personal communication was done with nurses and physician to explain the purpose of the study and gain their best possible cooperation. The Patients who met the study criteria were included in the study after explaining the nature and purpose of the study and obtaining their consents.
- All the questionnaires were distributed to all patients to assess patients' educational needs and obtain baseline data.
- The objectives and content of the breathlessness and fatigue management guidelines were established based on review of related literatures **(Lemon et al., 2008; Dewit 2009; Smeltzer, et al., 2010; leader, 2010; Lewis et al., 2011)**, as well as patients' educational needs obtained from the collected data. It was designed in an Arabic language. Each part of the booklet was pertaining to different aspects of breathlessness and fatigue and how to manage them. The first aspect (theoretical part) included; knowledge about COPD (such as; definition, causes, risk factors, signs and symptoms especially shortness of breathing and fatigue and complications) and self-care practices regarding breathlessness and fatigue. The second aspect (practical part) included the procedures for upright positioning, breathing exercises, relaxation techniques and respiratory muscles exercises. Media was prepared by the researchers, including the guidelines handout and audiovisual materials as CD**.**
- Content validity of the guidelines was tested through experts' opinions. Those experts included five experts in Medical Surgical Nursing and two experts in respiratory diseases at Faculty of medicine, Ain Shams University.
- ***Implementation phase:*** During implementation phase, the guidelines, were given for each patient separately and explained through modified lectures, discussions, demonstration and re-demonstration based on his needs and level of understanding for 4-5 successive sessions. An instructional media was used. Each session took approximately 30-45 minutes, 2 times per week at morning and afternoon shift.
- All of the studied patients were cooperative with the researchers. The researchers telephone number were given to studied patients and patients' telephone number were taken to ensure contact and meeting them during follow up visits in outpatients clinics to complete data collection during follow up period.
- ***Evaluation phase:*** Post- implementation of the guidelines, assessment was done using the same pre-test tools except patients' assessment and clinical data sheet.
- Comparison between the collected data before and after the guidelines' intervention was done to determine the effectiveness of these guidelines in improving patients' dyspnea and fatigue.

Administrative and ethical consideration

Ethical permission was obtained to conduct the study. An official approval was obtained to conduct the study from the director of Ain Shams University hospitals and heads of each selected setting. Patients' consents were obtained after explaining the aim of the study and assuring them that they can withdraw at any phase of the study.

Statistical analysis:

Data statistical analysis was done using the statistical package for social sciences (SPSS) version 11. Data were presented using descriptive statistics in the form of mean, standard deviations, and percentages. Quantitative variables were compared using paired T test and Kruskal Wallis test. Statistical significance was considered at P-value <0.05.

3-Results

Table (1): Personal characteristics of the study sample

Personal characteristics	Group N = 50	
	No	%
Age		
40 +	10	20.0%
50 +	27	54.0%
60 +	13	26.0%
Range	43 – 65	
Mean ± SD	**55 ± 5.7**	
Gender		
Male	41	82.0%
Female	9	18.0%
Education		
Read and write	7	14.0%
Basic education	24	48.0%
Middle education	4	8.0%
Higher education	15	30.0%
Occupation		
• White collar	10	20.0%
• Blue collar	19	38.0%
• Exposed to irritant	10	20.0%
• Retired or house wife	11	22.0%
Smoking		
• Yes	39	78.0%
• No	11	22.0%

The characteristics of the study sample are described in table (1). More than half of patients (54%) were 50 years age or older, with the majority of the study sample (82%) were males. Nearly half of the study sample (48%) has basic level of education, 38% of the study sample was white collar and 78% were smoking.

Table (2) Distribution of the Studied Patients According to clinical data Characteristics (N=50).

	Group N = 50	
	No	%
Duration of illness		
• <1 year	20	40.0%
• >1 year	30	60.0%
Disease Severity		
Stage II (Moderate)	38	76.0%
Stage III (Severe)	12	24.0%
Repeated Hospitalization		
No	34	68.0%
Once	12	24.0%
Twice	3	6.0%
Three times and more	1	2.0%

Table (2) illustrates the clinical characteristics of patients under the study. As regards the duration of illness, it was showed that more than half of the patients (60%) were diagnosed as COPD for more than 1year and 76.0% of the study sample had COPD stage II (moderate) severity of the disease. Meanwhile, 68.0% of them were not hospitalized before and only 2.0% were hospitalized three times before or more.

Table (3) Patients' signs and symptoms associated with dyspnea pre and post guidelines intervention (N = 50)

Dyspnea associated signs and symptoms	Group No. 50				Paired T test		
	Pre		Post				
	No	%	No	%	test	P	Significance
1- Difficult or labored breathing							
Yes	43	86.0	5	10.0	57.853	< 0.000	HS
No	7	14.0	45	90.0			
2- Feeling of suffocation of smothering							
Yes	48	96.0	14	28.0	49.066	< 0.000	HS
No	2	4.0	36	22.0			
3- Tightness in the chest							
Yes	27	54.0	10	20,0	2.398	< 0.000	HS
No	23	46.0	40	80.0			
4- Inability to get enough air							
Yes	32	64.0	2	4.0%	36.029	< 0.000	HS
No	18	36.0	48	96.0			

Table (3) shows the incidence of associated dyspnea signs and symptoms. There was a highly statistically significant difference in all signs and symptoms with higher rate among patients pre guidelines intervention compared to the patients post intervention at P < 0.000.

Table (4) Difference between the number of patients with satisfactory level of knowledge pre & post guidelines intervention (N = 50)

Knowledge items	Group N = 50				Paired T test	P	Significance
	Pre		Post				
	No	%	No	%			
•Chronic obstructive pulmonary disease	0	-	42	84	81.8	0.000	HS
•Controlling dyspnea	12	38	37	74	13.15	0.001	HS
•Energy conservation	26	52	43	86	11.97	0.001	HS
•Breathing exercises	5	10	49	98	77.94	0.000	HS
•Relaxation techniques	6	12	39	78	44.0	0.000	HS
•Respiratory muscles exercises	0	-	40	80	89.8	0.000	HS
Total Satisfactory knowledge	0	-	44	88	78.6	0.000	HS

(HS) Highly significant ($P < 0.001$).

Table (4) shows levels of knowledge of the studied patients pre and post guidelines intervention. It illustrates that, none of them had However, the satisfactory level of knowledge pre intervention. majority (88 %) of them had satisfactory level of knowledge post guidelines intervention ($p < 0.001$).

Table (5) Difference between the number of patients with satisfactory level of self care practices regarding dyspnea and fatigue pre & post guidelines intervention (N = 50)

Self care practices	Pre		Post		Paired T test	Significance
	No	%	No	%		
Breathing exercises	5	10	49	98	77.94	HS
Relaxation techniques	6	12	9	18	2.5	S
Respiratory muscles exercises	0	-	40	80	81.8	HS
Inhaler use	5	10	49	98	77.94	HS

(HS) Highly statistically significant (P <0.001); (S) Statistically significant (P <0.05)

Regarding patients' level of practices pre and post guidelines intervention, table (5) reveals that, the minority of them had satisfactory level of practices related to breathing exercise and inhaler uses pre guidelines implementation with highly significant improvement post guidelines implementation regarding the same items. Moreover, none of them had satisfactory level of practices related to respiratory muscle exercise pre guidelines implementation increased to 80% of the study sample post intervention. Also, there is statistically significant improvement in level of practices regarding relaxation exercise post guidelines implementation.

Table (6) Difference between severity of the dyspnea among the studied patients pre and post guidelines intervention

Dyspnea Borg scale (max=10)	Group N = 50				Test		
	Pre		Post				
	No	%	No	%	Paired T test	P	Significance
Non	0	0.0	3	6.0	12.3	< 0.01	HS
Mild (1-3)	9	18.0	21	42.0			
Moderate (4-7)	34	68.0	24	48.0			
Severe (8-10)	7	14.0	2	4.0			
Mean score MBS (0-10)	6±1.1		3.2±3.1		**Kruskal Wallis test** 4.99	0.08	HS

(HS) Highly statistically significant at p<0.01

Concerning severity of dyspnea pre and post guidelines implementation table (6) shows the difference between severities of the shortness of breathing among the studied patients pre and post guidelines intervention using Modified Borg scale. It reveals that more than two third of the studied patients (68.0%) had moderate dyspnea pre guidelines intervention compared with 48.0 % post intervention with highly significant difference between them. Also, the same table shows that the number of patients with severe dyspnea was lower in post guidelines intervention (4.0%) with highly statistically significant difference compared with 14.0% in pre guidelines intervention (P< 0.01). Moreover, there is a highly statistically significant difference between the mean scores of dyspnea severity for COPD patients pre and post guidelines intervention.

Table (7) Patients' shortness of breath grades pre and post-guidelines implementations (N = 50)

Shortness of breath grades	Pre		Post		Paired T Test	P value	Significance
	No	%	No	%			
Grade 1	1	2.0%	8	16.0%	23.1	< 0.01	HS
Grade 2	4	8.0%	19	38.0%			
Grade 3	21	42.0%	13	26.0%			
Grade 4	19	38.0%	7	14.0%			
Grade 5	5	10.0%	3	6.0%			

By evaluating shortness of breath grades pre and post guidelines implementation using the Medical Research Council (MRC) breathlessness scale, table (7) illustrates that, there is a highly statistically significant difference between the number of COPD patients with different grades pre and post guidelines implementation. It is shown in the same table that, only 42.0% of the patients with grade 3 pre-intervention in comparison with 26.0% of patients post intervention. Also, 38.0% of the patients with grade 4 in pre intervention compared to 14.0% post intervention.

Table (8) Fatigue dimensions pre and post- guidelines implementation among patients in the study (N = 50)

Fatigue dimensions	Pre		Post		Paired T test	P	Significance
	Mean	SD	Mean	SD			
➢ General fatigue (0-24)	11.5	3.8	4.6	2.4	15.1	<0.01	HS
➢ Physical fatigue (0-24)	15.6	3.9	4.6	2.8	17.3	<0.01	HS
➢ Emotional fatigue (0-24)	16.3	2.8	4.7	1.9	21.4	<0.01	HS
➢ Mental fatigue (0-24)	17.0	2.9	5.0	1.8	21.1	<0.01	HS
➢ Vigor fatigue (0-24)	17.0	3.0	5.0	1.6	20.6	<0.01	HS
Total scale score	77.4	12.3	23.8	6.7	24.2	<0.01	HS

(HS) Highly statistically significant at p<0.01

Table (8) demonstrates the difference between fatigue dimensions among the studied patients pre and post guidelines implementation. It reveals that the mean scores of fatigue dimensions were decreased post guidelines implementation compared to pre guidelines implementation with highly statistically significant differences between them at $p < 0.01$.

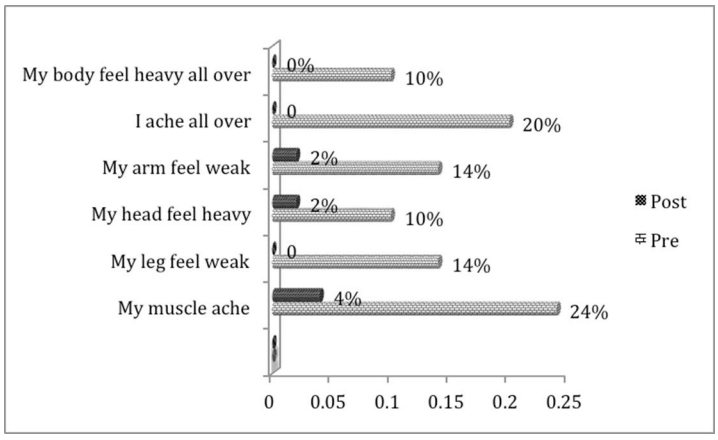

Figure 1. The difference between physical fatigue dimension pre and post guidelines implementation (No. 50)

Figure (1) shows the difference between physical fatigue among the studied patients pre and post guidelines implementation. It illustrates that, none of them had heavy feeling all over the body; aching all over and feeling weak leg. Only 2% were feeling weak arm and heavy head and 4% were feeling muscle ache post intervention compared with higher percentages pre guidelines implementation, with a statistically highly significant differences between them ($p < 0.001$).

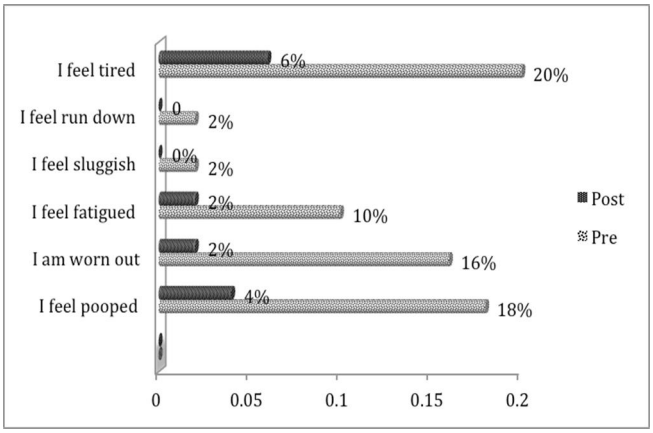

Figure 2. The difference between general fatigue dimension pre and post guidelines implementation (No. 50)

Figure (2) shows the difference between general fatigue among the studied patients pre and post guidelines implementation. It shows that none of them feeling run down and feeling sluggish and only 2% of them feeling fatigue and worn out also, 4 % of patients were feeling pooped compared with higher percentages pre guidelines implementation, with statistically highly significant differences between them ($p < 0.001$).

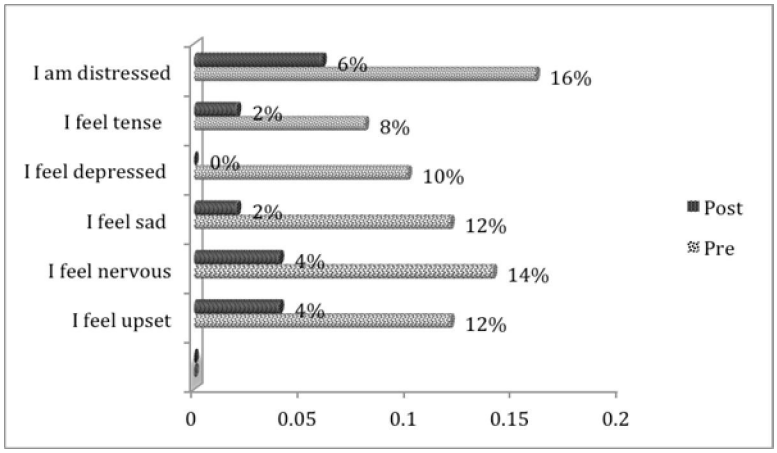

Figure 3. The difference between emotional fatigue dimension pre and post guidelines implementation (No. 50)

Figure (3) shows the difference between emotional fatigue among the studied patients pre and post guidelines implementation. It reveals that none of them were feeling depressed, only 2% feeling tense and sad, also, 4 % feeling nervous and upset and 6% feeling distressed in comparison with higher percentages pre guidelines implementation, with statistically highly significant differences between them ($p < 0.001$).

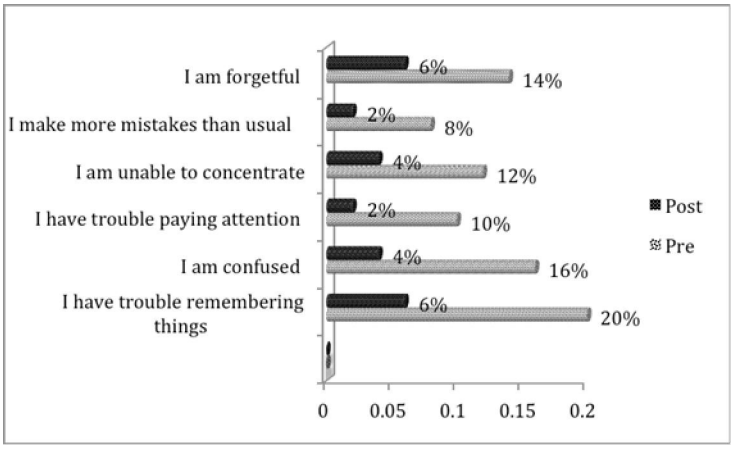

Figure 4. The difference between mental fatigue dimension pre and post guidelines implementation (No. 50)

Figure (4) shows the difference between mental fatigue among the studied patients pre and post guidelines implementation. It reveals that, only 2% of them make mistakes than usual and have trouble paying attention also, 4 % unable to concentrate and confused post intervention. Moreover, only 6% of patients are forgetful and have trouble remembering things in comparison with higher percentages pre guidelines implementation, with a statistically highly significant differences between them ($p < 0.001$).

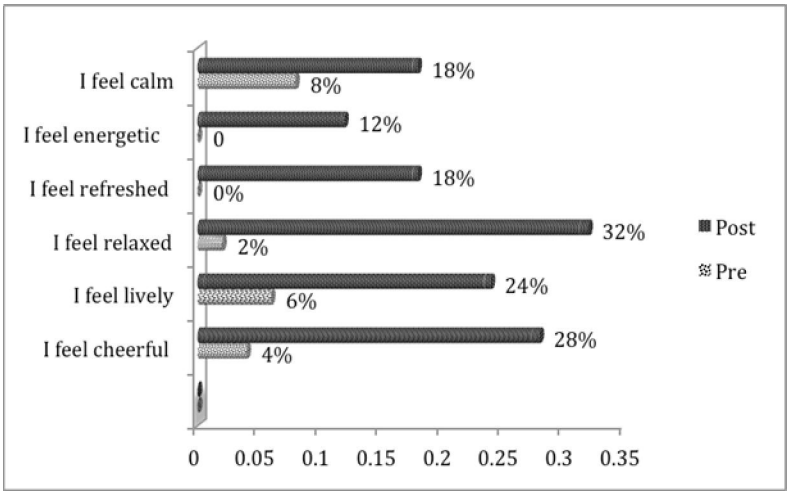

Figure 5. The difference between emotional fatigue dimension pre and post guidelines implementation (No. 50)

Figure (5) shows the difference between vigor fatigue among the studied patients pre and post guidelines implementation. It reveals that none of them had feeling energetic and refreshed, only 2% feeling relaxed, 4% feeling cheerful, 6% feeling lively and 8% feeling calm pre guidelines intervention in comparison with higher percentages post guidelines implementation, with statistically highly significant differences between them ($p < 0.001$).

Table (9) Difference between anxiety level among the studied patients pre and post guidelines intervention (N = 50)

Anxiety level	Pre		Post		Paired T test		
	No	%	No	%	Test	P	Significance
➢ Normal	0	0%	0%	-	13.3	< 0.01	HS
➢ Mild	6	12	38	76			
➢ Moderate	14	28	5	10			
➢ Sever	30	60	7	14			

Table (9) Illustrates patients' anxiety level pre/post guidelines intervention. As noticed, 60 % of patients had sever anxiety followed by 28% of them had moderate anxiety and 12% of them had mild anxiety pre guidelines intervention, which changed into 14%, 10% and 76%, respectively post guidelines intervention, with highly statistically significant difference between them at $P < 0.01$.

4-Discussion

Dyspnea and fatigue, the two most common symptoms experienced by patients with chronic obstructive pulmonary disease, are believed to result in decreased activity levels and poor quality of life (**Tell et al. 2012).** The aim of this study was to examine the effect of breathlessness and fatigue management guidelines on improving dyspnea and fatigue among the patients suffering from COPD. Also, it was hypothesized that, patients who receive breathlessness and fatigue nursing guidelines will have a lower level of dyspnea and fatigue.

Regarding characteristics of the patients under study, it was found that more than half of the study sample had mean age 55 and standard deviation ±5.7. This finding is inconsistent with **(Tel, et al. 2012)** who found out that mean age of the COPD patients in their study was 66.03 years (SD= 11.33). Most of the study sample was male; this finding is congruent with **Mohamed (2005)** who found that, all of the study sample were male. Nearly two fifth of the study sample was blue collar, this finding may be due to the high prevalence of COPD between blue collar who are exposed to irritants at their work place which are inhaled into their lungs causing serious lung damage as most of those patients were working as solders, tanners or turners.

It was found that the majority of the studied subjects were smoking. This result is in the same line with **National Heart, Lung, and Blood Institute (2013),** who found that COPD most often occurs in people with a history of smoking (either current or former smokers). Also, as many as one out of six people with COPD never smoked.

As regards the clinical characteristics of the studied subjects it was found that more than half of the patients had a disease more than 1 years and had a stage II COPD (moderate), and less than half of them were hospitalized before. This result was similar to **Baghai–Ravary et al. (2009)** who stated that, hospitalization rates in the patients with COPD are high, and increase with age. Also, similar to **Tel et al. (2012)** who illustrated that, high fatigue score and score of the daily activities affected by fatigue were presented by those who had the COPD for ≥ 12 years.

The goal of all patient education is to improve clinical outcomes by teaching appropriate self-management skill. Regarding patients' level of knowledge pre and post guidelines implementation, the study revealed presence of highly statistically significant improvement in all items of knowledge.

Concerning the total patients' knowledge pre and post guidelines implementation, there was a highly statistically significant improvement post intervention, reflecting the positive effect of the management guidelines**.** This may be due to that this knowledge is of great importance for the patient, also, unavailability of this knowledge through the health care team in the hospital.

This result was congruent with **Cleary et al. (2012)** who stated that, many people who are first diagnosed with COPD report feeling confused and worried, that are relieved when they have an explanation and more information for their breathlessness and other symptoms. Also, knowing as much as patient can about COPD, including patient diagnosis and problems associated with the diagnosis and when the patient actively involved in decision-making and the development of a management plan with the health care professional these may lead to promote the patient health status.

Regarding patients' level of practice pre and post guidelines implementation, the study revealed presence of highly statistically significant improvement in all items of practice, except that related to relaxation exercise, where the improvement was merely significant. This may be due to the unfamiliarity of patients with this type of management. This result is consistent with **Ries et al. (2007)** who mentioned that, coping with a chronic condition involves skills training, learning to manage a number of symptoms, and consciously assessing and making lifestyle changes. Experience has shown that those who develop a management plan with their health care team and follow it can live better with COPD.

Moreover, **Garcia-Aymerich et al. (2006)** stated that, Scheduling time to relax the daily is important. Relaxation can be formal, such as guided relaxation practice, or informal, such as watching football or listening to music. Formal relaxation practice helps to: increase the metabolism, slow the heartbeat, relax the muscles, slow the breathing and lower the blood pressure.

Also, **Tel, et al. (2012)** mentioned that, people who have COPD have more difficulty breathing out fully. The patient could practice relaxed breathing any time while trying to catch the breath. For example, relaxed breathing may be useful after coughing or exercising. By learning to conserve energy with everyday tasks, the patient will be able to perform many activities with less effort and less shortness of breath. Along with exercise, keeping active in normal daily activities is an important part of maintaining the fitness.

Meanwhile, **Velloso et al. (2006)** stated that, the patient with COPD should share in developing a management plan, including: Stopping smoking and preventing a relapse, knowing the medication needed, using the inhalation devices and preventing and managing a flare up, exercise and physical activity, breathlessness, breathing control and energy conservation, airway clearance: keeping lungs clear, home oxygen therapy and managing stress, anxiety and depression.

Dyspnea has traditionally been considered the primary symptom limiting COPD patients. MRC dyspnea scale provides a simple and valid method of categorizing patients in terms of their disability due to COPD **(Bestall et al., 1999).** The data retrieved from assessment of the severity and grades of breathlessness pre and post guidelines implementation using Modified Borg scale and Medical Research Council (MRC) breathlessness scale showed presence of highly statistically significant improvement post guidelines implementation, proving the second hypothesis. This may be due to the patients' craving to learn and practice relieving strategies to overcome this overwhelming problem that bother those patients.

The data in the current study also revealed that near half of the study sample had dyspnea grade three before education which decreased significantly after education, this finding goes in the same line with **(Wong et al., 2010**) who found that, 53.3% of participants in their study are reporting dyspnea at a Grade 3 level

Fatigue may be affected by dyspnea and is frequently told by the COPD patients (**Wong et al., 2010)**. By assessing fatigue dimensions pre and post-guidelines implementation, it was found that, all dimensions of fatigue improved highly significantly, proving the third hypothesis. This result may be due to the improvement in dyspnea suffered by the study sample, as it is associated with an increased work of breathing and an increase in energy consumption, and

may contribute to the perception of fatigue in patients with COPD **(Breslin et al., 1998).**

The current study showed that vigorous and mental fatigue are the most negatively rated subscale, this findings are not similar to those of (**Wong et al., 2010)** Who found that physical fatigue was the dimensions that most negatively rated by persons with COPD.

In the current study it was discovered that, the majority of the patients had moderate and severe anxiet pre guidelines. While, a significant reduction was found in patients' anxiety post guidelines. This finding was similar to those of **Maurer et al. (2008)** who found anxiety is very common co-morbidity in COPD and has significant impact on patients, their families, society, and the course of the disease. Untreated and undetected anxiety may increase physical disability, morbidity, and health-care utilization.

Conclusion

The current study concluded that, breathlessness and fatigue management guidelines has positive effect on patients' level of knowledge and practices regarding management of dyspnea and fatigue, Also, breathlessness, fatigue and anxiety had been improved in patients with COPD who received breathlessness and fatigue management guidelines. These means all the study hypotheses had been proved.

Recommendations

According to results of the current study, the following suggestions are recommended:

- Conducting comprehensive health education programs for patients with COPD in outpatients' clinics with simplified printed guidelines through leaflets, brochures or booklets explaining how to prevent and control breathlessness and fatigue.
- Further evaluation of the effect of strategies to prevent and ameliorate breathlessness and fatigue intensity and distress responses in larger sample of COPD patients in order to generalize the results.
- A home-based program should be done to effectively improve the breathlessness and the fatigue among the patient with COPD.

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