Palliative Intervention for Mitigating Fatigue and Sleep Inefficiency among Chronic Obstructive Pulmonary Disease Clients

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Abstract   Chronic obstructive pulmonary disease is a public health problem cause mortality. Palliative intervention is supportive in managing, and helping clients living with chronic obstructive pulmonary disease. **Aim:** This study aims to evaluate the effect of palliative care intervention for mitigating fatigue and sleep inefficiency among chronic obstructive pulmonary disease clients. **Design:** A quasi-experimental design was used. **Setting:** The study was conducted in Chest Outpatient Clinic, Ain Shams University Hospitals. **Sample:** A purposive sample comprised of 70 clients. **Tools:** A structured interview questionnaire was used to collect the data and included three parts: Part I. Client's demographic characteristics. Part II. The Pittsburgh Sleep Quality Index. Part III. Fatigue Severity Scale. **Results:** The sleep quality index was improved from 7.1% of clients had good sleep quality pre intervention to 85.7% post intervention and also fatigue severity was improved from 90% of them had high fatigue pre intervention to 4.3% post intervention with highly statistically significant positive correlation between total fatigue and sleep quality index among chronic obstructive pulmonary disease clients (p= <0.001). **Conclusion:** The palliative care intervention had a positive effect on chronic obstructive pulmonary disease clients and helped them to mitigate sleep inefficiency, which led to reduce fatigue. **Recommendations:** An illustrated booklet containing information about benefits of gradual relaxation exercises should be available in all chest outpatient clinics. Training of the nurses on how to apply the palliative care intervention to chronic obstructive pulmonary disease clients.

Keywords: palliative, mitigating fatigue, sleep inefficiency, chronic obstructive pulmonary disease

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1. Introduction

Chronic obstructive pulmonary disease (COPD) is a common public health problem and considered an essential cause of morbidity and mortality in both developed and developing countries. The COPD is expected to be the third leading cause of death by 2030 [1]. Chronic obstructive pulmonary disease (COPD) is the most common serious lung disease in the United States(US) over the last few decades. There are 12 to 16 million adults in the United States diagnosed with COPD, it is about 6.4% of the US population and an equal number of Americans with COPD may still be undiagnosed. As well, 3 million people worldwide die from COPD annually [2,3].

Its prevalence, morbidity, and mortality vary across countries and different groups within countries [4].

Chronic obstructive pulmonary disease is a condition that makes it difficult to move air into and out of a person's lungs, this is called airflow obstruction or resistance. The COPD is characterized by a progressively increasing airflow obstruction that cannot be fully reversed, although it can sometimes be temporarily improved by medications. In almost all cases, COPD has been caused by the long-term inhalation of pollutants, especially cigarette smoke. This obstruction in airflow of individuals with COPD experience symptoms such as dyspnea, coughing, sleep disturbances, and fatigue [5,6].

Fatigue is a common symptom in COPD. It is a subjective and multidimensional symptom that incorporates total body feelings ranging from tiredness to exhaustion, this condition interferes with individuals' ability to do their body functions [7]. Chronic obstructive pulmonary disease is one of the chronic systemic diseases that affects on people's sleep routine and quality [8]. Sleep is one of basic needs of human and has important role in individual's health and productive life [9].

Poor sleep quality and quantity could be attributed to stressful conditions and release of epinephrine and norepinephrine, resulting in increased heart rate, blood pressure, and respiratory rate [10]. Breathing exercises in clients with COPD, such as pursed-lip breathing and

diaphragmatic breathing, aim to improve airway function and respiratory pattern through reducing respiratory rates [11].

Palliative care intervention is a multidiscipline specialty that is used to improve quality of life for both clients and their families, focused on clients with a serious disease and helping to mitigate the symptoms and stress of their disease, and can be provided along with curative treatment [12].

Palliative care intervention becomes a valuable assistant of therapeutic care for clients with COPD in the absence of curative treatment, progressive dyspnea, and the use of opioids for the treatment of severe and difficult symptoms. This is a prime motivator of therapy. Clients with COPD experience psychological and emotional suffering and high morbidity and mortality rates. In spite of this, they don't always receive adequate palliative care due to lack of knowledge about it [13].

As well palliative care intervention, known as supportive care provided across outpatient settings that focus on mitigate suffering and providing comfort, it is basic in managing chronic obstructive pulmonary disease. This care is focused on helping to achieve the best possible quality of life. It is appropriate for all clients living with COPD regardless of age, stage or prognosis [14].

Nurses have a huge role in promoting healthy behavior for clients with COPD by providing advice, educating, and supporting them and their families, and encouraging management of their disease. The nurse also assists the individual to use controlled breathing techniques, including pursed-lip breathing, the forward leaning position, and abdominal breathing, to control dyspnea and anxiety. The goal is a reduced respiratory rate, and enhanced expiratory tidal volume, thus decreasing air trapping [15]. Nurses who work in palliative care intervention are specially trained to deal with complex pain and symptoms, as well as communication about serious illness, improve understanding of treatment options and match their goals to those options, also help support family caregivers and provide practical support [16].

1.1. Significance of the Study

Chronic obstructive pulmonary disease is one of the main causes of global mortality. It is estimated that 210 million clients are living with this disease, and COPD is predicted to become the third leading cause of death in the world by 2030 [17]. The prevalence of chronic obstructive pulmonary disease in the Middle East and North Africa is around 4% in adults. As well, 3 million Egyptians are at risk of chronic obstructive pulmonary disease, accounting for about 3.9% of population. However, prevalence and mortality information is not available [18].

Today, a supportive non-pharmacological method as relaxation and breathing exercises for obstructive pulmonary disease focusing on the clients' needs to help them achieve independence and maintain the maximum level of autonomy and function in society [18]. So palliative care intervention is important for mitigating fatigue and sleep inefficiency among chronic obstructive pulmonary disease clients.

2. Aim of the Study

The study aimed to evaluate the effect of palliative care intervention for mitigating fatigue and sleep inefficiency among chronic obstructive pulmonary disease (COPD) clients.

2.1. Hypotheses

H1. Palliative care intervention will mitigate fatigue severity and sleep inefficiency to COPD clients.

H2. There will be a significant relation between fatigue severity and sleep quality to COPD clients.

2.2. Subjects and Methods

2.2.1. Design

A quasi experimental study design was utilized.

2.2.2. Setting

The study sample was recruited from the Chest Outpatient Clinic, affiliated to Ain Shams University Hospitals, Egypt.

2.2.3. Sample

A purposive sample comprised of 70 clients, who were selected according to the following inclusion criteria:
- Conscious adult, age from 20-40 years .
- Willing to collaborate and participate in the study.
- Diagnosed with COPD since 6 months or more.
- Client with no co-morbid conditions.
- Ability to read and write.

Sample Size Calculation:

The sample size estimated by using the following equation:

$$n = \frac{N \times p(1-p)}{\left[\left[N-1 \times \left(d^2 \div z^2\right)\right] + p(1-p)\right]}$$

Nxp(1-p)=(761*(0.053*(1-0.053)))/
N-1=(761-1)*
d^2/z^2=0.0025 / 3.8416
p(1-p)=0.053*(1-0.053)
n=70
Where:
n= Sample size.
N= Community size (clients attended chest outpatient clinic in the year 2017).
z= Class standard corresponding to the level of significance.
d= The margin error rate.
p= Ratio provides a neutral property = 0.053 [20].
Based on the equation, the sample size is 70 clients who participated in the study.

2.2.4. Tools for Date Collection

A structured interview questionnaire was used in pre and post intervention. It was constructed by the researchers in simple Arabic language, and consisted of three parts.

Part I: Client's demographic characteristics such as: Age, gender, educational level and family income, marital and working status, duration of disease… etc.

Part II: The Pittsburgh Sleep Quality Index (PSQI): It was adapted from [21] to measure the quality and patterns of sleep for the clients.

2.2.5. Scoring System

The Pittsburgh Sleep Quality index (PSQI) contains 19 questions combined to form seven components (sleep quality, latency, duration, efficiency, disturbances, sleep with medication, and daytime dysfunction). The client's answers point to the most accurate answer for the majority of days and nights in the past month. Each of which has a range of 0-3 points. The seven component scores are then added to yield the total score, with a range of 0-21 points, zero indicating no difficulty and twenty one indicating sever difficulties. The total scores were categorized as the following:

Poor PSQI >75% with score ranged from ≥ 17-21
Average PSQI 50-75% with score ranged from 11-16
Good PSQI <50% with score ranged from 0-10

NB: Sleep efficiency = (hours slept/hours in bed) x 100%

Part III: Fatigue Severity Scale (FSS): The FSS was adopted from [22]. It contains nine items that explore severity of fatigue symptoms.

2.2.6. Scoring System

The items were scored in five-point Likert scale. The scale ranging from strongly disagree takes one, disagree takes two, neutral takes three, agree takes four, strongly agree takes five points. The client read each statement and circle a number from 1 to 5, depending on how he/she felt during the past week. A low value indicates disagreement, while a high value indicates agreement. The total scores were categorized as the following:

Low fatigue severity <50% with score ranged from ≤ 22
Average fatigue severity 50-75% with score ranged from 23-34
High fatigue severity >75% with score ranged from ≥35-45

2.3. Content Validity

Testing validity of the tools was reviewed by a panel of five experts in the Community Health Nursing and Medical Surgical Nursing fields to ascertain their face, clarity, completeness and relevance of the content.

2.4. Reliability of the Tools

Testing reliability of proposed tools was done statistically as the following: The PSQI tool Cronbach's alpha was 0.83, and FSS: Cronbach's Alpha was 0.88, this indicate high reliability of the tools.

2.5. Pilot Study

A pilot study was carried out on 10% (7) of the total number of the study sample to test the applicability, clarity and efficacy of the tools, also to assess the time required for filling in the tools before beginning the actual data collection. According to the results of the pilot study, no modifications were done on the tools of the study. So, those clients who participated in the pilot study were included in the main study sample.

2.6. Ethical Considerations

The purpose of the study was explained to the hospital director in order to get approval to apply this study for clients in the Chest Outpatient Clinic. As well, the researchers explained the aim of the study to each client and got consent regarding participation in the study. Clients who agreed to participate were assured that the obtained information will be treated confidentially and used only for the purpose of the study. They were also informed that they have the right to refuse or withdraw at any time from the study without giving any reason.

2.7. Field Work

The official approvals were obtained from the administrators of Ain Shams University Hospitals for conducting the study in the Chest Outpatient Clinic. Letters of request were issued to them from the Faculty of Nursing, Helwan University, containing the aim of the study and its expected outcomes. Each client involved in the study was interviewed individually, the purpose of the study was explained to them. The intervention was developed by the researchers based on reviewing the recent and related literature and tool assessment (pre-test).

The study data collection took a period of nine months from the beginning of December 2017 to the end of August 2018, about 20-25 minutes were necessary to complete the tools. The researchers were available in the Chest Outpatient Clinic three days/week, from 9.00 a.m. to 1.00 p.m.

The application of palliative care intervention was conducted through four phases: Assessment, planning, implementation, and evaluation phase.

1- Assessment phase

The beginning phase was done by using the pre-test after the approval taken to carry out the study, the researchers greeted the clients, introduced themselves for them also, they explained the aim of the study. An analysis of the obtained pretest data was then done to help with the design of the palliative care intervention. In the pre-test, data were collected by applying the demographic data, PSQI and FSS for clients who were attending to the Chest Outpatient Clinic.

2- Planning phase:

The intervention was designed according to general objective to mitigate fatigue and sleep inefficiency for clients with COPD, this achieved through application of palliative care intervention by performing deep breathing and relaxation exercises, this based on analysis of the actual clients' needs in pre assessment by using the pre-test tools.

A booklet was prepared by the researchers, in simple Arabic language and consistent with the related literatures. As well, the intervention met clients' needs and their understanding level. This booklet included: Meaning, benefits of exercises for COPD clients, purpose of deep breathing, positive effects, and the practices that take into consideration during deep breathing exercises, information

about how to perform gradual relaxation, respiration control, and relaxation exercises.

3- Implementation phase:

The palliative care intervention was presented in sessions. The total number of clients was 70 divided into 10 groups, each group comprised 7 clients, the intervention was applied in 4 sessions for each group (2 theoretical & 2 practical). Each session takes from 35-45 minutes according to the items presented.

The educational CD on palliative care intervention include: Correct deep breathing and relaxation exercises technique, developed by the researchers, was given to clients. The researchers met the clients with COPD in a quiet and special room in the Chest Outpatient Clinic and then allowed them to listen and watch a CD and the researchers did these exercises, and then the clients were asked to do them. Each client was given the booklet and CD and asked to do these exercises in the home once a day for hours till they felt improved. After two months the client were asked in telephone to come to outpatient clinic to assessed in the post test. The methods of teaching included a lecture, followed by group discussions in addition to listen and watch a CD, and practices. Media of teaching were the booklet and CD.

4- Evaluation phase:

Effect of the palliative care intervention on the studied clients was evaluated as follows: The quality and efficiency of sleep and fatigue severity for the client were measured by using post–test, immediately after finishing all sessions of the intervention for one time only by using the same tool.

2.8. Statistical Analysis

Recorded data were analyzed using the Statistical Package for Social Sciences (SPSS), version 20.0. Quantitative data were expressed as mean and standard deviation (SD). Qualitative data were expressed as frequency and percentage. Paired sample t-test was used when comparing between related sample. Chi-square (X^2) test was used to compare proportions between two qualitative parameters. Spearman's rank correlation coefficient (r) was used to assess the degree of association between two sets of variables. P-value ≤0.05 was considered significant, and P≤0.001 was considered as highly significant.

2.9. Results

Table 1: This table reveals that 31.4% of the clients were aged 20-30 years, while 68.6% of them were >30-40 years. Regarding gender, 62.9% of the clients were male. Concerning educational level, an equal percentage of 40.0% of them were either primary, or university, and 71.4% were married. As for family level of income, 77.1% were low income and 22.9% were moderate income. concerning working status, 57.1% of them were employed, and related to working type more than half of them were working as carpenters, bakers, and shoe repair. As regards duration of disease, 48.5% of them had the disease from 1-5 years, and 22.9% had it from >10 years. Regarding to smoking, 40.0% were smoker, and 71.4% of the smokers intended to quit smoking.

Table 1. Distribution of Client's with Chronic Obstructive Pulmonary Disease According to their Demographic Characteristics (n=70)

Demographic characteristics	No	%
Age (years)		
20-30	22	31.4
>30-40	48	68.6
Mean±SD	32.86 ± 6.90	
Gender		
Male	44	62.9
Female	26	37.1
Educational level		
Primary education	28	40.0
Preparatory and secondary education	14	20.0
University	28	40.0
Marital status		
Single	16	22.9
Married	50	71.4
Widowed	4	5.7
Family level of income		
Low income than expenditure	54	77.1
Moderate income and expenditure	16	22.9
High income than expenditure	0	0.0
Working status		
Employed	40	57.1
Unemployed	30	42.9
Working type (n=40)		
Carpenters	17	42.5
Bakers	10	25.0
Shoe repair	13	32.5
Duration of disease (in years)		
1-5	34	48.5
6-10	20	28.6
>10	16	22.9
Family history of disease		
Yes	24	34.3
No	46	65.7
Smoking		
Smoker	28	40.0
Non-smoker	42	60.0
Quit of smoking (n=28)		
Yes	20	71.4
No	8	28.6

Table 2: Shows that there were highly statistically significant differences in all components of PSQI scores pre/post palliative care intervention application (p= <0.001).

Figure 1: Indicates that 7.1% of the clients had good sleep quality index pre intervention and improved to 85.7% of them having good sleep quality post intervention with a highly statistically significant difference in comparison to pre palliative intervention (P= <0.001).

Table 3: Demonstrates that there were highly statistically significant differences in all items of fatigue severity scores pre/post palliative care intervention application (p= <0.001).

Table 2. Descriptive Statistics for Comparison between PSQI Scores Pre and Post Palliative Care Intervention (n=70)

PSQI components		Pre		Post		Chi-square	
		No	%	No	%	X^2	P
Sleep quality **During the past month, how would you rate your sleep quality overall?**	Very good	2	2.9	40	57.1	132.36	<0.001**
	Fairly good	3	4.3	26	37.1		
	Fairly bad	38	54.3	2	2.9		
	Very bad	27	38.5	2	2.9		
Sleep latency How long has it taken you to fall asleep each night?	< 15 minutes	6	8.6	65	92.8	117.89	<0.001**
	16-30 minutes	44	62.8	2	2.9		
	31-60 minutes	17	24.3	1	1.4		
	> 60 minutes	3	4.3	2	2.9		
During the past month, how often have you had trouble sleeping because you… Can't get to sleep within 30 minutes	Not during the past month	4	5.7	37	52.8	117.95	<0.001**
	Less than once/week	2	2.9	28	40.0		
	Once or twice/week	10	14.3	3	4.3		
	Thrice or more/week	54	77.1	2	2.9		
Sleep duration How many hours of sleep do you get at night actually?	> 7 hours	23	32.8	3	4.3	132.36	<0.001**
	6-7 hours	42	60.0	2	2.9		
	5-6 hours	2	2.9	40	57.1		
	< 5 hours	3	4.3	25	35.7		
Sleep efficiency: When have you usually gone to bed? When have you usually gotten up in the morning? How many hours of actual sleep do you get at night?	> 85%	2	2.9	2	2.9	21.85	<0.001**
	75-84%	25	35.7	32	45.7		
	65-74%	22	31.4	34	48.5		
	< 65%	21	30.0	2	2.9		
Sleep disturbance **During the past month, how often have you had trouble sleeping because you…** Wake up in the middle of the night or early morning	Not during the past month	2	2.9	26	37.1	132.36	<0.001**
	Less than once/week	2	2.9	39	55.7		
	Once or twice/week	16	22.8	3	4.3		
	Thrice or more/week	50	71.4	2	2.9		
Get up to use the bathroom	Not during the past month	4	5.7	18	25.7	93.33	<0.001**
	Less than once/week	10	14.3	47	67.1		
	Once or twice/week	12	17.1	2	2.9		
	Thrice or more/week	44	62.9	3	4.3		
Can't breathe comfortably	Not during the past month	2	2.9	37	52.8	132.5	<0.001**
	Less than once/week	2	2.9	28	40.0		
	Once or twice/week	16	22.8	3	4.3		
	Thrice or more/week	50	71.4	2	2.9		
Cough or snore loudly	Not during the past month	2	2.9	14	20.0	118.97	<0.001**
	Less than once/ week	3	4.3	50	71.4		
	Once or twice/week	18	25.7	4	5.7		
	Thrice or more/week	47	67.1	2	2.9		
Feel too cold	Not during the past month	18	25.7	47	67.1	87.05	<0.001**
	Less than once/week	1	1.4	18	25.7		
	Once or twice/week	22	31.4	2	2.9		
	Thrice or more/week	29	41.5	3	4.3		
Feel too hot	Not during the past month	6	8.6	40	57.1	111.53	<0.001**
	Less than once/week	2	2.9	25	35.7		
	Once or twice/week	22	31.4	3	4.3		
	Thrice or more/week	40	57.1	2	2.9		
Have bad dreams	Not during the past month	10	14.3	52	74.3	67.85	<0.001**
	Less than once/week	24	34.3	15	21.4		
	Once or twice/week	14	20.0	1	1.4		
	Thrice or more/week	22	31.4	2	2.9		
Have pain	Not during the past month	6	8.6	38	54.2	105.01	<0.001**
	Less than once/week	4	5.7	27	38.6		
	Once or twice/week	26	37.1	2	2.9		
	Thrice or more/week	34	48.6	3	4.3		
Please describe, how often you have had trouble sleeping because of other reason (s):	Not during the past month	46	65.7	53	75.7	38.98	<0.001**
	Less than once/week	2	2.9	14	20.0		
	Once or twice/week	12	17.1	2	2.9		
	Thrice or more/week	10	14.3	1	1.4		
Sleep with medications How often have you taken medicine to help you sleep?	Not during the past month	16	22.8	53	75.7	82.98	<0.001**
	Less than once/week	2	2.9	12	17.1		
	Once or twice/week	30	42.9	3	4.3		
	Thrice or more/week	22	31.4	2	2.9		
Day time dysfunction How often have you had trouble staying awake while driving, eating meals, or engaging in social activity?	Not during the past month	2	2.9	37	52.8	140.74	<0.001**
	Less than once/week	3	4.3	27	38.6		
	Once or twice/week	24	34.3	3	4.3		
	Thrice or more/week	41	58.5	3	4.3		
How much a problem has it been for you to keep up enthusiasm to get things done?	Not during the past month	2	2.9	45	64.2	140.01	<0.001**
	Less than once/week	2	2.9	20	28.6		
	Once or twice/week	31	44.2	3	4.3		
	Thrice or more/week	35	50.0	2	2.9		

**p-value <0.001 (HS).

Table 3. Descriptive Statistics for Fatigue Severity Items Scores Pre and Post Palliative Care Intervention (n=70).

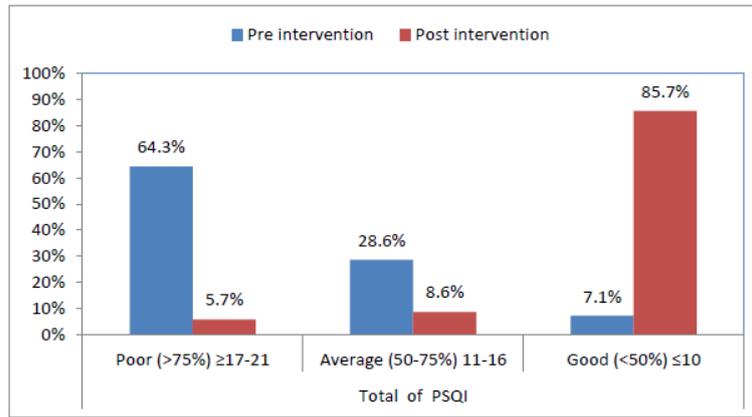| Fatigue severity items	Pre intervention		Post intervention		Chi square test	
	No	%	No	%	X²	P- value
During the past week, I have found that: **My motivation is decreased when I am fatigued.**						
Strongly disagree	3	4.3	21	30.0	114.15	<0.001**
Disagree	2	2.9	34	48.6		
Neutral	13	18.6	11	15.7		
Agree	26	37.1	2	2.9		
Strongly agree	26	37.1	2	2.9		
Exercise brings fatigue for me.						
Strongly disagree	2	2.9	33	47.1	140	<0.001**
Disagree	1	1.4	31	44.3		
Neutral	8	11.4	2	2.9		
Agree	27	38.6	3	4.3		
Strongly agree	32	45.7	1	1.4		
I am easily fatigued.						
Strongly disagree	2	2.9	15	21.4	126.28	<0.001**
Disagree	1	1.4	42	60.6		
Neutral	6	8.6	8	11.4		
Agree	24	34.3	3	4.3		
Strongly agree	37	52.9	2	2.9		
Fatigue affects my physical function.						
Strongly disagree	2	2.9	13	18.6	110.13	<0.001**
Disagree	1	1.4	38	54.3		
Neutral	15	21.4	15	21.4		
Agree	26	37.1	3	4.3		
Strongly agree	26	37.1	1	1.4		
Fatigue causes recurrent problems for me.						
Strongly disagree	2	2.9	19	27.1	112	<0.001**
Disagree	1	1.4	34	48.6		
Neutral	13	18.6	14	20.0		
Agree	39	55.7	1	1.4		
Strongly agree	15	21.4	2	2.9		
My fatigue prevents continued physical functioning.						
Strongly disagree	2	2.9	15	21.4	114.28	<0.001**
Disagree	3	4.3	34	48.6		
Neutral	9	12.9	18	25.7		
Agree	38	54.3	2	2.9		
Strongly agree	18	25.7	1	1.4		
Fatigue interferes with performing certain responsibilities.						
Strongly disagree	2	2.9	11	15.7	101.6	<0.001**
Disagree	3	4.3	40	57.1		
Neutral	22	31.4	14	20.0		
Agree	22	31.4	2	2.9		
Strongly agree	21	30.0	3	4.3		
Fatigue is among the most disabling symptoms.						
Strongly disagree	2	2.9	16	22.9	81.06	<0.001**
Disagree	3	4.3	18	25.7		
Neutral	24	34.3	32	45.7		
Agree	24	34.3	3	4.3		
Strongly agree	17	24.3	1	1.4		
Fatigue interferes with my work, family, and social life.						
Strongly disagree	2	2.9	15	21.4	102.94	<0.001**
Disagree	1	1.4	36	51.4		
Neutral	21	30.0	14	20.0		
Agree	25	35.7	3	4.3		
Strongly agree	21	30.0	2	2.9		

**p-value <0.001 (HS).

Figure 1. Total Scores of Sleep Quality for Clients' with Chronic Obstructive Pulmonary Disease Pre and Post Palliative Care Intervention (**p-value <0.001 HS)
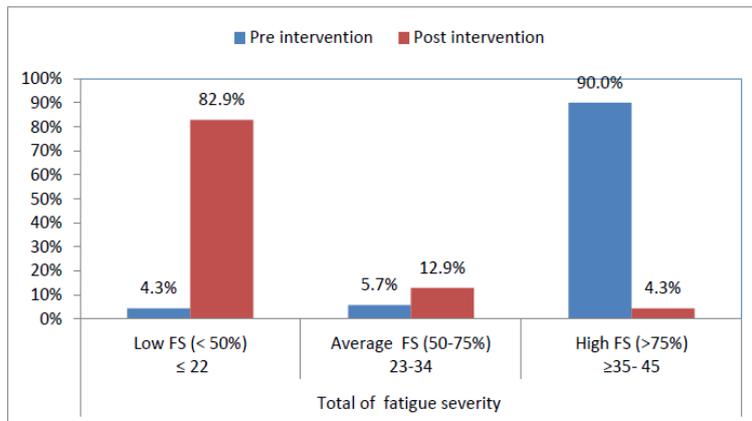

Figure 2. Total Scores of Fatigue Severity for Clients' with Chronic Obstructive Pulmonary Disease Pre and Post Palliative Care Intervention (**p-value <0.001 HS)

In relation to H1:

Table 4. Comparison between Pre and Post Palliative Care Intervention for Clients with Chronic Obstructive Pulmonary Disease According to their Pittsburgh Sleep Quality and Total Fatigue Severity Mean Score (n=70)

Items	Pre intervention	Post intervention	t-test	p-value
Pittsburgh sleep quality				
Sleep quality	1.83±1.12	0.17±0.38	11.76	<0.001**
Sleep latency	2.74±0.56	0.69±0.47	23.68	<0.001**
Sleep duration	2.40±0.55	0.43±0.50	22.24	<0.001**
Habitual sleep efficiency	1.94±0.83	1.51±0.61	3.48	<0.001**
Sleep disturbance	2.63±0.49	1.03±0.29	23.56	<0.001**
Sleeping with medication	2.63±0.49	0.43±0.50	26.42	<0.001**
Day time dysfunction	2.54±0.56	0.51±0.50	22.62	<0.001**
Total PSQI	16.71±2.81	4.77±1.62	30.79	<0.001**
Total fatigue severity	54.83±5.42	17.80±4.68	43.27	<0.001**

**p-value <0.001 (HS).

According to H2:

Table 5. Correlation between Total Fatigue Severity and Pittsburgh Sleep Quality (n=70).

Pittsburgh sleep quality	Total fatigue severity	
	r	p-value
Sleep quality	0.722	<0.001**
Sleep latency	0.881	<0.001**
Sleep duration	0.864	<0.001**
Habitual sleep efficiency	0.270	<0.001**
Sleep disturbance	0.887	<0.001**
Sleeping with medication	0.910	<0.001**
Day time dysfunction	0.905	<0.001**
Total PSQI	0.930	<0.001**

r: Spearman's rank correlation coefficient
**p-value <0.001 (HS).

Figure 2: Reveals that 90% of the clients had high fatigue severity pre intervention and improved and reduced to reach 4.3% post intervention with a highly statistically significant difference in comparison to pre intervention (p= <0.001).

Table 4: Shows highly statistically significant differences between pre and post palliative care intervention for clients' with chronic obstructive pulmonary disease in all items of Pittsburgh sleep quality and total fatigue severity (p= <0.001).

Table 5: Displays that there were highly statistically significant positive correlations between total fatigue severity and all components of Pittsburgh sleep quality index among chronic obstructive pulmonary disease clients (p= <0.001).

3. Discussion

Chronic obstructive pulmonary disease clients might experience fatigue that results from sleeplessness and decrease of the oxygen capacity [23]. Palliative care intervention increases the quality of life for these clients who are facing problems associated with life threatening disease, through the prevention and mitigate of suffering [24].

Concerning the demographic characteristics of the studied clients with COPD, the present study revealed that, for more than two thirds of the studied clients their age was between >30-40 years. This was due to avoid clients with co-morbid conditions that may affect the results and with age range 20-40 years. These results are in agreement with those of [25], in Egypt, about "effect of care protocol on the knowledge, practice and clinical outcomes of patients with chronic obstructive pulmonary disease", which mentioned that around two thirds of the studied sample were in age between 30-50 years. However, this finding was incongruent with study done by [26], about "preference for different relaxation techniques by COPD patients", which reported that, the mean age of Caucasian patients with COPD was 67 years.

In the present study finding, less than two thirds of studied clients were male, this finding may be due to the increased prevalence of smoking among this gender and the occupational exposure of them to polluted work environment more than females. This finding was supported by that of [27], in Egypt, about "quality of life in COPD patients", which stated that the majority of patients were male. However, this study result was in disagreement with that of [28], in North Shore-Long Island, about "Effect of pulmonary rehabilitation on fatigue Severity Scale in patients with lung disease", which reported that, more than half of the study subjects were female. Additionally, the [29], which mentioned that, females are more likely to have COPD than males.

In relation to educational level, the current study result showed that, an equal percentage of two fifths of clients were either primary, or university. This was due to inclusion criteria of this study to allow good understanding and application of the study intervention. These results were disagreement with those of [30], in the south of the Dutch, about "improving quality of life in depressed COPD patients", who found that more than one third of the studied subjects had low educational level.

As regards marital status, the results of the present study revealed that, nearly three quarters of the clients were married. This finding is supported by [31], in Brazil, about "influence that socio-demographic on quality of life in COPD patients on long-term home oxygen therapy", who mentioned that, more than half of the studied sample were married. This may reflect the load, as well as the higher levels of anxiety and stress experienced by the clients. These married individuals are a burden on their families because of the decrease expected roles in their life.

Regarding working type, this study finding showed that more than half of the studied sample were working as carpenters, bakers and shoe repair. So, this result conveys that these clients are more likely to have the disease because they were exposed to more pollutions that are risk factors for developing the disease. This result is in accordance with that of [32], in Egypt, about" effect of care protocol on the knowledge, practice and clinical outcomes of patients with chronic obstructive pulmonary disease", who reported that, less than three fifths of the studied subjects were exposed to irritating works.

The current study finding indicated that, there were highly statistically significant differences in all components of PSQI mean scores (Sleep quality, latency, duration, efficiency, disturbance, sleep with medications and day time dysfunction) between pre/post palliative care intervention application. This may be due to the continuous performance of the exercise intervention that affected positively on sleep quality. These findings were supported by those of [25], which revealed that there were highly statistically significant differences between mean scores of total sleeping pattern pre and post implementation of a care protocol for COPD patients.

Similarly, these results were similar to those of [33], in Italy, about "relaxation techniques for people with chronic obstructive pulmonary disease", which found that training sessions of relaxation techniques could decrease anxiety and produce benefits for some physiological parameters that have positive effect in quality of sleep in persons with COPD.

As regards fatigue severity items scores pre and post palliative care intervention, these study findings showed that there were highly statistically significant differences in all items of fatigue severity scores pre/post palliative care intervention. These findings were in agreement with those of the study done in Indonesia by [34], about "the effect of breathing exercises on the fatigue levels of patients with chronic obstructive pulmonary disease", who reported that training of respiratory exercises through face to face procedure while implementing treatment procedures may have significant effects on controlling fatigue and improving the symptoms. As well, [35], in Egypt, about "chronic obstructive pulmonary disease: Effect of nursing intervention protocol on clinical patients' outcomes post-weaning from mechanical ventilation", who explained that there was statistically significant change in the mean score of patients' fatigue post pulmonary rehabilitation program in both groups.

The results of the present study displayed that, there were highly statistically significant correlations between pre and post palliative care intervention for clients' with COPD in all items of Pittsburgh sleep quality index and

total fatigue severity scale. In addition, the Pittsburgh sleep quality index was improved post palliative care intervention with highly statistically significant difference in comparison to pre intervention. This results was in the same line with that of a study done in East of Turkey, by [36], about "effect of progressive relaxation exercises on fatigue and sleep quality in patients with chronic obstructive lung disease", who mentioned that, progressive relaxation exercises have positive effects on fatigue severity and sleep quality in patients with COPD and found statistically significant difference in global sleep quality and patients' sleep quality improving in the group applying the progressive relaxation exercises.

This may be due to the application of the palliative care intervention and relaxation technique which became an integral part of the care of clients with COPD because of its benefits as reducing anxiety and stress, facilitating sleep, and mitigate fatigue. Additionally, this reflects the effectiveness of the palliative care intervention in mitigating the sleep inefficiency among COPD clients.

The current study result reveals that fatigue severity was improved post intervention with a highly statistically significant difference in comparison to pre intervention. This result was supported by [37], in Uppsala, Sweden, about "physical activity and fatigue in chronic obstructive pulmonary disease", who clarified that fatigue was higher in subjects with low physical activity among those with COPD. Recently, this result also was similar to that of [38], in Iran, about "the effect of progressive muscle relaxation on the management of fatigue and quality of sleep in patients with chronic obstructive pulmonary disease", who found that progressive muscle relaxation program reduces fatigue, but has no effect on some subscales of sleep quality as sleep disturbances, use of sleeping medications, and daytime dysfunction. This may be owing to the fact that exercises and relaxation positively improves pulmonary function and thus reflect on mitigating dyspnea, fatigue and also sleep inefficiency.

The above mentioned results proved the aim of the present study and justified its first hypothesis, which revealed that the palliative care intervention will mitigate fatigue severity and sleep inefficiency to COPD clients.

The findings of the current study displayed that there were highly statistically significant positive correlations between total fatigue severity score and all components of sleep quality among COPD clients. These results were similar to those of a study conducted in Iran, by [9], about "the relationship between sleep quality with fatigue severity and academic performance", which clarified that a significant relation between sleep quality and fatigue severity (p≤0.000).

The above mentioned results proved the second hypothesis of the present study, which revealed that, there will be a significant relation between fatigue severity and sleep quality to COPD clients.

4. Conclusion

The palliative care intervention had a positive effect on chronic obstructive pulmonary disease clients and helped them to mitigate sleep inefficiency, which led to reduce fatigue. As well, the results showed highly statistically significant positive correlations between fatigue severity and all components of sleep quality index among chronic obstructive pulmonary disease clients.

5. Recommendations

- An illustrated booklet containing information about benefits of gradual relaxation exercises should be available in all chest outpatient clinics.
- Training of the nurses on how to apply the palliative care intervention to chronic obstructive pulmonary disease clients to cope with their disease.
- Counseling for public about the importance of exercises for chronic obstructive pulmonary disease.

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