

## Effect of Clinical Pathway Implementation on Outcomes of Patients with Chronic Obstructive Pulmonary Disease

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**Abstract:** Chronic obstructive pulmonary disease (COPD) is a chief reason of morbidity, mortality, and resource utilize worldwide. Clinical Pathways (CPs) encourage the implementation of evidence based practice, improve clinical processes by reducing risk and variation in health service delivery and reduce duplication by using a standardized approach to clinical management. **The study aimed** to evaluate the effect of clinical pathway implementation on outcomes of patients with chronic obstructive pulmonary disease. **Patients and Methods:** A quasi experimental research design was utilized. 60 adult patients with COPD of both sexes were included; they were sequentially recruited equally into 2 groups (control and study groups 30 for each). A study was performed in the Chest Department at Assiut University Hospitals. Two tools were utilized for data collection: COPD assessment sheet and Clinical Pathway Protocol. **Results:** There were highly significant statistical differences among the two groups concerning hospital stay and psychological problems and dyspnea scale on discharge. **Conclusion and Recommendations:** implementation of CP in managing COPD patients decreased the hospital stay, medications administration, investigations and improving dyspnea and anxiety levels thereby yielding cost savings. CP should be implemented for COPD patients to replace the traditional nursing care plan.

**Keywords:** Clinical Pathway (CP), Chronic Obstructive Pulmonary Disease (COPD) & Hospital Stay.

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### I. Introduction

Chronic Obstructive Pulmonary Disease (COPD) is a chronic inflammatory lung disease that leads to obstructed airflow from the lungs. Symptoms include dyspnea, chest wheezing, sputum production and cough. It is result of long-term exposure to irritating gases or particulate matter, most often from cigarette smoking. People with COPD are at growing risk of developing lung cancer, heart disease and a variety of other conditions<sup>[1]</sup>.

COPD represents an important public health challenge and is a great reason of chronic morbidity and mortality worldwide. COPD is presently the 4<sup>th</sup> leading reason of death in the world, but is anticipated to be the 3<sup>rd</sup> leading reason of death by 2020. More than 3 million people died of COPD in 2012 represent for 6% of all deaths globally. Globally, the COPD burden is expected to increase in coming decades because of senility and persistent exposure to COPD risk factors<sup>[2],[3]</sup>.

COPD is a disease status characterized by airflow restriction that is not fully reversible. Airflow restriction commonly is advanced and linked with an abnormal inflammatory response of the lungs to gases or harmful atoms and characterized by chronic inflammation through parenchyma, pulmonary vasculature and the airways<sup>[4]</sup>.

COPD is associated with numerous comorbid conditions. These include ischemic heart disease, glaucoma and cataracts, osteoporosis and osteopenia, anemia, cachexia and malnutrition, peripheral muscle dysfunction, cancer and the metabolic syndrome. Rates of accepted depression and anxiety in COPD vary from 20% to 50% and increase with disease severity<sup>[5]</sup>.

COPD is partly treatable. With appropriate management, most people with COPD can attain quality of life and good symptom control, as well as reduced risk of other associated conditions<sup>[1]</sup>.

The goals of management of COPD are to relieve symptoms, prohibit disease progression, decrease mortality, increase exercise tolerance, recover health status, prevent and treat complications and exacerbations.

Goals of acute care include improving airflow obstruction. Treatment regimens are based on severity of COPD [6].

Clinical pathways (CP), known as care paths, are multidisciplinary plans of best clinical practice. CP differs from practice guidelines, protocols, and algorithms because they are utilized by a multidisciplinary team and have a focus on the quality and coordination of care. CP is distinct tool that details processes of care and highlights inefficiencies of care [7].

The CP refers to expected outcomes and interventions that the collaborative practice team establishes. The professional nurse is responsible for initiating and updating the plan of care, care map, or clinical pathway that is used to guide and evaluate patient care. The CP provides a time frame for expected outcomes of care and involves an interdisciplinary team of caregivers who use the pathway to provide consistent care [8].

In essence, the CP can be viewed as a road map health care team and the patient should follow to guide the patient's care management and recovery. As the patient progresses along the path, specified goals should be accomplished. If a patient's progress deviates from the planned path, a variance has occurred and the interprofessional team members must create an action plan to address the problem or issue. CPs were developed in response to the need to identify cost-effective care plans and quality to reduce the patient's hospital stay [9].

### **Study Significance:**

Chronic obstructive pulmonary disease (COPD) has obtained solicitude as a great public health concern. It is presently the concentrate of intense research because of its tirelessly increasing spread, mortality, and disease burden. In Assiut, the number of COPD patients who were admitted to chest department was approximately 550 cases in 2016 [10]. The patient suffering from COPD is demanding and requiring the integration of skills from numerous different specialties. These patients often have prolonged hospitalizations, which may be marked by many complications. This study proposes that appropriately implemented clinical pathways have the probable to reduce hospital stay and restrict variability in care, thereby yielding cost savings.

### **Study Aim:**

This study aimed to evaluate the effect of clinical pathway implementation on outcomes of patients with chronic obstructive pulmonary disease.

### **Research Hypothesis:**

- COPD Patients to whom clinical pathway is implemented will have less hospital stay than those who will receive a traditional hospital care.

## **II. Patients and Methods**

### **Research Design:**

A quasi experimental research design was utilized in this study.

### **Technical Design:**

#### **Setting:**

The study was accomplished in the Chest Department at Assiut University Hospitals.

### **Study Sample:**

60 adult patients with chronic obstructive pulmonary disease aged from 18 to 65 years old of both sexes were included in this study. They were sequentially recruited equally into 2 groups (control who received a routine hospital care and study group who received a clinical pathway 30 for each).

### **Tools:**

#### **Tool (I): Chronic obstructive pulmonary disease assessment sheet (Annex 1):**

The researcher developed this sheet using relevant literature. It was designed to assess patient's condition and it included three parts to cover the following data:

**Part I: Socio demographic data about the patient such as:** name, marital status, age, sex, occupation, level of education, date of discharge and admission, hospital stay, previous admission to hospital, number of admissions in the last year, age of start COPD and patient's condition at discharge.

**Part II: Assessment of patient's condition throughout:** medical history, exposure to risk factors, medications, history of chronic diseases, laboratory investigations, diagnostic procedure, physical examinations, complications, vital signs and psychological problems (Hamilton Anxiety Scale: The scale consisted of 14 items, each determined by a series of symptoms, and measures both somatic anxiety and psychic anxiety. Each

item was scored on a scale of 0 (not present) to 4 (very severe), with a total score range of 0–56, where <17 indicates mild severity, 18–24 mild to moderate severity and 25–30 moderate to severe<sup>[11]</sup>).

**Part III: Dyspnea Scale (Modified Borg Dyspnea Scale):** It was adopted from **Borg (1982)<sup>[12]</sup>** & **Kendrick et al. (2000)<sup>[13]</sup>**. This scale was used to measure the degree of dyspnea on admission and discharge. It ranged from 0 to 10. Nothing at all (0), very very slight (Just Noticeable) (0.5), very slight (1), slight (2), moderate (3), somewhat severe (4), severe (5-6), very severe (7-8), very very severe (Almost Maximal) (9) and maximal (10).

**Tool (II): Clinical Pathway Protocol (Annex 2):**

This tool was adopted from **Grey Bruce Health Network (2011)<sup>[14]</sup>**, and then modified after the approval of collaborative pathway team. The pathway consisted of 5 parts:

**Part I: Pre-Printed Orders (COPD Admission Order Set):**

These orders were started in an in-patient unit once a patient was admitted with COPD.

**Part II: COPD Clinical Pathway:**

The COPD CP had a 5 day predestined length of remain. It had two stages (stage (1) was almost 2 days and stage (2) was almost 3 days). If the patient met the outcomes at the top of the page, he was ready to transfer to the next stage. Staff member used the column for his shift and initial tasks as they were done, or enter not implemented and initial if they are not implemented to the patient. Throughout each stage, staff pointed out and completed the discharge criteria page (If any of the criteria had been met, these initialed and dated).

**Part III: Patient Pathway:**

It explained to the patients what was happened to them during hospitalization. It was offered to the patient at admission to discharge.

**Part IV: Patient Education Materials (COPD booklet):**

It was developed according to assess COPD patients' needs and prepared in an arabic language by the researcher and based on the related literature and expertise opinions.

**Content of COPD booklet:**

- **Theoretical part covered:** introduction about the disease, anatomy and physiology of respiratory system, definition of COPD, types, stages of COPD, causes, signs and symptoms, complications, factors that can make symptoms worse (COPD exacerbation), suggestions to reduce or avoid exposure to those factors, diagnosis, management, smoking cessation, nutrition and prevention.
- **Practical part covered:** using inhalers, breathing and coughing exercise, body positions to reduce shortness of breath and relaxation techniques.

**Part V: COPD Teaching Checklist:**

It was placed in the chart and utilized to track what education had been done with the patient and what was unaccomplished to cover before the patient's discharge.

**Operational Design:**

**Administrative Design:**

An official consent to perform the study was taken from the responsible authorities at the previously mentioned research setting after explaining the study aim.

**Data Collection Technique:**

The study was accomplished on 3 phases:

**Phase (1): Preparatory Phase:**

It included reviewing of literature related to the effect of clinical pathway implementation on outcomes of patients with chronic obstructive pulmonary disease; theoretical knowledge about various aspects of problem using books, articles periodicals, scientific journals, research and the internet was done in order to get a clear picture of all aspects related to COPD and clinical pathway, as well as, to develop the tools of the study for data collection and for implementation of clinical pathway.

**Validity:**

It was instituted by panel of seven expertises in nursing (4 professors) and medical (3 professors) staff who checked the tools for its efficiency, slight modifications were needed.

**Pilot Study:**

A pilot study was implemented on 10% of sample in a selected setting to assess the clarity and appropriateness of the created tools. No needful change was done, so the patients selected for the pilot study were implicated in the main study.

**Phase (2): Implementation Phase:**

- An agreement was taken from the head of the chest department at Assiut University Hospitals.
- Each patient involved in the study (in the control then the study group) was assessed for his medical condition (Tool I). Data was collected from control group first then from the study group to avoid sample confusion. The control group received the routine hospital care while the study group undergone developed clinical pathway protocol (Tool II).
- The researcher presented herself and elucidated the study aim for the patients who will be involved in the study. The researcher confident that the data collected and information were confidential and would be used only to improve their health.
- The researcher explained to each patient in the study group the patient's pathway and the contents of the booklet and taught them how to do breathing and coughing exercises.
- Staff members who involved in the patient care (all nurses and physicians in the department) were met in separated sessions to explain the pathway in brief and outline the main roles to be played by each one.
- Data used to be collected every day from patient's admission until discharge from the Chest Department in Assiut University Hospital for patients with COPD during three shifts for both groups.

**Phase (3): Evaluation Phase:**

This phase consisted of comparing the patient's outcomes of both groups during the admission and discharge.

**Statistical Design:**

The data collected were tabulated and statistically analyzed to compare the patient's outcomes of both groups during the admission and discharge as regards the various variables. The statistical analysis was done using computer program SPSS ver. (23). Descriptive statistics (number, percentage, mean  $\pm$  S.D) were done. Qualitative variables were comparing by chi-square test. For independent samples, quantitative variables were comparing by t-test. P. value was calculated to be significant if:

- $P > 0.05$  Non significant (NS).
- $P < 0.05$  Significant.
- $P < 0.01$  Highly significant.

**The study limitations:**

- The work place circumstances where the data were collected required almost permanent presence in the department and which was unsuitable for me and my job place.
- The spirometry stopped working for a period of time which postponed the research for a while.
- The closure of the chest department to re-structure and transfer to another place which had less capacious leads to reduction of number of admitted cases.
- Lack of pervious scientific studies that applied the clinical pathway to COPD patients.

**III. Results**

Figure (1) indicated that most of the control and study groups lived in rural area (90 %) and had age between 50 - 65 years (83.3 %). Two third of the study group were male (63.3 %), whereas more than half of the control group were females (56.7 %). The entire of the study group was married (100 %), whereas most of the control group was married (93.3 %). Near the half of the two groups were housewives (36.67 %), (46.7 %) respectively and two third of both groups were illiterate (66.7 %).

Table (1) exposed that there was highly significant statistical difference among the two groups related to hospital stay and number of admission in the last year. Also there was significant statistical difference among the two groups linked to preceding hospital admission, whereas there was no significant statistical difference among the two groups concerning patient's condition at discharge and age of starting COPD.

Table (2) demonstrated that there was no significant statistical difference among the two groups attached to medical history excluding long duration of cough there was highly significant statistical difference.

Table (3) revealed the types of medications taken on admission and discharge for both groups. Bronchodilators had the highest percentage in both groups and Diuretics had the lowest percentage.

Table (4) revealed that the most common comorbid diseases in all cases were diabetes, hypertension and heart disease and there was significant statistical difference among the two groups concerning heart disease (p = 0.03).

Table (5) exhibited that there was highly significant statistical difference among the two groups attached to kidney function, CBC and Na<sup>+</sup> on discharge and Mg<sup>++</sup> on admission. There was significant statistical difference among the two groups concerning K<sup>+</sup>, liver function and blood sugar on discharge. And the study group had done modicum laboratory investigations than the control group.

Table (6) demonstrated that there was highly significant statistical difference among total Dyspnea Scale and total Hamilton Anxiety Rating Scale.

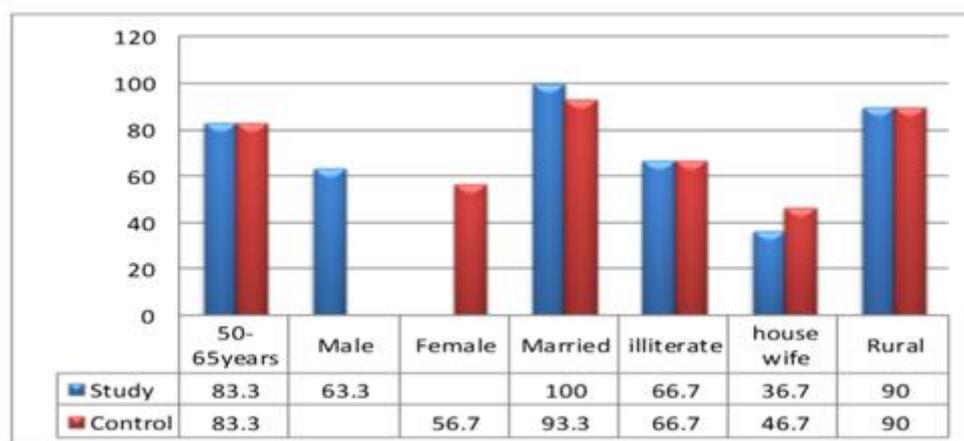


Figure {1}: Socio demographic data for both groups

Table {1}: Frequency distribution of days of hospital stay for control and study groups (n=60)

Variables	Study (N=30)		Control (N=30)		p.value
	N	%	N	%	
<b>Length of stay in hospital:</b>					0.001**
- 1 - 5 days	28	93.3%	4	13.3%	
- 6 - 10 days	2	6.7%	16	53.3%	
- More than 10 days	0	0.0%	10	33.3%	
<b>Previous admission to hospital:</b>					0.05*
- Yes	14	46.7%	21	70%	
- No	16	53.3%	9	30%	
<b>Number of admission in last years:</b>					0.001**
- 1 - 4 times	12	40%	21	70%	
- 5 - 10 times	0	0.0%	0	0.0%	
<b>Age of start COPD:</b>					0.82NS
- 18 - 38 years	10	33.3%	11	36.7%	
- 39 - 55 years	18	60%	18	60%	
- more than 55years	2	6.7%	1	3.3%	
<b>Patient condition at discharge:</b>					0.24NS
- Improve	30	100%	28	93.3%	
- No improve	0	0.0%	2	6.7%	

Use cross tabulation for this comparison, significant statistical difference P ≤ 0.05

\*\* =Highly Significant Difference \* =Significant Difference NS =Not Significant

Table {2}: Frequency distribution of medical history for control and study groups (n=60)

Variable	Study (N=30)		Control (N=30)		p.value
	N	%	N	%	
<b>Chronic cough:</b>					0.75 NS
- Present	29	96.7%	29	96.7%	
- Not present	1	3.3%	1	3.3%	
<b>How long you have had it:</b>					0.001 **
- 1 - 10 years	13	43.3%	25	83.3%	
- 11 - 20 years	12	40%	4	13.3%	
- 21 - 30 years	4	13.3%	0	0.0%	
- More 30 years	0	0.0%	0	0.0%	
<b>How much you cough:</b>					

- Sometimes	1	3.3%	1	3.3%	0.64 NS
- Moderate	8	26.7%	11	36.7%	
- Severe	18	60%	17	56.7%	
- Continuous through the day	2	6.7%	0	0.0%	
<b>Frequent winter colds:</b>					
- Present	22	73.3%	21	70%	0.50 NS
- Not present	8	26.7%	9	30%	
<b>Weight loss:</b>					
- Present	4	13.3%	4	13.3%	0.64 NS
- Not present	26	86.7%	26	86.7%	
<b>Hypoxemia:</b>					
- Present	25	83.3%	25	83.3%	0.600 NS
- Not present	5	16.7%	5	16.7%	

Use cross tabulation for this comparison, significant statistical difference  $P \leq 0.05$   
 \*\* =Highly Significant Difference \* =Significant Difference NS =Not Significant

**Table {3}: Frequency distribution of medications for control and study groups (n=60)**

Variables	Study (N=30)				Control (N=30)			
	Taken		Not taken		Taken		Not taken	
	N	%	N	%	N	%	N	%
<b>Antibiotics:</b>								
- Admission	30	100%	0	0.0%	30	100%	0	0.0%
- Discharge	24	80%	6	20%	21	70%	9	30%
<b>Bronchodilators:</b>								
- Admission	30	100%	0	0.0%	30	100%	0	0.0%
- Discharge	30	100%	0	0.0%	30	100%	0	0.0%
<b>Steroids:</b>								
- Admission	29	96.7%	1	3.3%	30	100%	0	0.0%
- Discharge	3	10%	27	90%	9	30%	21	70%
<b>Histamine-2 Blockers:</b>								
- Admission	28	93.3%	2	6.7%	30	100%	0	0.0%
- Discharge	2	6.7%	28	93.3%	2	6.7%	28	93.3%
<b>Diuretics:</b>								
- Admission	8	26.7%	22	73.3%	11	36.7%	19	63.3%
- Discharge	9	30%	21	70%	11	36.7%	19	63.3%

**Table {4}: Frequency distribution of history of chronic diseases for study and control groups (n=60)**

Variable	Study (N=30)		Control (N=30)		p.value
	N	%	N	%	
<b>Diabetes Mellitus:</b>					
- Present	9	30%	8	26.7%	0.500 NS
- Not present	21	70%	22	73.3%	
<b>Hypertension:</b>					
- Present	6	20%	11	36.7%	0.126 NS
- Not present	24	80%	19	63.3%	
<b>Heart disease:</b>					
- Present	10	33.3%	18	60%	0.03 *
- Not present	20	66.7%	12	40%	
<b>Neurological disease:</b>					
- Present	0	0%	0	0.0%	-
- Not present	30	100%	30	100%	
<b>Previous history of DVT:</b>					
- Present	0	0%	0	0%	0.500 NS
- Not present	30	100%	30	100%	
<b>Anticoagulant therapy:</b>					
- Present	1	3.3%	1	3.3%	0.60 NS
- Not present	29	96.7%	29	96.7%	
<b>Liver disease:</b>					
- Present	0	0.0%	3	10%	0.11 NS
- Not present	30	100%	27	90%	

Use cross tabulation for this comparison, significant statistical difference  $P \leq 0.05$   
 \* =Significant Difference NS =Not Significant

**Table {5}: Frequency distribution of different laboratory investigations for study and control groups (n=60)**

Variables	Study (N=30)				Control (N=30)				p.value
	Done		Not done		Done		Not done		
	N	%	N	%	N	%	N	%	
<b>Complete Blood Count (CBC):</b>									
On admission	30	100%	0	0.0%	30	100%	0	0.0%	-
On discharge	5	16.7%	25	83.3%	26	86.7%	4	13.3%	0.001 **
<b>Calcium (Ca++):</b>									
On admission	30	100%	0	0.0%	30	100%	0	0.0%	-
On discharge	5	16.7%	25	83.3%	6	20%	24	80%	0.5 NS
<b>Magnesium (Mg++):</b>									
On admission	30	100%	0	0.0%	10	33.3%	20	66.7%	0.001 **
On discharge	8	26.7%	22	73.3%	6	20%	24	80%	0.38NS
<b>Potassium (K+):</b>									
On admission	30	100%	0	0.0%	30	100%	0	0.0%	-
On discharge	24	80%	6	20%	30	100%	0	0.0%	0.01 *
<b>Sodium (Na+):</b>									
On admission	30	100%	0	0.0%	30	100%	0	0.0%	-
On discharge	22	73.3	8	26.7%	30	100%	0	0.0%	0.002**
<b>Erythrocyte Sedimentation Rate (ESR):</b>									
On admission	30	100%	0	0.0%	30	100%	0	0.0%	-
On discharge	3	10%	27	90%	2	6.7%	28	93.3%	0.50NS
<b>Kidney function:</b>									
On admission	30	100%	0	0.0%	30	100%	0	0.0%	-
On discharge	8	26.7%	22	73.3%	24	80%	6	20%	0.001**
<b>Liver function:</b>									
On admission	30	100%	0	0.0%	30	100%	0	0.0%	-
On discharge	2	6.7%	28	93.3%	8	26.7	22	73.3%	0.04*
<b>Prothrombin time and concentration, INR:</b>									
On admission	30	100%	0	0.0%	30	100%	0	0.0%	-
On discharge	4	13.3%	26	86.7%	6	20%	24	80%	0.36NS
<b>Blood sugar:</b>									
On admission	30	100%	0	0.0%	30	100%	0	0.0%	-
On discharge	25	83.3%	5	16.7%	30	100%	0	0.0%	0.02*

Use cross tabulation for this comparison, significant statistical difference P ≤0.05

\*\* =Highly Significant Difference \* =Significant Difference NS =Not Significant

**Table {6}: Relation between total Dyspnea Scale (Modified Borg Dyspnea Scale) and total Hamilton Anxiety Rating Scale (HAM-A) for study group (n =30)**

HAM-A Scale	Dyspnea Scale	p.value
	Mean ± SD	
On Admission	29.13 ± 7.56	0.001**
On Discharge	13.66 ± 6.14	

\*\* =Highly Significant Difference

#### IV. Discussion

Clinical pathways are the treatment protocol in order to reduce or eliminate variation of care by specifying to nursing and medical staff. Clinical pathway aims to offer increased quality of care and decreased hospital stay, which in return gives a win-win opportunity for both the health care team and the patient. The clinical pathway is a multidisciplinary process designed to provide patient quality of care throughout the hospital stay. The clinical pathway is custom-made to the patient’s diagnosis and identify to the physician and nurse/caregiver all care needs and treatments to be administered <sup>[15]</sup>.

Therefore, this study was conducted aiming to evaluate effect of clinical pathway implementation on outcomes of patients with chronic obstructive pulmonary disease. The present study illustrated that patients with COPD to whom clinical pathway was applied had less hospital stay, less medications administration, less laboratory investigations, improving dyspnea and anxiety levels than those who received a traditional hospital care, hence yielding cost savings.

Based on the findings of this study, the patient's socio demographic data between the study and control groups were comparable and no significant differences were observed. This finding was agreeing with **Abd-Elwanees et al. [2014]** who mentioned that there were no any significant differences in the age, gender, and other demographic and baseline characteristics between the clinical pathway (CP) and the non-clinical pathway (non-CP) groups <sup>[16]</sup>. Concerning level of education, the present study revealed that two third of both groups were illiterate. While **Ban et al. [2012]** found that the non-CP group comprised of patients with lower levels of education compared to the CP group <sup>[17]</sup>.

As regards length of stay (LOS) in hospital, this study confirmed our hypothesis that usage of clinical pathway in COPD management decreased the hospital stay; where we observed that there was highly significant statistical difference among the study and control groups. These results were in agreement with study of **Abd-Elwanees et al. [2014]** who found that the mean LOS of patients managed by the clinical pathway was less than the non-CP group who were managed according to the unit's routine care<sup>[16]</sup>. This was in congruence with **Ban et al. [2012]** who found a significant decline in LOS of the CP group as compared to the non-CP group<sup>[17]</sup>. In the same line **Celis et al. [2004]** mentioned that the mean hospital stay for CP patients was fewer than the control group<sup>[18]</sup>.

The present study clarified that all study group were improved on discharge whereas two cases of the control group not improved and there was no significant statistical difference among the two groups. Contrariwise, in a study of **Ban et al. [2012]** who reported that there were two deaths in the CP group and none in the non-CP group. This difference was not significant<sup>[17]</sup>.

This study stated that there was no significant statistical difference among the control and study groups as regards medical history except long duration of cough which showed highly significant statistical difference. Chronic cough present in the majority of both groups and was severe in the two groups.

**Calverley [2013]** stated that cough is now take into account, along with sputum production and dyspnea, to be one of the essential symptoms of COPD and which taken together with exposure to a suitable risk factor should lead to a diagnostic spirometry test. Its existence helps recognize those patients at greatest risk of future exacerbations<sup>[19]</sup>.

In a telephone survey of 2950 COPD patients **Kessler et al. [2011]** reminded that cough was reported by more than half of cases with one fifth rating it severe to extreme. These symptoms were most evident on rising in the morning and were more possible to be present than at other times of the day<sup>[20]</sup>.

The current study demonstrated that the common type of medications taken for study and control groups was bronchodilators. In this respects **Beeh [2016]** mentioned that bronchodilators are the cornerstone of symptomatic COPD management. They are recommended on a regular basis to prevent or reduce symptoms, improve health status and exercise tolerance with a preference of long-acting over short-acting drugs where long-acting bronchodilators prevent the occurrence of exacerbations<sup>[21]</sup>.

The present study showed that the most common comorbid diseases in all cases were diabetes, heart disease and hypertension and there was significant statistical difference among the control and study groups concerning heart disease.

This concept is supported by **Mannino et al. [2008]** who reported that the existence of respiratory impairment was linked with a higher risk of having cardiovascular, disease comorbid hypertension and diabetes, and also having at least two of these comorbid diseases<sup>[22]</sup>.

Moreover, **Ban et al. [2012]** indicated that more than half of COPD patients had at least one comorbid disease. The most common comorbid disease was hypertension<sup>[17]</sup>.

The findings of this study documented that the study group had done fewer laboratory investigations than the control group. In this context, **Lopez & Ramirez [2017]** indicated that the prevalence of clinical pathways has increased dramatically across the globe. Countries have become more aware of the need for producing high quality care at an affordable cost. Barriers to cost effectiveness include but are not limited to variations in treatment; over-testing; over-prescribing; lackluster health outcomes across various populations. Implementing clinical pathways in acute and chronic respiratory diseases will have many financial and quality-driven benefits<sup>[23]</sup>.

The current study illustrated that there was highly significant statistical difference between total Dyspnea Scale and total Hamilton Anxiety Rating Scale.

**Tselebis et al. [2016]** stated that it is important to note that dyspnea at rest or on exertion does not correlate with the amount of anxiety-related symptoms, and furthermore, the amount of decrease in dyspnea with pharmacotherapy or exercise training is not associated with the reduction in anxiety-related symptoms, this indicates that there are other factors contributing to this relationship. Moreover, although patients with panic report more calamitous misinterpretations of somatic symptoms, they don't vary from patients without panic on measures of physical functioning, disease severity, dyspnea, or psychological distress. Thereby, it has been offered that panic symptoms may reflect a cognitive demonstration of pulmonary symptoms rather than objective pulmonary status.<sup>[24]</sup>

## **V. Conclusion& Recommendations**

Implementation of clinical pathway in COPD patients' management decreased the hospital stay, medications administration, investigations and improving dyspnea and anxiety levels thereby yielding cost savings. **We can recommend that:**

1. Clinical pathway should be implemented for COPD patients to replace the traditional nursing care plan.

2. The current clinical pathway should be constantly monitored and revised to ensure that they remain effective and relevant and operate in the way they were designed to.
3. Nurses should be encouraged to collaborate with the other health members to provide a comprehensive care for the patients with COPD using the clinical pathway.
4. Elaborating a training program for health team on the COPD clinical pathway implementation for better quality of care.
5. All COPD patients and their family should receive adequate knowledge and skills regarding management of COPD.

### References

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