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Compliance to self-care management among adults with chronic obstructive pulmonary disease

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Abstract---Background: Chronic obstructive pulmonary disease (COPD) is still defined as a disease state characterized by poorly reversible airflow limitation induced by cigarette smoke and/or other noxious particle and gases. The aim of this study was to evaluate the effect of intervention program for adults with chronic obstructive pulmonary disease on their knowledge and practices regarding compliance to self-care management. Research design: A Quasi-experimental research design was utilized to fulfill the aim of this study. Setting: This study was conducted at outpatient clinic of Menia Chest Hospital, Menia Governorate, Egypt. Sample: A purposeful sample of 115 COPD patients. Tool; one tool was used included six parts. (1 socio-demographic characteristics of COPD patients, (2 medical history of COPD patients (3 the effect of COPD on activity of daily living and health status of COPD patients (4 Patients' knowledge about COPD, (5) adults 'compliance to self-care management and (6) adults reported practices regarding self-care management. Results: less than two third of the studied sample had unsatisfactory total knowledge of COPD, in pre intervention program, comparing to less than three quarter of them had satisfactory total knowledge regarding COPD in post intervention program. Also less than two third of the

studied sample had poor compliance to self-care management in pre-intervention program, comparing to the majority of them had good compliance to self-care management in post-intervention program. The minority of the studied sample had done practices regarding self-care management in pre-intervention program comparing to slightly less than two third of them in post-intervention. Conclusion: There were improvement in studied sample knowledge, compliance and practices after intervention, there are highly statistical significance differences between the studied sample knowledge and age, residence, educational level and occupation in pre-intervention program and there highly positive correlation between studied sample knowledge regarding COPD and their compliance to self-care management in pre-intervention program. Recommendation: the study recommended that; continuous educational program for COPD patients with chronic obstructive pulmonary disease should be applied periodically in order to improve knowledge, practice and clinical outcomes for those patients.

Keywords---compliance, self-care management, chronic obstructive pulmonary disease.

Introduction

Chronic obstructive pulmonary disease (COPD) is the third leading cause of death in the United States and across the world. COPD-related exacerbation is the leading cause of hospital admissions among adults and is the cause of an estimated 120,000 deaths annually in the United States (*Roversi and Fabbri, 2018*). Chronic obstructive pulmonary disease is still defined as a disease state characterized by poorly reversible airflow limitation induced by cigarette smoke and/or other noxious particle and gases. COPD is characterized by fixed airflow obstruction and limited reversibility. Exacerbations of COPD are believed to be one of the leading causes of morbidity and mortality worldwide. Although COPD is a major global health burden, adults lack knowledge of disease severity, predominantly in relation to acute exacerbations (*Hashimoto et al., 2016*).

Cigarette smoking, the most important and best-established risk factor for COPD, is also a major risk factor for all other chronic diseases and cancer, not only because it damages the lung directly, but also because it may simultaneously cause systemic effects affecting all organs. The most common comorbidities of COPD that are possibly related to the systemic effects of smoking are congestive heart failure, arrhythmias, hypertension, peripheral and coronary artery diseases, diabetes and metabolic syndrome, osteoporosis, cancer (particularly lung cancer), pulmonary vascular abnormalities, psychiatric disorders, cachexia, skeletal muscle abnormalities, and infections (*Sparks and Karlson, 2016*). Compliance to self-care management is the behavior that adults suffering from chronic diseases engage in to actively identify the challenges and problems associated with their health condition and to resolve these challenges and problems. Interventions to improve outcomes of chronic disease and/or reduce hospital readmissions have

been developed on the basis of self-management principles (Hançerlioğlu et al., 2019).

Compliance to self-care management is considered an integral component of the chronic care model of disease management, which also includes clinical information systems, delivery system redesign, decision support (guidelines), health care organization, and community resources. Self-management knowledge can support adults with COPD in managing their symptoms; preventing complications; and making adequate decisions on medication, exercise, breathing techniques, diet, and contacting community health nurse (*Chen and Yao, 2018*). Educational interventions are the most common strategies for compliance to self-care management that might be as simple as provision of written material alone, instruction or demonstration in inhalation techniques, or as complex as a training program or structured program including provision of comprehensive information on disease pathology, treatment plan, medication, and self-management with action plan (*Lenferink et al., 2017*). Community health nurse (CHN) can improve the health status of their adults and avert unnecessary COPD-related readmissions and life-threatening exacerbations using techniques that allow quick recognition of the triggers and symptoms of exacerbation (*Liang et al., 2017*).

Significance of the study

The World Health Organization (WHO) estimated that 300 million people had asthma and 210 million had COPD and many more suffered from other chronic respiratory disease (CRDs); in total, these cases accounted for 4% of global burden of disease. To date, CRDs affected more than one billion of people all over the world (*WHO, 2015*). In terms of mortality, chronic respiratory diseases were responsible for the four million deaths worldwide per year and for approximately 8% of death from non-communicable diseases (NCDs) occurring under the age of 70 years in 2012 (*WHO, 2014; WHO 2016*). (*Galal et al., 2018*) revealed in their study that most of the asthma and COPD adults in Egypt were non-adherent to their medications. Prevalence of (COPD) in Qena Governorate was 6.6% with high rates among smokers. In Mallawy Chest Hospital, Menia Government, Egypt the prevalence of COPD among high-risk adults in Egypt was estimated to be about 10% (*Badway et al., 2016*).

Aim of the Study

The aim of this study was to evaluate the effect of intervention program for adults with chronic obstructive pulmonary disease on their knowledge and reported practices regarding compliance to self-care management through:

- Assessing health status of adults with chronic obstructive pulmonary disease
- Assessing adults' knowledge regarding chronic obstructive pulmonary disease.
- Assessing adults' reported practice regarding their compliance to self-care management of chronic obstructive pulmonary disease.
- Designing and implementing intervention programs for adults with chronic obstructive pulmonary disease about their compliance to self-care management.

- Evaluating the effects of intervention program for adults with chronic obstructive pulmonary disease on their knowledge and reported practices regarding compliance to self-care management.

Research Hypothesis

The intervention program will improve the patients' knowledge and practices regarding compliance to self-care management of chronic obstructive pulmonary disease.

Research design

A Quasi-experimental research design was utilized to fulfill the aim of this study.

Technical Design

Research Setting

The study was conducted in the outpatient clinic of Menia Chest Hospital, Menia Governorate, Egypt. It's the only specialized hospital for treatment of chronic respiratory diseases in Menia Governorate. It is the main hospital that serves all patients with chronic respiratory disease in Menia city and its villages.

Sample

A purposive sample had used for choosing the study sample, the total number of the study sample were (115) of adult with COPD. It was representing 10% of the yearly average, from the total (1155) adults with COPD attending the study setting in chest outpatient clinics of Menia Chest Hospital from 1/7/2018 to 30/6/2019.

Subject Criteria

Criteria of selection had included:

- Adult diagnosed with COPD.
- Age will ranged from 18 yrs. to 60 yrs.
- Those who are free from physical or mental disability.

Data collection tool

One tool had been used to conduct this study that designed after reading related literature and taking expert's opinion; it had been written in Arabic language and contained six parts as follow.

Tool I

- **Part I:-**Demographic data of the study sample i.e, age, sex, residence, education level and occupation and type of family.
- **Part II:-**Medical history of the studied sample that include previous and current medical history i.e, smoking, chronic disease, previous hospitalization.

- **Part III:-** Assessment of the effect of COPD on patients' activity of daily living. It composed of fourteen closed-ended questions about the adult ability to bath himself, move, feed self, use a toilet, grooming self, travel, make a shopping, prepare food, perform the housework, make own bed, take own medication, manage own money, Care for children and communicate with others.

Scoring system

The score range from 0-2 which is composed of three items, score (0) for never, (1) for some times, (2) for always. The impact score ranged from (1-28) and classified into three level, (<14) for fully independent, (14-21) for independent with help and (>21) for fully dependent.

Assessment of the effect of COPD on adult health status (To, 2017)

It composed of twenty eight closed-ended questions to assess the effect of COPD in the respiratory system, skeletal system, cardiovascular system, digestive system and psychological status.

Scoring system

The score range from 0-2 which is composed of three items, score (0) for never, (1) for some times, (2) for always. The impact score ranged from (1-56) and classified into three level, (<28) for mild or no effect, (28-42) for mild to moderate effect and (>42) for severe effect.

- **Part IV:** Assessment of patents' knowledge about COPD which was composed of twenty three close-ended questions such as definition, causes, symptom, risk factors, complication, precaution measures, preventive measures and treatment (*Johnson, 1989; Swain, 2004*).

Scoring system

The total optimal score = 23 point, this score ranged between (0) for incorrect answer, (1) for correct answer. The score ranged from (1-46) and represent 100% for all items for every question which categorized into two levels as unsatisfactory knowledge level for 0- 69% and satisfactory knowledge level for 70-100% (*Mohammed et al., 2020*).

- **Part V:-**Assessment of patients compliance to self-care management which was composed of twenty three close-ended questions such as compliance to treatment, health nutrition, enough rest, exercise, health environment, correct use of inhaler and breathing exercise (*Johnson, 1989; Swain, 2004*).

Scoring system

The optimal score were 46, the score range from 0-2 which is composed of three items, score (0) for never, (1) for some times, (2) for always and represent 100% for all items for every question which categorized into two levels as poor compliance levels

for 0<70% and good compliance level for 70-100% (*Ibrahim & Abd El-Maksoud, 2018*).

- **Part VI:-** assessment of patients reported practices regarding self-care management, it was adapted from (*Johnson, 1989; Swain, 2004*). It composed of 8 close-ended questions such as correct use of inhaler and breathing exercise.

Scoring system

The optimal score were 8, the score range from 0-1 which is composed of two items, score (0) for not done, (1) for done and represent 100% for all items for every question which categorized into two levels as not done practices levels for 0<70% and done practices level for 70-100% (*Ibrahim & Abd El-Maksoud, 2018*).

Validity and Reliability

Validity

The tool of the study was given to a group of five experts in nursing community field. The tool was examined for content coverage, clarity, relevance, applicability, wording, length, format, and overall appearance. Based on experts' comments and recommendations; minor modifications had been made.

Reliability

Internal consistency of interview questionnaire was assessed with the Cronbach's alpha coefficient. Cronbach's alpha coefficient of 0.00 indicates no reliability and a coefficient of 1.00 indicates perfect reliability. However, a reliability coefficient of 0.70 is acceptable.

Table 1
Cronbach's alpha for each section of the interview questionnaire tools

Scale title	Cronbach's Alpha
Part III:-The effect of COPD activity of daily living and health status	.723
Part IV: Patents' knowledge about COPD	.711
Part V:- Patients compliance to self-care management	.872
Part VI:- reported practices regarding self-care management	.758

Operational Design

Pilot study

A pilot study was carried out, 10% of the total subjects were recruited for the pilot study before conducting the actual study to determine the size and the method of selection of the sample, to test the feasibility, clarity and applicability of the study tool also to test relevancy and clarity of the content, to calculate the time needed for conducting the study and to estimate the needed time to be filled in the tool. The needed modifications were carried out. The pilot study was excluded from the total study sample.

Administration Design

An official permission to carry out the study had been obtained from administrators of Menia Chest Hospital through an issued letter from the Dean of Faculty of Nursing/ Ain Shams University.

Fieldwork

- An official permission to conduct the study was obtained from directors of Menia chest hospital. The researchers explained to the patient their ethical rights and got their consent.
- Data were collected over a period of eight months from the beginning January 2021 to the end August 2021. Each patient was interviewed individually three times to collect the data before implementing the intervention program, and one during implementing the program and after finishing the intervention program.

The Present study was conducting in four phase

Preparatory phase

A review of recent current national and international related literature in various aspects of the disease was applied to design the study tool and to be acquainted with various aspects of the disease.

Assessment phase (2 months)

It included assessment the level of the demographic characteristics, health history, and adults' knowledge regarding their disease, self-care practices and degree of compliance to self-care management through assessment tool.

Planning and implementation phase (2 months)

A plan was formulated for each patient based on assessment phase and literature review, the researchers prepared the training places, teaching aids and media (picture, and handouts). A booklet as a teaching aid was prepared. The objective to improve compliance of the COPD adult to self-care management according to structured time plan and implemented through:

Theoretical part (2 months)

it had been implemented in 6 sessions, once a week and each session take about 1 hour. Each session included five to seven adult with COPD. The researcher started each session with summary of the previous one. The researcher use teaching aids and media (picture, and handouts) to improve patients' knowledge. The 1st session include an introduction about COPD disease, definition of disease, mechanism of the disease, risk factors, sign and symptoms, causes and warning sign of the disease of the disease. The 2nd Session was to discuss the complications of the disease, diagnostic measures and lab investigation. The 3rd Session was to discuss the management of COPD, pharmacological, and non-pharmacological measures. The 4th Session was to discuss the management of COPD exacerbation. 5th and 6th session was to discuss the definition of the concept of compliance to self-care management and principles of compliance to self-care management.

Practical part (1 month)

This had been implemented in 2 sessions, in the last week after completion of the theoretical part and each session took about 1 hour. The 1st Session: - The content of this session was to teach the participants the correct methods of using inhaler devices. The 2nd Session: - The content of this session was to teach the participants the correct methods of practicing breathing exercise (diaphragmatic and pursed lip breathing exercises).

Evaluation phase (1 month)

The evaluation of the effectiveness the intervention program was carried after finishing the program using the pre-test questionnaire and the observation checklist.

Ethical Consideration

Approval was taken from the ethical commitment at the Faculty of Nursing, Ain Shames University. A written consent had been obtained from the patients with COPD. Confidentiality of data was given by assurance that no individual would be identifiable in any publication of the data. Individual anonymity was achieved by coding participant's information. Participants had been informed verbally about their right to withdraw from the study at any time.

Statistical Design

Data collected and coded. Then the collected data were organized, analyzed using appropriate statistical significance tests using the Computer Statistical Package for Social Science (SPSS), version 21. Data presented by using descriptive statistics in the form of percentages. The statistical analysis has included the arithmetic mean, standard deviation and X2 test. Degrees of significance of results were considered as follow:-

- P-value > 0.05 not significant
- P-value ≤ 0.05 Significant
- P-value ≤ 0.01 Highly Significant

Results

Table (1): shows that the age of 50.4% of the studied sample is in between 51:60 years, 69.6% of them are male, 78.3% of them are married, 72.2% live in extended family and 79.1% live in urban region. Regarding the educational level 57.4% of them had Secondary education. Regarding the occupation 47.0% of them had vocational work and 80% of them had insufficient income. Figure (1): clarifies that 60% of the studied sample had unsatisfactory total knowledge of COPD, in pre-intervention program, comparing to 73% of them had satisfactory total knowledge regarding COPD in post-intervention program. Figure (2): illustrates that 64.3% of the studied sample had poor compliance to self-care management during pre-intervention program, comparing to 88.7% of them had good compliance to self-care management during post-intervention program. Figure (3): shows that only 5% of the studied sample had done practices regarding breathing exercise in pre-intervention program comparing to 66% of them in post-intervention program. Table (4): shows that there highly positive correlation between studied sample knowledge regarding COPD and their compliance to self-care management in pre intervention program. But there is negative correlation between studied sample knowledge regarding COPD and their compliance to self-care management in post intervention program.

Table 1
Number and Percentage Distribution of Adults with Chronic Obstructive Pulmonary Disease according to their socio-demographic characteristics (no.=115)

Characteristics	No	%
Age / years		
30:40	24	20.9
41:50	33	28.7
51:60	58	50.4
Gender		
Male	80	69.6
Female	35	30.4
Marital Status		
Married	90	78.3
Divorced	7	6
Widowed	18	15.7
Residence		
Urban	91	79.1
Rural	24	20.9
Educational level		
Not read or write	12	10.4
Basic education	33	28.7
Secondary education	66	57.4
University education	4	3.5
Occupation		
Vocational	54	47.0
Employee	32	27.8

Housewife	29	25.2
Retired	0	0.0
Type of family		
Extended	83	72.2
Nuclear	32	27.8
Income		
Sufficient	23	20
Insufficient	92	80

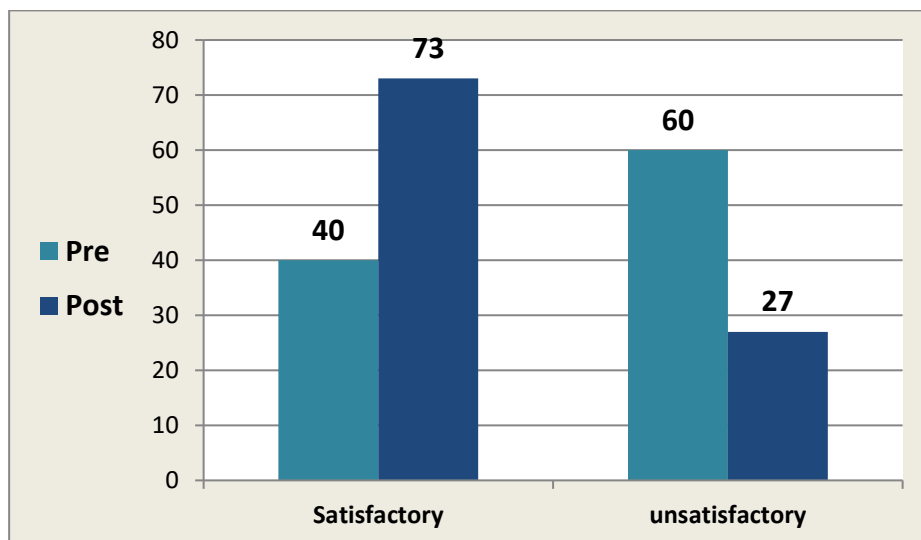


Figure 1. Distribution of Adult with Chronic Obstructive Pulmonary Disease according to their total knowledge regarding COPD during Pre/Post Intervention Program (no.=115)

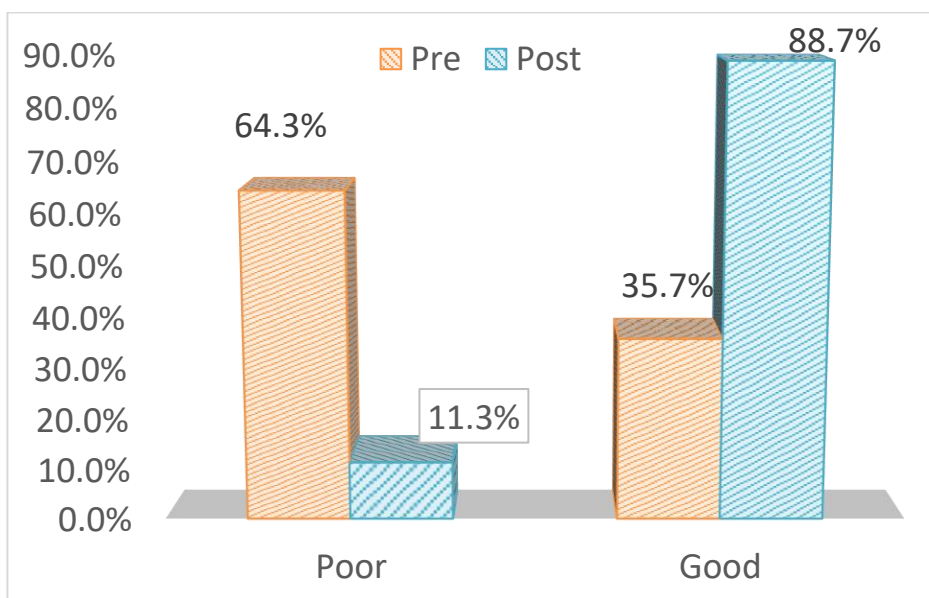


Figure 2. Distribution of Adult with Chronic Obstructive Pulmonary Disease According to their Total Compliance to Self-Care Management during Pre/Post Intervention Program (no.=115)

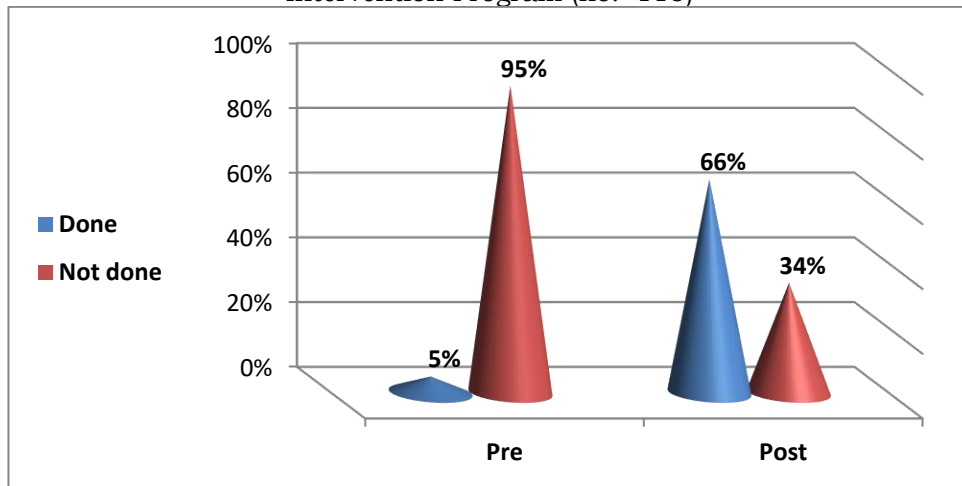


Figure (3): Distribution of Adult with Chronic Obstructive Pulmonary Disease According to their Total Reported Practices Regarding COPD self-care management during Pre/Post Intervention Program (no.=115)

Table 4

Correlation between Knowledge Scores of the Studied Sample and Compliance to Self-Care Management Pre & Post Intervention Program (n = 115)

			Knowledge (pre)	Knowledge (post)
Pre	Compliance to self-care management	r	0.860	
		P – value	0.0001**	
Post	Compliance to self-care management	r		0.097
		P – value		0.301

Discussion

Chronic Obstructive Pulmonary Disease (COPD) is an increasing cause of mortality and chronic morbidity worldwide. COPD is characterized by persistent respiratory symptoms that include breathlessness, cough and/or sputum production. Self-management interventions in patients with COPD have the goals of motivating, engaging and supporting patients to positively adapt their behaviors and develop skills to better manage their disease *Ogunbayo et al., (2017)*. Regarding the studied sample total knowledge regarding COPD, the current study clarified that less than two third of the studied sample had unsatisfactory total knowledge of COPD, in pre intervention program, comparing to less than three quarter of them had satisfactory total knowledge regarding COPD in post intervention program. The deficient pre-program knowledge depicted among the studied sample in the present study might be attributed to the low level of education among some of them, lack of health literacy about

COPD and inadequate health services that to provide them with accurate knowledge, Figure (1).

This result come in accordance with *ShokryAbd-Allah & ElsayedElshora, (2021)* who studied "Knowledge and Practices Regarding Chronic Obstructive Pulmonary Disease among Elderly Patients at chest diseases department in cardiothoracic hospital at Sednawy Hospital in Zagazig city. (n=60)" and stated that very low percentages of adequate knowledge about anatomy of respiratory system, diet& fluid for COPD patient, dealing with &causes of dyspnea exacerbation and exercise for COPD among the studied elderly. Also this result come in the same line with *Elesawy et al., (2018)* who studied " Effect of Nursing Intervention Program on Patients knowledge and Practice regarding Breathlessness in patients with Chronic Obstructive Pulmonary Disease in chest department at Aswan University Hospitals (n=40)" and reported that all of the studied sample had unsatisfactory knowledge regarding COPD in pre intervention program that improved to the majority of them (90%) had satisfactory knowledge regarding COPD.

In addition this result comes in accordance with *Labieb et al., (2020)* who stated that the vast majority of studied sample had poor knowledge regarding COPD. In addition this result was supported by *Khadyer & Hassan, (2019)* who studied " Effectiveness of an Instructional Program on Knowledge for Patients with Chronic Obstructive Pulmonary Disease Toward Self-Care Management at Al- Hussein Teaching Hospital in Al- Nasiriyah City (n=60)" and reported that the instructional program regarding COPD had a positive effect in the patients' knowledge. More over this result come in agree with *Wouters et al., (2020)* who studied " Information needs of older patients living with chronic obstructive pulmonary disease (COPD) indicated for a specific geriatric rehabilitation program: a prospective cohort study in the Netherlands (n=158) " and stated that the in adequate knowledge regarding the disease, diet, smoking and medication pre the intervention program and their knowledge had improved after the program.

This result was congruent with previous studies done by *Sharma et al., (2016)* who studied " Effectiveness of self-instructional module on knowledge of self-care management of chronic obstructive pulmonary disease among patients with chronic obstructive pulmonary disease" and reported that a highly statistically significant improvement in all items of knowledge post intervention, reflecting the positive effect of the education program, and the need for its application for COPD patients. Regarding the total compline to self-care management the present study illustrated that less than two third of the studied sample had poor compliance to self-care management during pre- intervention program, comparing to the majority of them had good compliance to self-care management during post-intervention program, Figure (2). This result comes in accordance with *Hancerlioglu et al., (2019)* who studied "The Effect of Self-Care Management on Compliance with Chronic Disease " and stated that the most of the studied sample had poor compliance to self-care management practices.

This result come in the line with *El-Gendy et al., (2015)* who studied "Awareness of patients with chronic obstructive pulmonary disease with dyspnea and fatigue self-management guidelines" and showed that, only ten percent of COPD patients

had satisfactory level of self-care management in pre intervention. After intervention, the study revealed presence of statistically significant improvement in total score practice, where majority of patients had satisfied and done practices at immediate and two months post-program. In the same context, *Salah et al., (2013)* who studied "Improving breathlessness and fatigue in patient with COPD in Egypt" found that, there was highly statistically significant improvement in all items of practice post implementation of guidelines.

Regarding the total practices to self-care management and showed that the minority of the studied sample had done practices regarding self-care management in pre-intervention program comparing to slightly less than two third of them in post intervention program, Figure (3). The inadequate pre-program practices was shown among the studied sample in the present study might be attributed to that the majority of studied sample had more than three chronic disease which take the priority in care rather than the breathing exercises regarding COPD. This success of the program might be attributed to the fact that the procedures were practiced under supervision and guidance of the researchers, with demonstration and re-demonstration, using real objects. This also may be due to the effective continuous practicing of breathing exercise which has a positive effect on improving respiratory muscles.

This result comes in the same line with *Labieb et al., (2020)* who reported that the majority of the studied sample had not done practices regarding self-care management. Also this result supported by *Ibrahim & Abd El-Maksoud, (2018)* who stated that all the studied subjects had unsatisfied practice at pre-test, but after implementing the program about half of them (47.5%) got satisfied score. This result come in accordance with *Elesawy et al., (2018)* who revealed that the majority of the COPD patients had done practices regarding COPD, and there highly statistically significant improvement in all items of practice after implementation of nursing intervention program.

Regarding the correlation between the studied sample knowledge scores and their compliance to self-care management pre & post intervention program, the present study showed that there highly positive correlation between studied sample knowledge regarding COPD and their compliance to self-care management in pre intervention program. But there is negative correlation between studied sample knowledge regarding COPD and their compliance to self-care management in post intervention program, Table (2). This result come in accordance with *van de Hei et al., (2021)* who studied "Personalized medication adherence management in asthma and chronic obstructive pulmonary disease: a review of effective interventions and development of a practical adherence toolkit" and reported that there were a positive correlation between the studied sample knowledge and their compliance to self-care management. Also this result was supported by *Çevirme & Gökçay, (2020)* who reported that the patients' self-care management was affected by the patients' level of knowledge.

Conclusion

Based on the findings of the present study, it can be concluded that the current study clarified that there were a significant improvement in the studied sample knowledge,

compliance and practices after the intervention program comparing in pre intervention program, there highly positive correlation between studied sample knowledge regarding COPD and their compliance to self-care management in pre intervention program, there was a highly positive correlation between studied sample practices for self-care management and their compliance to self-care management in pre and post intervention program. Also there was a positive correlation between the studied sample knowledge regarding COPD and their practices for self-care management in post- intervention program.

Recommendation

The following recommendations were reached in the light of the results of this study:

- Continuous educational program for COPD patients with chronic obstructive pulmonary disease should be applied in chest outpatient clinics periodically in order to improve knowledge, practice and clinical outcomes for those patients.
- Provide the community with the preventive information especially at the primary level about the COPD to increase the public's awareness about risk factors of COPD and its causes and healthy life style through the dissemination of mass media such as antismoking media, well balanced diet regime, physical exercise, continues follow up system, and others health promotion programs.
- Further research to identify barriers that have been associated with poor compliance to self-care management.
- Further research is recommended to identify the support that will help people self-managing and adapting to life with COPD to reduce the impact of this slowly progressive condition.

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