Effect of Implementing Clinical Pathway on Health Status and Functional Capacity of Elderly Patients with Chronic Obstructive Pulmonary Disease



1Assistant lecturer, Gerontological Nursing, Faculty of Nursing, Mansoura University, Mansoura, Egypt. corresponding author: Email: asmaamohammed78@mans.edu.eg 2 Assistant Professor, Gerontological Nursing, Faculty of Nursing, Mansoura University, Mansoura, Egypt

3 Professor, Chest Medicine, Faculty of Medicine, Mansoura University, Mansoura, Egypt

4Professor, Gerontological Nursing, Faculty of Nursing, Mansoura University, Mansoura, Egypt

5Professor, Department of Community Health Nursing, Faculty of Nursing, New Mansoura University, New Mansoura, Egypt

1- ABSTRACT

Background: Chronic obstructive pulmonary disease is chronic respiratory diseases pose a high burden of morbidity and mortality on health systems and patients globally. Clinical Pathways encourage the application of evidence-based practice, improve clinical practices by reducing risk and variation in healthcare delivery, and get rid of redundancies by using a standard approach to clinical management. Aim: this study aimed to measure the effect of implementing clinical pathway on health status and functional capacity of elderly patients with chronic obstructive pulmonary disease. Research design: A quasi-experimental research design was utilized. Method: Sixty-two chronic obstructive pulmonary disease elderly patients who were attending the Mansoura University Hospital's chest medicine department were included in the purposeful sample. The individuals were split equally into two groups: study group (n=31) who received clinical pathway protocol, and control group (n=31) who received only routine care. Results: Elderly patients in the study group had significantly improved health status on discharge than the control group with mean 15.03±5.74 and 23.77±6.15 for the study group and control group respectively. The mean distance achieved by study group on admission was 245.48±54.70 meter and it improved on discharge to 283.22±55.46 meter with a significant difference (p <0.001). **Conclusion**: Clinical pathways are an effective tool in improving health status, functional capacity of elderly patients with chronic obstructive pulmonary disease. Recommendation: Incorporating the chronic obstructive pulmonary disease clinical pathway into the plan of care of elderly chronic obstructive pulmonary disease patients to replace the conventional nursing care plan for better quality of care.

Keywords: Chronic Obstructive Pulmonary Disease, Clinical Pathway, Elderly Patients, Functional Capacity, Health Status.

2- Introduction:

Globally, the elderly population is rapidly increasing, especially in emerging nations, due to the early 20th century medical technology revolution (Lee et al., 2018; Ismail, Ahmad, Hamjah, & Astina, 2021). Life expectancy is rising, and the number is expected to double by 2050. Egypt has the highest percentage of older adults, accounting for 17.9% of the country's population by 2052 (World Population Ageing, 2019; Central Agency for Public Mobilization and Statistics, 2021). Chronic obstructive pulmonary disease (COPD) is more common in older persons (Matera, Hanania, Maniscalco & Cazzola, 2023). A condition affecting the lungs' tiny airways is known as chronic obstructive pulmonary disease (COPD). It causes obstruction and resistance to airflow into and out of the lungs, particularly in older persons whose aging process is linked to functional and organ degradation as well as prolonged exposure to risk factors for COPD (GOLD, 2022).

Chronic obstructive pulmonary disease is predicted to rise to third globally by 2025, with a projected increase of 112 million cases by 2050 (Hu & Long, 2021; Boers et al., 2023). The disease is prevalent among the elderly, with an estimated 10% prevalence in the US population over 75 years old (Mollica et al., 2021). In Egypt, COPD prevalence is estimated at 10% among highrisk adults (Said, Ewis, Omran, Magdy, & Saleeb, 2015). Even in people with milder forms of the disease, COPD is linked to severe declines in quality of life. Dyspnea, physical disability, anxiety, sadness, readmission to the hospital, and a higher risk of death have all been linked to poor quality of life in COPD patients (Dekhuijzen, Hass, Liu, & Dreher, 2020).

Chronic respiratory symptoms and exercise intolerance brought on by dyspnea are hallmarks of the everyday lives of people with COPD (**Pereira**, **Pereira**, & Santa-Clara, 2021). Fatigue from exercise results in a sedentary lifestyle and a gradual loss of functional ability (Camargo et al., **2020**). The management of COPD requires a comprehensive and multidisciplinary approach to address the complex nature of the disease. Clinical pathways, which provide a systematic framework for the evaluation, diagnosis, treatment, and continuing care of COPD patients, have become important instruments in the delivery of healthcare. These paths include best practices and evidence-based recommendations to enhance patient care, encourage uniformity, and enhance results **(Bollmeier & Hartmann, 2020).**

A clinical pathway for COPD is being developed to streamline care across healthcare settings, ensuring timely and appropriate therapies at every stage of disease development. It emphasizes long-term management techniques, including pharmaceutical therapies, vaccinations, pulmonary rehabilitation, and smoking cessation interventions, to reduce symptoms and prevent disease progression (Wind, van der Linden, Hartman, Siesling, & van Harten, 2021; Tanumihardja & Nurwahyuni, 2023).

2.1 The aim of the study was to:

Measure the effect of implementing clinical pathway on health status and functional capacity of elderly patients with chronic obstructive pulmonary disease.

2.2 Research Hypotheses

- 1. Elderly patients with COPD who follow a clinical pathway will experience better health status than those who receive standard hospital treatment.
- **2.** Elderly patients with COPD who follow a clinical pathway will experience improved functional capacity compared to those receiving standard hospital treatment.

3. Method

3.1 Design of Study

This study utilized a quasi-experimental research design (study-control). The study design was appropriate for examining the impact of a therapeutic pathway on the treatment outcomes of older adult individuals suffering from chronic obstructive pulmonary disease.

3.2 Setting

This study was carried out at the Mansoura University Hospital's Department of Chest Diseases. It was made up of three rooms on one floor, each with ten beds, and three units for intensive care, each with six beds. Additionally, it had room with a device for measuring pulmonary function tests and another unit for sleep disturbances.

3.3 Study sample:

Sixty-two older adult patients attending the previously described setting comprised the purposive sample. The subjects were allocated equally into two groups, with 31 people in each group for the study and the control group. The groups were chosen based on the following requirements:

Inclusion Criteria

- **1.** Participants of both sexes who were 60 years of age or older.
- **2.** Admitted to the department of chest medicine after being diagnosed with COPD in accordance with the GOLD guidelines for 2022.
- **3.** Be able to speak clearly and consent to take part in the study.

Exclusion Criteria

- 1. Older adult patients with other respiratory conditions or other related conditions such unstable angina or heart failure are excluded.
- 2. Elderly patients with COPD who engaged in alternative nursing care programs.

3.4 Sample size calculation

Calculation of Sample Size

DSS research was utilized to calculate sample size (<u>https://www.DSS</u> research.com /calculating sample size using percentage). Percentage of severe dyspnea was 16.7 on discharge among group of implemented clinical pathway and it was 40.0% among control group (**Abo El Ella, Mohammad, & El-Shinnawy, 2018**), with alpha error of 5% (95% significance) and β error 10% (study power of 90%). Then the calculated sample size was 62.

According to the previous mentioned study criteria. The elderly patients were divided randomly into study and control groups by block randomization, the researcher was used block size of 4 that gives balanced combinations with 2 A for study group and 2 B for control group subjects was calculated as 6 (AABB, BBAA, ABAB, BABA, ABBA & BAAB). Blocks were randomly chosen to determine the assignment of all subjects.

Tools

Three tools were utilized in this study to collect the data:

Tool I: Structured Interview Sheet for Health and Demographic Data

In order to gather baseline data from the study participants, the researcher created this threesection tool, which is based on a review of pertinent literature:

Section 1: Demographic Information: age, gender, education level, marital status, employment status before to retirement, and income source.

Section 2: Medical Health History: includes information about past chronic illness history, current medication usage, dates of admission and discharge, length of hospital stay, prior hospital admission, number of hospital admissions in the past year, and history of exposure

The pulmonary function test's parameters

to risk factors for illness such as dust, smoke, air pollution, and chemical fumes.

Section 3: Pulmonary Functions Tests

The obstructive ventilatory defect was assessed using it. Spirometry was used to measure the results of several tests, which included Forced Vital Capacity (FVC), Forced Expiratory Volume in First Second (FEV1), and the ratio of FEV1/FVC, which measures the two variables together. It measures the patient's capacity to breathe in and out of air as well as the ease and speed at which they can expel air from their lungs. The spirometer is a highly valid and reliable tool for assessing lung function (Sooriyakanthan, Wimalasekera, & Kanagasabai, 2019) and (Kim and Lee, 2020).

Spirometer test	Normal	Abnormal	
A. Forced Expiratory Volume in first second		Mild	70-79%
(FEV1)	Equivalent to or over	Moderate	60-69%
B. Forced Vital Capacity (FVC)	unan 80%	sever	> 60%
		Mild	60-69%
C. (FEV1/FVC)	Equivalent to or over	Moderate	50-59%
			Less than 50%

Tool II: The COPD Assessment Test (CAT)

Jones et al. (2009) developed this tool. The COPD assessment and monitoring tool is the CAT, a brief and uncomplicated questionnaire. For the purpose of patient assessment and long-term follow-up, the CAT offers the patients and the physicians a straightforward and trustworthy way to gauge a patient's overall health condition related to COPD. It has eight questions with a total score of 40. Each question is given on a semantic 6-point (0-5) differential scale. Clinical impact was classified as mild, moderate, severe, or extremely severe with scores of 0–10, 11–20, 21–30, and 31–40, respectively.

Al-moamary et al., (2011) validated its translation into Arabic and confirmed its validity and dependability. Test-retest reliability was assessed using the intraclass correlation coefficient (r=0.78) and Cronbach alpha to measure the CAT's internal consistency.

Tool III: Six Minute-Walk Distance (6MWD)

American Thoracic Society developed this tool in 2002. The 6MWD's ease of use, low cost, and suitability for standardization have made it a valuable tool in determining a patient's functional capacity submaximal level for COPD patients. It was employed by calculating the 6MWD, or the maximum distance (in meters) that an elderly patient can cover in six minutes when walking quickly on a level, hard surface. The patients were given a timer and told to run as far as they could in six minutes. The exam that was utilized to evaluate both groups. The walk distance of the patients before and after the program was compared.

Protocol of the clinical pathway

This procedure was taken from the **Grey Bruce Health Network (2011)** and changed with the collaborative pathway team's consent. The following made up the pathway:

Part one: COPD Admission Order Set (Orders that are pre-printed):

In an inpatient unit, these orders were started as soon as a patient with COPD was admitted.

Part two: Clinical Pathway of COPD

Clinical pathway of COPD had a predetermined duration of five days. There were two phases to it: phase 1 lasted nearly two days, and phase 2 nearly three days. The patient was prepared to go on to the next phase if the goals listed at the top of the page are met. A staff person entered initial duties and shift information in the column as completed, or entered not implemented and initial if not applied to the patient. Staff members completed the discharge criteria sheet at each stage, noting any criteria that had been met and initializing and dating it.

Part three: Pathway of the Patient

The patients were given an explanation by the researcher on what to expect while they were in the hospital. From admission to discharge, it was made available to the patient.

Part four: Educational Materials for Patient (booklet of COPD)

Based on the researcher's assessment of the needs of COPD patients and an analysis of relevant literature, the booklet was created in Arabic, based on recent evidence and opinions of expertise.

COPD booklet content

- Section of Theoretical Content: The following topics were covered in the theoretical section: an overview of the disease, the anatomy and physiology of the respiratory system, changes brought on by aging that affect the respiratory system, the definition of COPD, its types and stages, causes, signs and symptoms, and an unusual manifestation in the elderly. Other topics covered included complications, factors that can exacerbate symptoms (COPD exacerbation), advice on minimizing or avoiding exposure to those factors, diagnosis, management, nutrition, and prevention.
- Section of Practical content: Using inhalers, practicing coughing and breathing, and airway clearance procedures were all covered in the practical section.

Part five: COPD observational Checklist

It was adopted from Fadila (2012) for assessing patients' practice regarding relief of symptoms and quality of life after implementing clinical pathway, including the following:

Breathing exercise (Diaphragmatic and Pursed lip breathing): was used to assess respiratory difficulties' and improve breathing patterns.

Inhaler techniques: was used to examine how the COPD patients adequately use a metereddose or a dry powder inhaler with capsule.

Clearance of airway techniques

(Coughing and breathing exercises): It was utilized to examine patient's ability to clear secretions from the airways which is the most effective method to eliminate the infection risk for COPD patients.

Scoring system

Scoring of the checklist of each item was made using 3-point ranging from 0 to 2, where "0" indicates that the skill was not done, "1" indicates that the skill was incompletely done and"2" indicates that the skill was completely done. Each technique was assigned a score, with a total score of 62. The total score was distributed as for breathing retraining exercise was 18 grades (8 grade for pursed lip breathing and 10 grade for breathing), diaphragmatic airwav clearance techniques was 10 grades and for using inhaler was (34) grades (16 grade for metered dose inhaler and 18 grade for dry powder inhaler) Fadila,(2012).

Validity of the study tools

A panel consisting of five specialists in the fields of medical surgical nursing and gerontological nursing reviewed the data collection tools to ensure their suitability and content validity. The necessary adjustments were made.

3.5 Pilot Study

Prior to beginning data collecting, a pilot research including 10% (N=6) of the study sample was conducted to evaluate and determine the feasibility, application, clarity, relevance, and amount of time required for data collection. The appropriate adjustments were made as a result. The study sample did not include any elderly patients who were part of the pilot study.

3.6 Ethical Considerations

2.8 The Mansoura University Faculty of Nursing's Research Ethics Committee granted ethical permission. Each participant in the study gave their oral agreement after being fully informed about the purpose, nature, risks, and benefits of the research. Confidentiality of the information gathered, and the study subjects' privacy were guaranteed, and it was utilized exclusively for that purpose. Every senior patient received assurances that their participation in the trial is entirely voluntary and that they can leave at any time without facing any negative consequences.

Process of Collecting Data

Phase I: preparatory phase

- The Mansoura University Faculty of Nursing officially granted authorization to conduct the study and interview the senior patients in the chosen government hospital.
- A formal letter explaining the goal of the study and the timeline for data collection was sent, accompanied by consent from the head of the Mansoura University Hospital.

- The manager of the chest department at Mansoura University Hospital granted permission for the study's implementation and data gathering.
- After a careful analysis of pertinent literature, the researcher created Tool I (the Structured Interview Sheet for Health and Demographic Data).
- The researcher in this study utilized the Arabic version of tool II, the COPD Assessment test. Reliability was guaranteed by means of r coefficient (r= 0.78).
- The researcher created the COPD booklet, which is divided into two sections (educational and practical), using plain Arabic and photo support. Regarding the content of the instructional management booklet's preparation, the theoretical contents covered topics such as defining chronic obstructive pulmonary disease and identifying its potential disease-related causes, among other information. The training pamphlet covered several practical topics such as utilizing inhalers, practicing breathing and coughing, and practicing airway clearance techniques.....etc.

Phase II: Implementation phase

- The actual fieldwork took place between early September 2022 and late March 2023. Three days per week, the researchers have worked the morning shift from 9:00 a.m. to 1:00 p.m. in the study settings.
- In order to determine the proportion of recently admitted patients with chronic obstructive pulmonary disease, the researcher spoke with the relevant physicians and nursing supervisors in the department of chest diseases. Following that, patients who met the inclusion criteria were randomized, with 31 matched patients in each group, to either the study group or the control group based on when they arrived at the chest department.
- After explaining the aim of the study to each older adult patient, the researchers met them one-on-one, built rapport with them, and got their verbal consent to be recruited in the study.
- In order to complete the socio-demographic and medical data, medical records were reviewed. The required data were filled in by direct observation (barrel-shaped chest, accessory muscle use), physical examination (measured respiratory rate and SPO2, listening to chest sound).

- Each elderly patient in both the study and the control groups was interviewed individually at the beginning of the proposed program in order to collect baseline data using tool I (Demographic and Health related Data Structured Interview Sheet), Tool II (COPD Assessment Test), and tool III (Six Minute Walk Test).
- Clinical Pathway protocol was implemented on the study group and observational teaching checklist was carried out to ensure adherence of elderly patients.
- Following the collection of baseline data, the researcher met with the senior patients under study. Following that, the researcher organized six instructional sessions, three times a week for two weeks, lasting between thirty and forty-five minutes each.
- Every session started with a recap of the previous one, followed by an explanation of the objectives of the current one, and concluded with a time for open discussion.
- Simple audio-visual materials such as a PowerPoint presentation on a lab top, booklet with illustrated pictures, and videos were used by the researchers to assist in transmitting ideas and maintaining the interest of the older adults during sessions.
- The elderly patients' phone numbers, which was used to follow up and inquire about their adherence to these procedures.
- Control group received a conventional hospital care.

Phase III : Evaluation phase

This phase involved comparing the admission and discharge results of the patients in terms of their health status and functional capacity in the two groups.

3.7 Statistical Analysis

The study used SPSS Version 22 for data analysis, using arithmetic mean and standard deviation for normally distributed quantitative data. Data were described and summarized using Count and percentage. Pearson's Chi square test, Monte Carlo exact test, Fisher exact test, Student t-test, paired sample t-test, Mann-Whitney U-test, and Wilcoxon signed-rank test were used to compare differences between independent groups. Graphs were presented for visualization of data utilizing Microsoft Excel and SPSS, and statistical significance was set at p < 0.05.

4. Results

Table 1. demonstrated that the age range of the elderly patients under research in the study group was 60–80 years, whereas the control group's age varied from 60–76 years. There were more men among the patients under study. 51.6% and 64.5% of the study and control groups, respectively, were married. In the research and control groups, the percentage of illiterates was 58.1% and 67.7%, respectively. No discernible changes in the study and control groups' demographic information were found, with two-thirds of both living in rural areas. The majority of the older people in the study also had another comorbid illness.

Table 2. showed that, while 29.0% and 25.8% of the pathway and non-pathway groups had COPD from one year to less than three years, respectively, 61.3% of the pathway group and 51.6% of the non-pathway group had COPD for more than three years. In terms of the total amount of hospital admissions that occurred in the previous year, the data indicates that 71.0% and 67.7% of the pathway and non-pathway groups, respectively, were admitted to the hospital.

Table 3. showed that dyspnea was reported by every patient in the CP and non-CP groups, and that coughing and breathing difficulties were the primary presenting symptoms for COPD older adult patients in both groups. The CP group reported 77.4% and the non-CP group 71.0% sleep disruption, the CP group reported 74.2% fatigue and the non-CP group 61.3%, and the CP group reported wheezes, 67.7% CP group and 83.9% non-CP groups group. Regarding current complaints, there were no statistically significant differences between the two groups (P<0.05).

Table 4. revealed that the study and control groups had average CAT scores of 32.19 ± 6.75 and 34.35 ± 6.17 at admission, respectively, with no statistically significant variation between them. CAT scores significantly decreased in both groups of patients at the time of discharge. For the study

and control groups, it is 15.03 ± 5.74 and 23.77 ± 6.15 , respectively. However, both the study participants' and the control group's CAT mean score decreased dramatically. It is noteworthy that there was a greater degree of reduction in the study group compared to the control group (P<0.001).

With regard to CAT score, it was discovered that 61.3% and 67.7% of the study and control groups, respectively, were admitted at the very sever stage, with no statistically significant variance between the two groups. There was a significant difference (P<0.001) between the study group and control groups when they were discharged; more than half (51.6%) of the study group was in the mild stage and more than half (54.8%) of the control group was in the sever stage.

Table 5. showed that there was no significant difference between the two groups' mean distances traveled by the patients: 245.48 ± 54.70 meters for the research group and 247.41 ± 59.99 meters for the control group. On discharge, however, there was a significant difference (P<0.05) in the research group's accomplished distance (283.22 ± 55.46 meters) compared to the control group's 251.19 ± 57.79 meters.

Within the research group, patients' average distance traveled upon admission was 245.48 ± 54.70 meters; upon discharge, it had significantly improved to 283.22 ± 55.46 meters (p <0.001). Conversely, the control group's mean distance at admission was 247.41 ± 59.99 meters, and it improved to 251.19 ± 57.79 meters at discharge with no statistically significant difference (P<0.05).

Figure 1. illustrates the correlation, following the adoption of the clinical pathway, between the CP group's health status (CAT) and functional capacity (6MWT). A positive correlation between the CAT score and the 6-minute walk was found.

	Study group		Control group		Test of			
Demographic data	n (31)	(%)	n (31)	(%)	significance			
Age					1			
60 to less than 65	17	54.8	12	38.7	$\chi 2 = 2.178$			
65 to less than 70	7	22.6	12	38.7	(0.326)			
more than 70	7	22.6	7	22.6				
Mean ± SD	66.64	±6.35	66.4	8±5.05				
Sex			-					
Male	17	54.8	23	74.2	$\chi 2 = 2.536 (0.111)$			
Female	14	45.2	8	25.8				
Marital status				1				
Single	0	0.0	2	6.5				
Married	16	51.6	20	64.5	MC = 4.244			
Widow	13	41.9	7	22.6	(0.236)			
Divorced	2	6.5	2	6.5	-			
Educational level								
Illiterate	18	58.1	21	67.7				
Read and write	7	22.6	5	16.1	$-\chi^2 = 0.655$ (0.721)			
Secondary	6	19.4	5	16.1				
Occupation before retirem	Occupation before retirement							
Work	17	54.8	23	74.2	$x^2 - 2536$			
Don't work	14	45.2	8	25.8	(0.111)			
Current work								
Yes	2	6.5	0	0.0	$\gamma 2 - 2.067$			
No	29	93.5	31	100.0	(0.151)			
Residence								
Rural	20	64.5	18	58.1	$\chi 2 = 0.272$			
Urban	11	35.5	13	41.9	(0.602)			
Income								
Not enough	21	67.7	23	74.2	$\chi 2 = 0.313$			
Enough	10	32.3	8	25.8	(0.576)			
Living condition								
Alone	5	16.1	7	22.6				
With family	21	67.7	17	54.8	$-\chi^2 = 0.166$ (0.684)			
With one of children	5	16.1	7	22.6				
Presence of comorbidity								
Yes	19	61.3	18	58.1	$\chi^2 = 0.067$			
No	12	38.7	13	41.9	(0.796)			

Table (1). Demographic and Health-Related Data of the Studied Elderly Patients with COPD in the Study and Control Groups

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(*) Statistically significant at p ${\leq}0.05,\,\chi^2$ = chi square, MC: Monte Carlo test

Table (2). The number of Hospital Admissions and the Duration of COPD for the Elderly Patients in Pathway and Non-Pathway Groups Throughout the Course of the Previous Year

	Pathway group		Non-pathway group		Test of significance		
Medical history	n (31)	(%)	n (31)	(%)			
Duration of the disease							
less than 1 year	3	9.7	7	22.6	$\chi 2 = 1.916$		
from1 year to less than 3 years	9	29.0	8	25.8	(0.384)		
more than 3 years	19	61.3	16	51.6			
Previous admission to hospital							
Yes	22	71.0	21	67.7	$\chi 2 = 0.076 \ (0.783)$		
No	9	29.0	10	32.3			
Number of previous hospitalization in last year							
Once	11	50.0	12	57.1			
Twice	9	40.9	5	23.8	$\chi 2 = 1.831 \ (0.400)$		
Third	2	9.1	4	19.0			

(*) Statistically significant at p ${\leq}0.05,\,\chi^2=$ chi square

Table (3). The Current Complaints of the Elderly COPD Patients Under Study in Both the Intervention and Control Groups.

Medical history	Interven	Intervention group		ol group	Test of significance
	n (31)	(%)	n (31)	(%)	
Symptoms of COPD		•			
Difficulty of breathing	31	100.0	31	100.0	
Cough	31	100.0	31	100.0	
Fatigue	23	74.2	19	61.3	$\chi^2 = 1.181$ (0.277)
Wheezes	21	67.7	26	83.9	$\chi^2 = 2.199$ (0.138)
Loss of appetite	11	35.5	7	22.6	$\chi^2 = 1.253$ (0.263)
Weight loss	6	19.4	8	25.8	$\chi 2 = 0.369$ (0.544)
Anxiety	19	61.3	14	45.2	$\chi 2 = 1.620$ (0.203)
Sleep disturbance	24	77.4	22	71.0	$\chi^2 = 0.337$ (0.562)
Sexual dysfunction	6	19.4	4	12.9	FT=0.477 (0.731)
Chest pain	10	32.3	13	41.9	$\chi^2 = 0.622$ (0.403)

(*) Statistically significant at $p \leq 0.05$, $\chi^2 = chi$ square, FE: Fisher Exact test

	CP group		Non-CP group		Test of significance		
CAT Score	n	0⁄~	n	0/			
	п	70	ш	70			
On the time of arrival							
Mild	0	0.0	0	0.0			
Moderate	2	6.5	0	0.0			
Sever	10	32.3	10	32.3	$(0)^a = 2.100$ (0.580)		
Very sever	19	61.3	21	67.7			
Mean ± SD	32.1	9±6.75	34.35±6.17				
On the time of departure							
Mild	16	51.6	2	6.5			
Moderate	11	35.5	12	38.7	(JDb 10.000		
Sever	4	12.9	17	54.8	$(0)^{\circ} = 18.980$ $(<0.001)^{**}$		
Very Sever	0	0.0	0	0.0			
Mean ± SD	15.0	3±5.74	23.77±6.15				
Z test $(P)^1$	5.056 (<0.001)**	4.944 (<0.001)**				

Table (4). Compares the COPD Assessment Test (CAT) Between the CP and non-CP Groups at the Time of Arrival and Departure

Wilcoxon signed rank Z -test (p) ¹: Comparing before (on admission) and after (on discharge) in each group Mann-Whitney U-test (p) ^a: Comparing the study and control group before clinical pathway implementation Mann-Whitney U-test (p) ^b: Comparing the study and control group after clinical pathway implementation *significant at p≤0.05

 Table (5). Comparing the Physical Function (6MWT) of the Experimental and Control Groups at Admission and Discharge

6MWT Score (meter)	Experimental group	Control group	Test of significance
	Mean ± SD	Mean ± SD	
On admission	245.48±54.70	247.41±59.99	(p) ^a =0.133 (0.895)
On discharge	283.22±55.46	251.19±57.79	$(p)^{b}=2.146$ (0.036)*
T - test $(p)^{I}$	15.189 (<0.001)**	1.655 (0.108)	

Paired –sample t-test (p) ¹: Comparing before (on admission) and after (on discharge) in each group Student t-test (p) ^a: Comparing the study and control group before clinical pathway implementation Student t-test (p) ^b: Comparing the study and control group after clinical pathway implementation *significant at $p \le 0.05$



Figure (1). shows Correlation Between CAT Score and 6 MWT Score in the Pathway Group After Adoption of Clinical Pathway

5- Discussion

Globally, one of the main causes of chronic morbidity and mortality is chronic obstructive pulmonary disease. It is currently among the top three global causes of death, with 90% of cases occurring in low- and middle-income nations (GOLD, 2023). A clinical pathway is a multidisciplinary management tool founded in evidence-based practice that defines and optimizes the various tasks performed by the professionals involved in patient care, improving patient outcomes and elevating staff and patient satisfaction (Tanumihardja & Nurwahyuni, 2023).

Thus, the purpose of this study was to ascertain how a clinical pathway would affect the functional ability and overall health status of older individuals suffering from chronic obstructive pulmonary disease. This study comprised sixty-two older adults with chronic obstructive pulmonary disease. They were split into two equal groups at random and in alternating orders of magnitude: the control group got standard care, while the study group followed a clinical pathway program for managing chronic obstructive pulmonary disease.

According to the demographic background of the current study, there were no discernible differences between the two groups' sociodemographic features. This indicates that both groups were dominated by homogeneity. This result was consistent with the findings of **Abd-Elwanees, El-Soussi, Othman, and Ali (2014)**, who reported that no significant differences were found between the CP and non-CP groups with regard to age, gender, and other demographic and baseline variables.

The mean age of the elderly patients under study was 66.64±6.35 years, whereas the control group's mean age was 66.48±5.05 years. This may be possibly due to aging impacting the respiratory system, a major risk factor for chronic lung diseases like COPD. Similarly, Karn, Hassan, Fadl, and Mahmoud (2018) discovered that the average age of the participants in their Egyptian study was 64 years old. Also, a study conducted in Egypt by Elsayed, Boughdady, and Abd Elhameed (2020) found that more two-thirds of the participants are in the 60-75 age range. The current study reveals that men are more affected by COPD than women due to increased exposure to risk factors like smoking and occupational and environmental toxins. The same findings were reported in a study done in Portugal by Ricardo, Simoes & Santiago, (2021) & in Egypt by Badway, Hamed& Yousef (2016). These findings were in contrast with a study carried out in Swedish by Lissper et al., (2019) & in USA by Wu, Rhoades, Chen, and Brown (2021).

Regarding the length of time that the study sample had COPD, the current study showed that over half of them had the disease for longer than three years, and this finding is corroborated by a studv conducted in Egypt bv Hamad. Abdelmoniem, and Saleh (2022). Furthermore, 71.4% of participants in a Manipal study by Castelino et al. (2017) reported having COPD for a period of one to five years. Furthermore, these results were at odds with those of Mohsen, Hanafy, Fathy, and El-Gilany (2019), who reported that 47.4% of their patients had COPD for more than ten years.

COPD patients had significantly higher rates of respiratory symptoms, such as cough, phlegm, wheeze, and shortness of breath, compared to non-COPD patients (Woldeamanuel, Mingude, & Geta, 2019). This is consistent with the results of the current study, which found that cough and difficulty of breathing were the most common presenting symptoms in both groups of elderly COPD patients. This finding is in agreement with a study done in Tanzania by Walker et al., (2018) & in Spain by Miravitlles, & Ribera (2017) & in Egypt by Elsayed et al., (2020).

In this study, a clinical pathway for the management of elderly patients with COPD was implemented by the researcher. The outcomes (health status and functional status) of patients managed by the pathway (CP group) were compared to those of patients managed by nurses' routine pulmonary care practices (non-CP group). In terms of baseline comparison, the patients in the CP group and the non-CP group were similar in terms of their access to medications, pulmonary care, and unit services.

According to the COPD Assessment Test (CAT) score, which was employed to assess the degree of symptoms and the overall effect of COPD on day-to-day functioning, there was no statistically significant variation in the two groups' admission COPD Assessment Test (CAT) scores. However, significantly improved by the time they were discharged, with the study group improving more than the control group. This outcome can be explained by the fact that COPD clinical pathways include a variety of interventions designed to improve patients' health, such as medication therapy, quitting smoking, exercise training, breathing exercises, teaching about selfmanagement, and psychological support. It is possible that the regular unit care and prescription medication are to blame for the control group's relative improvement. This result was supported by a study done in Turkey by Ceyhan, Tekinsoy, and Kartin (2022) and another study conducted in Turkey by Kilic, Tural Onur, Gorek Dilektasli, Ulubay, and Balcı (2023). While this finding disagreed with a study done in Potro by Jacome, (2016) who reported that no significantly difference after pulmonary rehabilitation.

In terms of functional capability, as determined by 6MWT, the current study discovered that, while there was no significant difference in the mean distance attained by the two groups upon admission, the study group's distance attained increased significantly after discharge. According to the study's conclusions, 6MWT scores significantly improved for older COPD patients who received clinical pathway. This improvement suggests an improvement in their exercise capacity and functional ability. It implies that clinical pathway, which likely included exercise training, breathing exercises, education, and support, was effective in improving the participants' physical endurance and overall function.

In this respect, **Zhang, Hu, Xu, Wu, and Lou, (2022)** conducted a systematic review in China and found that the pulmonary rehabilitation group's 6MWT distance considerably improved when compared to the control group. Furthermore, a study conducted in Brazil by **Da Costa et al.,** (**2014**) revealed that following a pulmonary rehabilitation program, there was a significant increase in the distance walked in the six-minute walk test (6MWT).

The current study found that there was a positive association between CAT score and 6minute walk. The positive association means that as disease severity increases (higher CAT scores), functional exercise capacity tends to decrease (shorter 6MWT distance). This finding implies that as respiratory symptoms worsen and disease impacts daily activities, patients experience reduced physical endurance and exercise capacity. This finding highlights the importance of assessing and managing COPD symptoms to improve patients' functional status and quality of life.

The findings of a study conducted in India by **Agrawal, Joshi, & Jain, (2015),** which showed a strong positive linear correlation between disease severity and 6MWT, corroborate this finding. Furthermore, a study conducted in India by **Konjeti, Gaikwad, Manjush, and Saini, (2022)** found a statistically significant difference (*p*<.0001) in the substantial correlation between the CAT score and the 6MWT.

According to the findings of the present study, the research hypothesis was proved as participants who followed the clinical pathway exhibited improvement in their COPD-related health status, and functional capacity than those who followed the routine care.

6- Conclusion: The results showed that the clinical pathway is a useful tool for enhancing COPD related health status, and functional capacity.

7- Recommendations

Based on the findings of this study, the following recommendations are suggested:

- Development of educational and training programs for all elderly patients in all health care hospitals to increase their benefits from the effect of use COPD clinical pathway.
- Providing training to nurses on the COPD clinical pathway implementation in order to improve the quality of care.
- Nurses should be urged to work in parallel with other medical professionals to use the clinical pathway to offer patients with COPD complete, comprehensive treatment.

8- Reference:

- Al-moamary, M.S., Al-Hajjaj, M.S., Tamim, H.M., Al-Ghobain, M.O., Alqahtani, H.A., & Al-Kassimi, F.A. (2011). The reliability of an Arabic translation of the chronic obstructive pulmonary disease assessment test. Saudi Medical Journal, 32 10, 1028-33.
- Abd-Elwanees, A., El-Soussi, A., Othman, S.,
 & Ali, R. (2014). Effect of implementing clinical pathway on the clinical outcomes of patients with acute exacerbations of chronic obstructive pulmonary disease. *Int J Nurs Sci*, 4(1), 1-10.
- Abo El-Ella, M. M., Mohammad, Z. A. E. L., & El-Shinnawy, O. M. (2018). Effect of Clinical Pathway Implementation on Outcomes of Patients with Chronic Obstructive Pulmonary Disease. Assiut Scientific Nursing Journal, 6(14), 129-134.
- Agrawal, S. R., Joshi, R., & Jain, A. (2015). Correlation of severity of chronic obstructive pulmonary disease with health-related quality of life and six-minute walk test in a rural hospital of central India. *Lung India : official organ of Indian Chest Society*, *32*(3), 233–240. <u>https://doi.org/10.4103/0970-2113.156231</u>
- American Thoracic Society. (2002). ATS statement: guidelines for the six-minute walk test. *Am J Respir Crit Care Med*, 166, 111-117.
- Badway, M. S., Hamed, A. F., & Yousef, F. M. (2016). Prevalence of chronic obstructive pulmonary disease (COPD) in Qena Governorate. *Egyptian Journal of Chest Diseases and Tuberculosis*, 65(1), 29-34.
- Boers, E., Barrett, M., Su, J. G., Benjafield, A. V., Sinha, S., Kaye, L., ... & Malhotra, A. (2023). Global burden of chronic obstructive pulmonary disease through 2050. JAMA Network Open, 6(12), e2346598-e2346598.

- Bollmeier, S. G., & Hartmann, A. P. (2020). Management of chronic obstructive pulmonary disease: A review focusing on exacerbations. American journal of healthsystem pharmacy : AJHP : official journal of the American Society of Health-System Pharmacists, 77(4), 259–268. https://doi.org/10.1093/ajhp/zxz306
- Camargo, P. F., Ditomaso-Luporini, L., de Carvalho Jr, L. C. S., Goulart, C. D. L., Sebold, R., Dos Santos, P. B., ... & Borghi– Silva, A. (2020). Association between the predictors of functional capacity and heart rate off-kinetics in patients with chronic obstructive pulmonary disease. *International Journal of Chronic Obstructive Pulmonary Disease*, 1977-1986.
- Castelino, F., Prabhu, M., Pai, M. S., Kamath, A., Mohapatra, A. K., Devi, E. S., ... & Nayak, S. G. (2017). Socio-demographic and clinical characteristics of Chronic Obstructive Pulmonary Disease (COPD) patients. *Manipal Journal of Nursing and Health Sciences (MJNHS)*, 3(2), 55-58.
- Central Agency for Public Mobilization and Statistics, Egypt, 2021
- Ceyhan, Y., & Tekinsoy Kartin, P. (2022). The effects of breathing exercises and inhaler training in patients with COPD on the severity of dyspnea and life quality: a randomized controlled trial. *Trials*, 23(1), 707.
- Da Costa, C. C., de Azeredo Lermen, C., Colombo, C., Canterle, D. B., Machado, M. L. L., Kessler, A., & Teixeira, P. J. Z. (2014). Effect of a Pulmonary Rehabilitation Program on the levels of anxiety and depression and on the quality of life of patients with chronic obstructive pulmonary disease. *Revista Portuguesa de Pneumologia* (*English Edition*), 20(6), 299-304.
- Dekhuijzen, P. R., Hass, N., Liu, J., & Dreher, M. (2020). Daily impact of COPD in younger and older adults: global online survey results from over 1,300 patients. COPD: Journal of Chronic Obstructive Pulmonary Disease, 17(4), 419-428.
- Elsayed, R., Boughdady, A., & Abd Elhameed, S. (2020). Functional Status And Sleep Quality Among Elderly Patients With Chronic Obstructive Pulmonary Disease. *Mansoura Nursing Journal*, 7(2), 162-183.

- **Fadila, D.(2012).**Effect of a pulmonary Rehabilitation Program on the Quality of life of Elderly Patients with Chronic Obstructive Pulmonary Disease, Doctoral thesis.
- Global Initiative for Chronic Obstructive Lung Disease (2023). Global strategy for the diagnosis, management, and prevention. A guide for health care professionals 2023 report. USA: GOLD; 2023.
- Global Initiative for Chronic Obstructive Lung Disease [GOLD] (2022). Global Strategies for Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease (2022Report). Retrieved 26 August 2022. https://goldcopd.org/2022gold-reports-2/
- Grey Bruce Health Network, (2011): COPD Care Pathway, http://www.healthpei.ca/carepathways/ (Accessed 22-1-2022).
- Hamad, A. H., Abdelmoniem, A. E., & Saleh, M. D. (2022). Effect of Supportive Nursing Care on Symptoms Severity and Quality of Life for Patients with Chronic Obstructive Pulmonary Disease. Zagazig Nursing Journal, 18(2), 126-145.
- Hu, J., & Long, Y. (2021). A commentary on Efficacy of pulmonary rehabilitation in improving the quality of life for patients with chronic obstructive pulmonary disease: evidence based on nineteen randomized controlled trials-a systematic review and meta-analysis"(Int J Surg 2020; 73: 78-86). International journal of surgery (London, England), 105934.
- Ismail, Z., Ahmad, W. I. W., Hamjah, S. H., & Astina, I. K. (2021). The Impact of Population Ageing: A Review. Iranian journal of public health, 50(12), 2451–2460. https://doi.org/10.18502/ijph.v50i12.7927
- Jácome, C. I. O. (2016). Pulmonary rehabilitation in mild chronic obstructive pulmonary disease and its impact on computerized respiratory sounds.
- Jones, P. W., Harding, G., Berry, P., Wiklund, I., Chen, W. H., & Leidy, N. K. (2009). Development and first validation of the COPD Assessment Test. *European Respiratory Journal*, *34*(3), 648-654.
- Karn, A. F. A., Hassan, W. A., Fadl, A. A. A.
 E., & Mahmoud, M. A. (2018).
 Effectiveness of pulmonary rehabilitation on pulmonary function parameters and dyspnea

in patients with stable chronic obstructive pulmonary disease. *Egyptian Journal of Bronchology*, *12*, 149-153.

- Kiliç, L., Tural Önür, S., Gorek Dilektasli, A., Ulubay, G., & Balcı, A. (2023). Understanding the Impact of Pulmonary Rehabilitation on Airway Resistance in Patients with Severe COPD: A Single-Center Retrospective Study. International Journal of Chronic Obstructive Pulmonary Disease, 1-10.
- Kim, B. S., & Lee, M. M. (2020). A study on the clinical usefulness, validity, and test-retest reliability of the Spirokit, a device that combines the pulmonary function test and respiratory muscle strength test. *Physical therapy rehabilitation science*, 9(2), 120-130.
- Konjeti, O., Gaikwad, N., Manjush, R. M., & Saini, M. (2022). Correlation of Six-Minute Walk Test and COPD Assessment Test (CAT) Scores with Spirometric Indices in Chronic Obstructive Pulmonary Disease Patients. International Journal of Medical Reviews and Case Reports, 6(14), 24-24.
- Lee, S. H., Kim, K. U., Lee, H., Kim, Y. S., Lee, M. K., & Park, H. K. (2018). Factors associated with low-level physical activity in elderly patients with chronic obstructive pulmonary disease. *The Korean journal of internal medicine*, 33(1), 130–137. https://doi.org/10.3904/kjim.2016.090
- Lisspers, K., Larsson, K., Janson, C., Ställberg, B., Tsiligianni, I., Gutzwiller, F. S., ... & Johansson, G. (2019). Gender differences among Swedish COPD patients: results from the ARCTIC, a real-world retrospective cohort study. NPJ Primary Care Respiratory Medicine, 29(1), 45.
- Matera, M. G., Hanania, N. A., Maniscalco, M., & Cazzola, M. (2023). Pharmacotherapies in older adults with COPD: challenges and opportunities. *Drugs* & Aging, 40(7), 605-619.
- Miravitlles, M., & Ribera, A. (2017). Understanding the impact of symptoms on the burden of COPD. *Respiratory research*, 18(1), 1-11.
- Mohsen, S., Hanafy, F. Z., Fathy, A. A., & El-Gilany, A. H. (2019). Nonadherence to treatment and quality of life among patients with chronic obstructive pulmonary disease. *Lung India: Official Organ of Indian Chest Society*, 36(3), 193.

- Mollica, M., Aronne, L., Paoli, G., Flora, M., Mazzeo, G., Tartaglione, S., ... & Iadevaia, C. (2021). Elderly with COPD: Comoborbitidies and systemic consequences. Journal of Gerontology and Geriatrics, 69, 32-44.
- Pereira, Â. M., Pereira, E., & Santa-Clara, H. (2021). Functional capacity and health status in patient with chronic obstructive pulmonary disease. Annals of Medicine, 53(sup1), S187. https://doi.org/10.1080/07853890.2021.1896 586
- Ricardo, J. A., Simões, J. A., & Santiago, L. M. (2021). Prevalence of chronic obstructive pulmonary disease in general practice patients in the Central Region of Portugal. *Family Medicine and Primary Care Review*, 23(2), 220-223.
- Said, A. F., Ewis, A. A., Omran, A. A., Magdy, M. E., & Saleeb, M. F. (2015). Prevalence and predictors of chronic obstructive pulmonary disease among high-risk Egyptians. Egyptian Journal of Bronchology, 9, 27-33.
- Sooriyakanthan, M., Wimalasekera, S., & Kanagasabai, S. (2019). Establishment of reference norms for lung function parameters of healthy Sri Lankan Tamils. *Pulmonary Medicine*, 2019.
- Tanumihardja, J. P., & Nurwahyuni, A. (2023, September). The Impact of Chronic Obstructive Clinical Pathway Lung Readmission: Implementation on Α Systematic Review. In The International Conference Public on Health Proceeding (Vol. 4, No. 02, pp. 592-598).
- Walker, R. W., Apte, K. K., Shimwela, M. D., Mwaiselage, J. D., Sanga, A. A., Namdeo,

A. K., ... & Salvi, S. S. (2018). Prevalence, risk factors and clinical correlates of COPD in a rural setting in Tanzania. *European Respiratory Journal*, *51*(2).

- Wind, A., van der Linden, C., Hartman, E., Siesling, S., & van Harten, W. (2021). Patient involvement in clinical pathway development, implementation and evaluation–A scoping review of international literature. *Patient education and counseling*, (105) 6, 1441-1448
- Woldeamanuel, G. G., Mingude, A. B., & Geta, T. G. (2019). Prevalence of chronic obstructive pulmonary disease (COPD) and its associated factors among adults in Abeshge District, Ethiopia: a cross sectional study. BMC Pulmonary Medicine, 19(1), 1-9.
- World Population Ageing (2019). Global And Regional Trends In Population Ageing. Available at :https://www.un.org/en/development/desa/po pulation/publications/pdf/ageing/WorldPopul ationAgeing2019-Report.pdf.
- Wu, H., Rhoades, D. A., Chen, S., & Brown, B. (2021). Native American Patients with Chronic Obstructive Pulmonary Disease Exacerbations in a Tertiary Academic Medical Center–A Pilot Study. *International Journal of Chronic Obstructive Pulmonary Disease*, 1163-1170.
- Zhang, H., Hu, D., Xu, Y., Wu, L., & Lou, L. (2022). Effect of pulmonary rehabilitation in patients with chronic obstructive pulmonary disease: a systematic review and meta-analysis of randomized controlled trials. *Annals of medicine*, 54(1), 262–273. <u>https://doi.org/10.1080/07853890.2021.1999</u> <u>494</u>