



## Effect of Educational Program on Quality of Life among Elderly Patients with Chronic Obstructive Pulmonary Disease

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### Abstract

**Study's purpose:** to evaluate effect of educational program on quality of life among elderly patients with COPD. **Methodology:** A quasi-experimental design was conducted at chest diseases department in Sednawy Zagazig Hospitals. The Study sample was selected purposively which composed of 60 elderly. Data collected by a structured interview questionnaire, Saint George Respiratory Questionnaire, Modified Borg Dyspnea Scale, Pulmonary Function Test and COPD elderly patient's practices. **Major results:** revealed post-program statistically significant improvements in QoL scores, elderly COPD knowledge and practices ( $P < 0.001$ ). The follow-up phase showed some declines, but still significantly higher compared with the pre-program levels ( $P < 0.001$ ). **Clinical implications:** there were improvements in knowledge, practice and quality of life compared with preprogram therefore, the education program should be implemented in the study setting on a long-term basis to test its sustainability, and in other settings to confirm its effectiveness and for further improvements.

**Keywords:** Educational program, Quality of life, Elderly patient and COPD.

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### Introduction

The aging of the population is the mechanism by which older people become a proportionally greater proportion of the total population. Aging reflects the accumulation over time of changes in a human being including physical, psychological and social changes, which is the biological process of getting older in a negative context (Scherbov, 2019). The world's aging population is poised to rise in size. According to World Population

Prospects: the 2017 upgrade, the number of older people aged 60 and over is expected to more than double by 2050 and more than triple by 2100, increasing from 962 million worldwide in 2017 to 2.1 billion in 2050 and 3.1 billion in 2100 (Syafinas et al., 2018). According to the Central Agency for Public Mobilization and Statistics, the number of elderly aged 60+ years reached 6.5 million in Egypt; 3.5 million males and 3 million females, comprising 6.7 percent of the total population. [CAPMAS] (Ahram Online,

2019).

Chronic Obstructive Pulmonary Disease [COPD] is a common, preventable and treatable disease characterized by recurrent respiratory symptoms and restriction of airflow associated with an irregular inflammatory reaction that is typically triggered by significant exposure to noxious particles or gases due to airway and/or alveolar abnormalities. COPD presents periods of abrupt worsening of symptoms, called acute exacerbations, this significantly affecting quality of life due to a progressive disability rather than immediate death (Miravittles et al., 2014). Globally, COPD is a leading cause of morbidity and mortality. From 1990 to 2013, COPD grew from the eighth to the fifth leading cause of the global burden of disease, according to the Global Burden of Disease (GBD) report. COPD was the fourth leading cause of death worldwide in 2013, and COPD is become the third leading cause by 2020. (Varmaghani et al., 2019). COPD is a very heterogeneous lung disease, with multiple (mixed) phenotypes present. Chronic bronchitis, with predominant airway-related changes (inflammation and airway wall thickening) and increased mucus development, and emphysema with (severe destruction of the alveolar wall, hyperinflation and impaired gas exchange are well-known phenotypes in COPD. Other phenotypes of COPD are related to the number of exacerbations (Brandsma et al., 2017). The risk of developing COPD is related to the following factors: tobacco smoke, including cigarettes, pipes, cigars, water pipes and other forms of tobacco that are common in many countries, as well as environmental tobacco smoke (ETS) and indoor air pollution from biomass fuel used for cooking and heating in poorly ventilated

homes, a risk factor that affects women in developing countries in particular (Lange et al., 2015).

Quality of life (QoL) is composed of various domains that involve physical, mental, and social wellbeing; which greatly varies for each patient. Impaired QoL is strongly linked to shortness of breath, impaired physical activity and mental health concerns including; depression, anxiety, and psychological disorders. COPD is linked with impaired daily activities (DAs), and reduced QoL. Numerous studies have found that lower levels of education, more breathlessness, tiredness, lower BMI, and depressive symptoms have adverse effects on QOL (Paap et al., 2015).

Pulmonary Educational program (PEP) is a comprehensive non pharmacological treatment to COPD which involves multidisciplinary care, including patient assessment and education, exercise training, and psychosocial support, usually conducted in an outpatient setting. PEP improves exercise capacity, shortness of breath, health-related quality of life (QOL), and health care utilization including significantly reducing hospitalization and mortality even following acute exacerbation (Mi, 2017).

The task of the nurse was to avoid patient deterioration and to explain how to fix or overcome the reparative process of nature. The nurse should suspect COPD in patients who present with complaints of progressive dyspnea, cough, and mucus production. Assess for risk factor, including cigarette smoking or occupational exposure. Physical assessment findings may include the following as use of accessory muscles, change in chest shape, cyanosis, clubbing of the fingers, cough productive, weight loss and signs of malnutrition (Miller et al., 2015).

## **Literature review**

A previous study carried out in Bhubaneswar City, India by **Pati et al. (2018)** found that with advancing age, COPD has a considerable adverse effect on QoL and is worse in the population of the geriatric age group also, acute exacerbations impair QoL. The degree of severity of COPD could be determined by Saint George Respiratory Questionnaire which reflects the impairment of their QoL. On the other hand a cross-sectional study in Main University, Egypt concluded that the majority of studied elderly had poor knowledge & practice regarding COPD with impaired in respiratory functions (**Labieb et al., 2020**). In the study setting, the high prevalence, complexity, and health implications associated with COPD in elderly lead to increase the attention on this topic. Also, the research on QOL promoting activity among COPD elderly patients is totally lacking in the vast majority of countries particularly in Zagazig city. Hence, the aim of this study is to evaluate the effects of the education program on the quality of life among elderly patients with chronic obstructive pulmonary disease.

## **Method**

### ***Study Design and Ethical Considerations***

A quasi-experimental study design was utilized to conduct the current study from September 2019 up to the end of March 2020 and follow up started from 1 July up to the end of September at the chest diseases department in cardiothoracic hospital at Zagazig University Hospitals. The study was approved by the Research Ethics Committee (REC) and the postgraduate committee of the faculty of nursing at Zagazig University. Verbal consent was obtained from the patients after a description of the purpose of the study.

### ***Sample***

A Purposive sampling technique was

used in the recruitment of 60 elderly for this study, diagnosed with COPD for one year or more, free from any other respiratory or associated disorders as heart failure, coronary artery diseases and asthma and free from psychiatric disorders and dementia (reported by older adult) was selected in the recruitment of this study.

### ***Sample size calculation***

The sample size was calculated by using the software EPI Info software program from CDC, Version 6.04. Assuming the elderly patients with COPD admitted to the chest diseases department 43 monthly and confidence level 95% power of the test 80% and percent of improvement 29% according to reference (**Mirbagher, 2011**).

### ***Tool of data collection***

Five tools were used to collect necessary data. **Tool I:** A structured interview questionnaire that was developed by the researcher based on the literature review. It consisted of four parts; Part one was used to assess the demographic characteristics which included age, sex, marital status, educational level, residence, occupation before retirement, income, and income source. Part two to collect the medical history of the COPD as; duration of disease, complaints, date of admission, previous hospital admission and medication used. Part three smoking habits among elderly patients involved data about history of smoking, when did stop smoking, the reason for stopping smoking and negative smoker for him. Part four; the elderly patients' knowledge regarding COPD included questions about (respiratory system nature, COPD nature, COPD medication, how to deal with oxygen, nutrition, fluids, exercise, measures to reduce risk of dyspnea & airway irritants, periodic examination and questions about

source of their knowledge.

**Tool II: Saint George Respiratory Questionnaire (SGRQ) (Jones et al., 1992).**

It used to measure health impairment and disturbance in daily physical activity and effect on quality of life among patients with COPD through three dimensions (symptoms, activities and impact of diseases on daily life). Responses to each dimension have a particular empirically determined weight. The lowest possible weight is 0 (no impairment) and the highest is 100 (maximal impairment). In the current study, it's Cronbach  $\alpha$  was 0.78.

**Tool III: Modified Borg Dyspnea Scale (Borg, 1982):**

This scale was used to detect the difficulty rate of elderly patients breathing. It begins at 0 where breathing is not difficult for elderly patients and progresses to 10 where breathing difficulty is maximal for elderly patients. This scale is divided into two stages which consider the starting need for breathing exercises; the first stage is medium difficulty breathing (3-4) score and somewhat serious difficulty breathing (5-7) score. This means the lower score, the lower difficulty breathing and the higher score, the higher difficulty breathing, it's Cronbach  $\alpha$  was 0.72.

**Tool IV: Pulmonary Function Test (Spirometer):** It was used to calculate the amount of airway obstruction (determined by the ratio between the first-second forced expiratory volume and the forced vital capacity (FEV1/FVC) (Harpreet et al., 2011). The COPD Foundation uses five spirometric grades within these domains: SG 0: regular spirometry, SG 1: mild, post-bronchodilator ratio FEV1/FVC  $<0.7$ , FEV1  $\geq 60$  percent predicted, SG 2: moderate, post-bronchodilator ratio FEV1/FVC  $<0.7$ , FEV1  $<60$  percent

predicted, SG 3: severe, post-bronchodilator ratio FEV1/FVC  $<0.7$ , FEV1  $<30$  percent predicted. Taking into consideration, FVC may be normal or decreased slightly (Bhatt et al., 2019). On the other hand, According to GOLD 2017, there are four stages of COPD by FEV1% of predicted; mild:  $<80\%$ , moderate:  $50\%-79\%$ , severe:  $30\%-49\%$ , very severe:  $29\%$  (GOLD, 2017), it's Cronbach  $\alpha$  was 0.81.

**Tool V: COPD elderly Patient's practices observational checklists:** This tool was developed by the researcher based on the literature review to assess the elderly performance of the following skills: inspiratory muscle training technique, breathing retraining exercise, upper and lower extremities exercises, airway clearance techniques and using inhaler. It was consisted of steps evaluated on a three point Likert scale ranging from completely done the step with score two, incompletely done with score one and score zero (0) for not done the step at all. The total grades were summed to grades and performance was considered adequate if the percentage was 50% or more and inadequate if less than 50% it's Cronbach  $\alpha$  was 0.83.

**Statistical analysis**

Data entry and statistical analysis were done using SPSS 20.0 statistical software package. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, means, standard deviations and medians for quantitative variables. Cronbach alpha coefficient was calculated to assess the reliability of the developed tools through their internal consistency. Qualitative categorical variables were compared using chi-square test. Paired Quantitative continuous data were compared using the paired t test. To decide whether there are variations on a

dichotomous dependent variable, the McNemar test was used. The Friedman test is the non-parametric alternative, with repeated steps, to the one-way ANOVA. When the dependent variable being evaluated is regular, it is used to monitor for differences between classes. Pearson correlation was used for assessment of the inter-relationships among scales and quantitative variables. Spearman rank correlation was used for assessment of the inter-relationships among quantitative variables and ranked ones. Statistical significance was considered at  $p\text{-value} \leq 0.05$  and highly significant at  $p\text{-value} \leq 0.01$ .

## Results

Among 60 elderly patients, the age was ranged between 60 and 82 years, with mean  $72.25 \pm 7.33$  years, with more male (91.7%). In addition, 98.3%, 43.3%, and 61.7% of the studied elderly were married, had intermediate education and worked as craftsman respectively, before retirement where 29.7% of them were pottery/ ceramic workers. In addition, 71.6% of the studied elderly were obese (**Table 1**).

As **Figure (1)** illustrates a statistically significant differences in total mean older patients score of COPD knowledge pre and post the educational program ( $P=0.001$ ). Before the program, the total mean score of COPD knowledge was  $13.30 \pm 2.25$  which increased to  $31.52 \pm 4.75$  at the post program phase, and declined to  $28.21 \pm 3.84$  at the follow-up phase. These improvements were statistically highly significant.

**Figure (2)** demonstrates, statistically significant difference in total mean score of practice among the studied older patients throughout the study phases pre, post and follow the educational program ( $P<0.001$ ).

Before the program, total mean score of practice was  $25.16 \pm 5.95$ . This increased to  $125.05 \pm 4.40$  at the post program phase, and declined to  $104.33 \pm 5.95$  at the follow-up phase. These improvements were statistically highly significant.

**Figure (3)** presents a statistically significant differences in total mean score of SGRQ among the studied older patients pre and post the educational program ( $P=0.000$ ). Before the program, total mean score of SGRQ was  $83.15 \pm 4.96$  which decreased to  $73.94 \pm 3.22$  at the post program phase, and increased slightly to  $74.76 \pm 3.78$  at the follow-up phase. These improvements were statistically significant.

**Table (2)** shows significant negative correlation between SGRQ score and COPD knowledge score, practices (observational checklist) score of the studied older adult. Regarding to older COPD patients' knowledge, this score had statistically significant negative correlation with SGRQ score. On the other hand, COPD knowledge score had positive correlations with practices score. Concerning to practice (observational check list) of the studied older patients, this score had statistically significant negative correlation with SGRQ score and positive correlations with COPD knowledge score.

## Discussion

Based on the current study findings that revealed very low percentages of adequate knowledge about COPD. The deficient pre-program knowledge depicted among the elderly in the present study might be attributed to the low level of education among some of them, Lack of health literacy about causes, symptoms and COPD management. In agreement with this result, **Sharma et al. (2016)** in India who reported that the most of the COPD patients had low/inadequate knowledge regarding

COPD. Also, Egyptian study confirmed this point by **Labieb et al. (2020)** who mentioned that the majority of study sample had poor knowledge and practice. On the same line a study done in Italy by **Ivziku, (2018)** showed that patients possess limited knowledge of COPD, especially on chest infections, and exacerbations related to a low education level among the studied patients.

Regarding COPD practices among the studied older patients, the current results clarified that there was poor level of all practices among older patients. The poor pre-program practices might be attributed to that the studied older patients had inadequate knowledge regarding the importance of breathing exercises for COPD management. These findings were in accordance with **Amer et al. (2018)** in Egypt who reported that most of the COPD patients had poor practices regarding COPD.

The recent study demonstrated that COPD older patients had significantly impaired QoL based on high SGRQ scores across (symptom, activity, impact, and total scores), among all domains affecting QOL related to poor knowledge and practices regarding COPD management. In congruence with this study finding, a study conducted by **Farag et al. (2018)** in Tanta (Egypt) explained that, based on high SGRQ ratings, COPD patients had significantly impaired QoL across (symptom, activity, impact, and total scores).

After implementation of the current study educational program, there were statistically significant improvements in older patient's knowledge. This indicates the effectiveness of the program in leading a positive change in their knowledge. This improvement was accompanied with little declines at the follow-up phase. This is

expected given the effect of old age on memory, especially the short term memory. In support of this, a study done in Tehran (Iran) by **Fotokian et al. (2017)** demonstrated that the studied sample provide useful knowledge regarding COPD after exploring experiences of the empowerment of older people with COPD.

The current findings demonstrated significantly variation of total mean score of practices before and after educational program. Before the program, total mean score of practice was  $25.16 \pm 5.95$ . This increased to  $125.05 \pm 4.40$  at the post program phase, and declined slightly at the follow-up phase  $104.33 \pm 5.95$ . This indicates the effectiveness of the program in leading a positive change in their practices so QoL was improved. In support with these results a study in Assiut, Egypt by **Al Karn et al. (2018)** who showed that the effectiveness of breathing exercise training (practices) in patients with COPD on QOL.

The current study revealed that, COPD knowledge improvement, the QOL also improved and approved by the current results that revealed a statistically significant negative correlations between total score of COPD knowledge among the studied older patients and their quality of life (SGRQ) score that mean when COPD knowledge of older patients improved, the total score of QoL was decreased (mean good QoL). On the same line, a study in China by **Yang et al. (2019)** demonstrated that there was a significant positive correlation between the level of knowledge of COPD and improved their quality of life.

Concerning practices of the studied older patients, after implementation of the current study educational program, this score had statistically significant negative correlation with SGRQ (QOL) mean the higher total score of practice, the lower

score of QoL (good QoL). It could be due to that the more breathing exercises among elderly patients that make them able to engagement of activities (practice improvement) and therefore good QoL. In support with these result a study in India by **Abraham (2018)** reported that breathing exercises (practices) among studied older patients had negative correlation with SGRQ and in agreement with this present study finding, a study in Saudi Arabia by **Al-Surimi et al. (2019)** who found that the overall QOL and its domains are closely correlated with the COPD practice of older patients.

**Evaluation the effect of educational program** on improving QoL in elderly patients at chest diseases department in Zagazig Hospital was the aim of the present study. The positive effect of the program on older COPD patient's QoL was both direct and indirect. The indirect effect was improved knowledge as well as improved COPD patient practices and good exercises practices findings. In support of this, the scores of COPD knowledge and practice were shown to be significantly and negatively correlated with QOL while, the score of COPD patient and knowledge was significantly positively correlated. Thus, the better the COPD knowledge and acquired skills in performing observational checklist practices lead to better QoL.

In congruence with this, a study done in Tanta (Egypt) by **Ibrahim. (2018)** concluded that the education program of patients regarding knowledge for COPD and healthcare practice is very effective in improving their self-management skills, practice and therefore improved quality of life but they need reinforcement follow-up. Similarly, a study done in Barcelona (Spain) by Ana et al. (2017) demonstrated

that the educational intervention decreased hospital admission and visits to emergency room, modified tobacco cessation in 77.8%, improved knowledge of COPD, improved quality of life and satisfaction improved in 66.6% of the studied sample. Also, a study goes on this stream, done in Shanghai, China by **Duan et al (2020)** clarified that chronic obstructive pulmonary disease (COPD), seriously affects self-management of the disease and quality of life (QoL). Pulmonary rehabilitation (PR) has been proposed as an exercise-based recovery program for its possible efficacy in enhancing cognitive function and QoL.

In summary, this study conducted to evaluate the effects of pulmonary educational program on knowledge, practice and QoL in elderly patients with COPD. The study results were clarifying the effects of pulmonary educational program on knowledge and practice was significantly correlated with QoL score.

On the contrary, a study by **Aboumatar et al. (2019)** concluded that, a 3-month program that integrated adjustment and long-term self-management assistance resulted in substantially higher COPD-related hospitalizations and emergency department visits without enhancing the quality of life in a single-site randomized clinical trial of patients hospitalized due to COPD. There was no improvement in the quality of life.

#### **Limitations of the Study**

The limitation of the study was that the author didn't have any data about the QoL among elderly before diagnosed with COPD. Purposive sampling technique could also be considered as a limitation.

#### **Conclusion**

The pulmonary educational program is effective in enhancing the quality of life

among older COPD patients. The implementation of educational program is also effective in improving older patients' knowledge, practices regarding COPD. Therefore, the educational program is a widely accepted approach in the prevention complication of COPD and further exacerbation, a process of transmission of knowledge and skills that are necessary for improvement quality of life among elderly patients with COPD.

### **Recommendation**

Based on the results of this study, the developed educational program regarding COPD should be implemented in the study setting on a long-term basis to test its sustainability, and in other settings to

confirm its effectiveness and for further improvements. Teaching elderly patients with COPD how to apply breathing exercises and use incentive spirometer and using inhaler correctly, providing teaching program about COPD to rural area and illiterate persons also, further research is suggested to explore the effectiveness of multiple-approach nursing interventions in improving the QoL of elderly with COPD.

### **Declaration of Conflicting Interests**

The Author(s) declare(s) that there is no conflict of interest.

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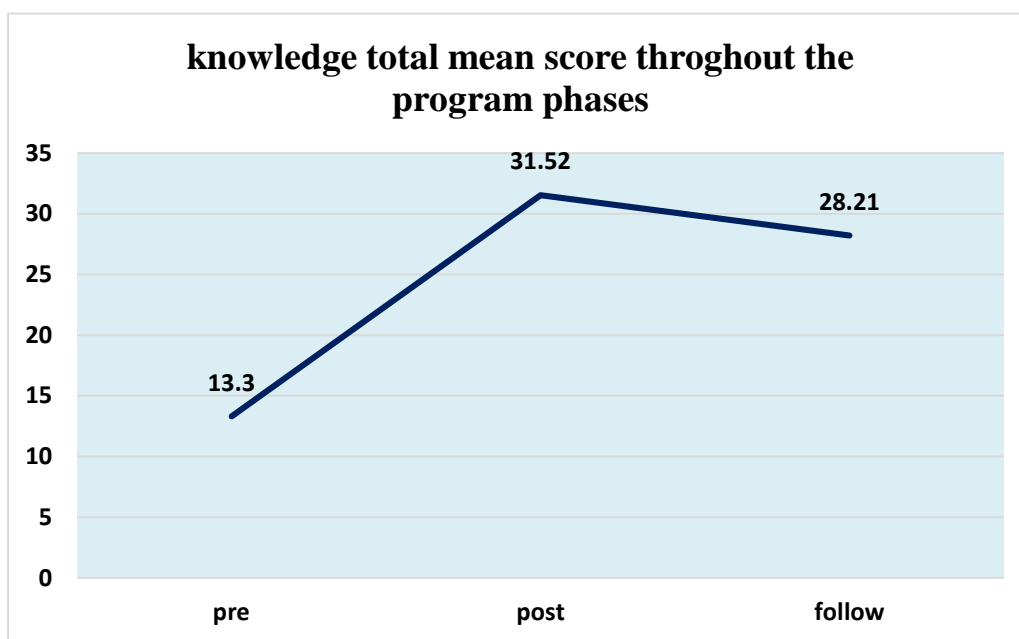


Table 1: Demographic characteristics of the studied elderly patients (N=60):

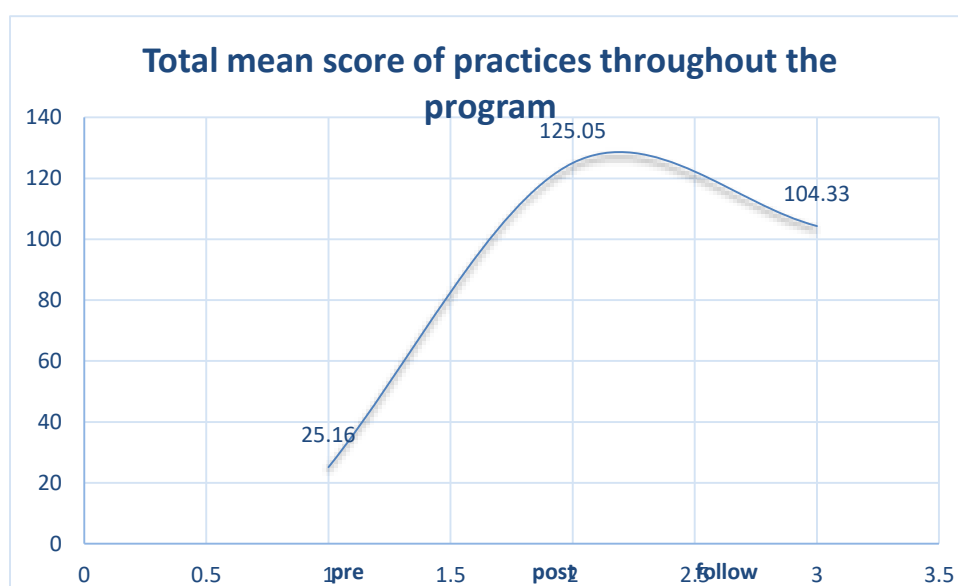
Demographic characteristics	Frequency (n=60)	Percent
<b>Age group: /year</b>		
<b>60</b>	22	<b>36.7</b>
<b>70</b>	36	<b>60.0</b>
<b>80 +</b>	2	<b>3.3</b>
<b>Mean ± SD (range)</b>	72.25 ± 7.33 (60 – 82)	
<b>Gender: Male Female</b>	55 5	<b>91.7</b> <b>8.3</b>
<b>Marital status:</b>	59	<b>98.3</b>
<b>Married Single</b>	1	<b>1.7</b>
<b>Education: Illiterate Read &amp; write</b>	9	<b>15.0</b>
<b>Intermediate University</b>	12 26 13	<b>20.0</b> <b>43.3</b> <b>21.7</b>
<b>Occupation before retirement: House wife</b>	3	<b>5.0</b>
<b>Employee,</b>	20	<b>33.3</b>
<b>Craftsman (worker):</b>	37	<b>61.7</b>
<b>Agriculture (farmer + Fertilizer plant)</b>		
<b>Construction (Cement Factory)</b>	7	<b>18.9</b>
<b>Pottery/ceramic workers</b>	7	<b>18.9</b>
<b>Chemicals and soap factory Paint worker and</b>	11	<b>29.7</b>
<b>Doco cars Chef</b>	6 5 1	<b>16.3</b> <b>13.5</b> <b>2.7</b>
<b>BMI:</b>		
<b>Normal Weight</b>	9	<b>15.8</b>
<b>Over weight</b>	43	<b>71.6</b>
<b>Obese</b>	8	<b>13.4</b>
<b>Height (cm)</b>		<b>162.87 ± 7.21</b>
<b>Weight (kg)</b>		<b>69.53 ± 14.29</b>
<b>BMI (kg/m<sup>2</sup>)</b>		<b>26.62 ± 4.65</b>

@ Not mutually exclusive

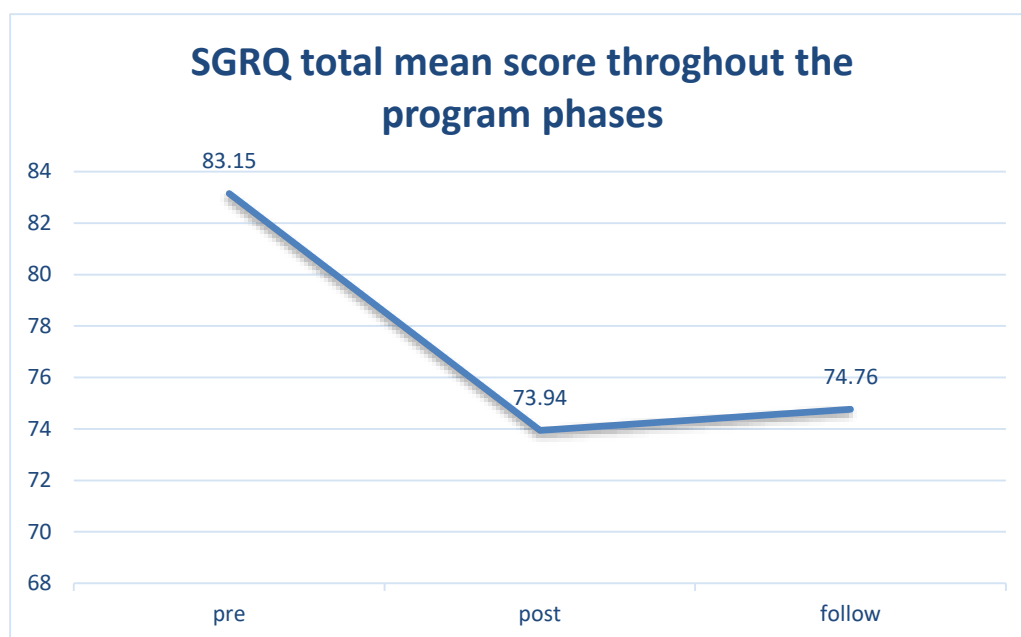
Underweight = <18.5      Normal weight = 18.5–24.9      Overweight = 25–29.9      Obesity =  
BMI of 30 or greater



**Figure 1:** Total mean score of COPD Knowledge among the studied elderly patients throughout the study phases [pre, post and following] (n=60)



**Figure2:** Total mean score of practice among the studied elderly patients throughout the study phases [pre, post and following] (n=60)



**Figure 3:** Total mean score of SGRQ among the studied elderly patients throughout the study phases [pre, post and following] (n=60)

**Table (2):** Correlation matrix of SGRQ, COPD knowledge and practice (observational checklist) scores, dyspnea level and pulmonary function test scores:

Scores	Spearman's rank correlation coefficient				
	SGRQ	COPD knowledge	practice (observational check list)	dyspnea level	Pulmonary function test
SGRQ		-.269*	-.519**	.512**	-.621**
COPD knowledge	-.269*		.411**	-.235	.283*
practice (observational check list)	-.519**	.411**		-.152	.093
dyspnea level	.512**	-.235	-.152		-.468**
Pulmonary function test	-.621**	.283*	.093	-.468**	

(\*\*) statistically significant at  $p < 0.01$

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