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Pattern of chronic obstructive pulmonary diseases in Nasser Institute, Egypt

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Abstract

Background: One of the most widespread chronic respiratory disease with rising morbidity and death is chronic obstructive pulmonary disease (COPD), resulting in enormous societal and economic costs. COPD is a widespread, avoidable, and curable condition characterised by usual symptoms such as dyspnea, coughing, and/or sputum production. The goal of this study was to use a COPD questionnaire to analyse clinical, demographic, and available prescription pattern for chronic obstructive pulmonary disease.

Results: Our findings suggest that patients' early knowledge of COPD risk factors and symptoms and assistance in early illness detection and the provision of patient-centred treatment based on patients' unique requirements in disease management are all necessary.

Conclusion: The major objective of COPD management is to control symptoms and limit the risk of exacerbation in order to enhance the quality of life of patients. In addition to pharmaceutical management, achieving these goals necessitates the adoption of a healthy lifestyle and the avoidance of risk factors.

Keyword: Chronic obstructive pulmonary disease patients in Nasser Institute

Background

In 2015, over 3 million people died from COPD worldwide [1]. COPD is the fourth greatest cause of mortality worldwide, and it is expected to be the third leading cause by 2020 [2].

The prevalence of COPD is predicted to climb in the next 30 years due to rising smoking rates in developing nations and ageing populations in developed countries. Every year, more than 4.5 million people would die from COPD and related disorders by 2030 [3].

The epidemiology, demographics, clinical characteristics of the patients, and prescription pattern varied greatly between Egyptian COPD patients and those investigated in other nations, highlighting the uniqueness of each country and the importance of national data on our health concerns [4].

The goal of COPD management is to alleviate symptoms, decrease the severity and frequency of exacerbations, and enhance exercise tolerance and health status [5].

The goal of the study was to evaluate clinical, demographic, and available prescription patterns for chronic obstructive pulmonary disease (COPD) using a COPD questionnaire, which can assist manage symptoms and minimise the risk of exacerbation, hence improving patients' quality of life.

Methods

In the cohort study conducted, 200 patients (110 outpatients and 90 inpatients) were included in the current study at Ain Shams University Hospital and Nasser Institute Hospital from January 2021 to June 2021. According to the Global Initiative for Chronic Obstructive Lung Disease Guideline [6], all patients met the COPD diagnostic criteria based on symptoms and spirometry. All

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patients who did not meet the COPD diagnostic criteria were eliminated.

In this study, patients were split into inpatients and outpatients in a table, and informed written agreement was acquired from the participants. The Ethical Committee of the Faculty of Medicine gave its approval to the project.

Each patient was subjected to the following questionnaire:

1) Smoking

Never smoking		
Passive smoking		
Ex-smoker	Age of onset *Pack/year	Years ago
	Stopped	
Current smoker	Age of onset Pack/year	
Shisha and Gouza	Session/day Session duration Stones/session	
Other special habits	Hashish Drugs Alcohol	

*Pack/year:

lifetime smoking exposure is measured in “packs/year”, with one “pack/year” equalling 20 cigarettes smoked every day for 1 year [7].

2) Symptoms

Cough for at least 3 months each year for at least 2 years

Expectoration	Present for many years, worst in winters, initially mucoïd, become purulent with exacerbation
*Dyspnea	When hurry on the level or up slight hill I walk slower than people of same age On walking 100 yards or after few minutes I cannot leave the house
Wheezes	
Others	

*Dyspnea is measured according to modified medical research council (MMRC) dyspnea scale [8].

3) Spirometry

Spirometry was performed on all patients using the spirometry system (Masterscreen 2001, Erich Jaeger GMBH, version 4.5, Germany).

	Actual	%Predicted before bronchodilator	%Predicted after bronchodilator
FEV1			
FVC			
FEV1/FVC			
FEF25–75%			

4) Pharmacological treatment: through revising the available previous doctor prescriptions, medical records, or what the patients remember

Antibiotic	Penicillin Cephalosporin Quinolone Macrolide Aminoglycoside Others	
B2 agonist	(Inhalers) Oral	
Xanthines	IV Oral	Short acting Sustained release
Steroid	Inhaler Oral I. V I. M	
Anticholinergic inhaler	Ipratropium bromide Tiotropium bromide	
Others	Mucolytic Antitussive	

5) Complications of COPD

Respiratory failure
Right-sided heart failure
Others

6) Outcome

Table 1 Distribution of the two studied groups according to smoking

	Inpatients (n = 90)		Outpatients (n = 110)	
	No	%	No	%
Smoking				
Never smoking	10	11.1	28	25.4
Current smoker	37	41.1	46	41.8
Ex-smoker	43	47.7	36	32.2

Table 2 COPD patients as regards the dyspnea grading

Symptoms (dyspnea) ^a	Inpatients (n = 90)		Outpatients (n = 110)	
	No	%	No	%
Grade I	3	3.3	23	14.3
Grade II	19	21.1	102	63.4
Grade III	40	44.4	36	22.4
Grade IV	28	31.1	0	0.0

^a According to modified medical research council (MMRC) dyspnea scale

Improved
Stationary
Discharged on (room oxygen, domiciliary oxygen)
Died

Statistical analysis

Statistics

Using the IBM SPSS software package version 20.0, the data were analysed [9]. The Kolmogorov–Smirnov test was used to verify the normality of distribution, and then the appropriate statistical analysis was applied [10]. Significance of the obtained results was judged at the 5% level.

Results

Two hundred patients (110 outpatients and 90 inpatients) were included in the current study at Ain Shams University Hospital and Nasser Institute Hospital from January 2021 to June 2021. All patients fulfilled the diagnostic criteria of COPD based on symptoms and spirometry according to the *Global Initiative for Chronic Obstructive Lung Disease Guideline* [6].

Table 1 shows that most of the inpatients (47.7%) were ex-smokers, while most of the outpatients (41.8%) were current smokers.

Table 2 shows that the majority of COPD inpatients were either in grade III (44.4%) or grade IV (31.1), while outpatients’ majority were in grade II (63.4), according to modified medical research council (MMRC) dyspnea scale.

Table 3 showed the analysis of the spirometry in the outpatient and inpatient and the spirometry results between pre and post.

Table 4 shows that the majority of studied COPD patients were in severe stage (51.1%) in the inpatient and in moderate stage (42.7%) in the outpatient.

Third cephalosporin was the most commonly used antibiotic in those suffering infective exacerbation (92.2%), followed by quinolone (4.4%) in inpatients. While in outpatients, both were equally used (4.5%) for each (Table 5).

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- B2 agonist mainly used as in nebuliser form (88.8%) in inpatients and in inhaler form (83.6%) in outpatients.
- While in case of xanthines, they were used in oral sustained release form (100%) in inpatients and (89%) in outpatients.
- Steroids mainly used in nebuliser form (27.7%) in inpatients and in inhaler form in outpatients (74.5%).
- Anticholinergic inhalers (ipratropium bromide) were commonly used in inpatients (90%), while in outpatients, it was only (0.9%).
- Mucolytics and expectorants were commonly used in treatment of COPD.

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Table 6 shows that all of the studied COPD inpatients were in improved state. Most of the outpatients were in stationary state (65.4%), while the others were improved.

Table 7 shows that among the studied COPD patients, 91% and 27.2% inpatients and outpatients respectively had respiratory failure and 8.8% and 19% inpatients and outpatients respectively had right-sided heart failure.

Discussion

The current study used a COPD questionnaire to analyse clinical, demographic, and available prescription pattern for chronic obstructive pulmonary disease.

This study was conducted in Ain Shams and Nasser Institute Hospitals from January 2021 to June 2021. In this study, 200 COPD patients were recruited who were either referred to an outpatient chest clinic or admitted to the hospital (110 outpatients and 90 inpatients).

Table 3 Descriptive analysis of the two studied groups according to spirometry

Spirometry	Inpatients (n = 90)			Outpatients (n = 110)		
	Actual	%Pred. pre	%Pred. post	Actual	%Pred. pre	%Pred. post
FEV1						
Min.-max	0.36–2.51	10.0–67.0	11.0–68.0	0.37–2.56	10.0–64.0	13.0–67.0
Mean ± SD	1.12 ± 0.47	35.67 ± 12.92	39.29 ± 13.02	1.28 ± 0.47	40.09 ± 13.88	43.45
Median	1.06	35.0	39.0	1.28	40.0	13.62
FVC						
Min.-max	0.73–4.72	24.0–98.0	25.0–98.0	0.81–4.89	19.0–102.0	22.0–103.0
Mean ± SD	2.49 ± 0.80	64.09 ± 17.87	65.23 ± 17.80	2.69 ± 0.81	68.0 ± 19.06	69.01 ± 19.03
Median	2.42	66.0	67.0	2.71	69.0	72.0
FEV1/FVC						
Min.-max	22.90–57.90	28.90–69.20	30.40–69.90	26.90–67.40	33.90–69.60	41.90–69.90
Mean ± SD	44.27 ± 7.96	55.08 ± 9.82	59.78 ± 8.78	47.20 ± 7.99	58.32 ± 9.03	62.73 ± 7.43
Median	44.60	56.30	61.40	48.50	60.70	66.10
FEF25-75%						
Min.-max	0.16–2.43	4.0–62.0	7.0–69.0	0.25–2.70	6.0–67.0	10.0–69.0
Mean ± SD	0.88 ± 0.46	27.40 ± 13.33	33.54 ± 13.62	1.05 ± 0.56	30.97 ± 15.77	36.71 ± 15.64
Median	0.75	24.0	31.0	0.96	28.0	34.0

COPD was diagnosed using the Global Initiative for Chronic Obstructive Lung Disease Guideline [6].

We discovered that a history of dyspnea (93%), a productive cough (76%), a wheezy chest (52%), and a CAT scoring > 10 (68%) were all highly related with the presence of COPD, with a statistically significant difference between confirmed and unconfirmed cases. And this is consistent with that of Munesarao et al. [12]. Few patients were diagnosed with COPD despite having a positive CAT score of less than or greater than 10, as this is associated to other factors than COPD, such as heart illness, occupational role, and recurrent chest infection.

In our study, the high prevalence of COPD among the population in urban areas was significantly higher than in rural areas, a finding that contrasts with a Chinese study that found an overall prevalence of COPD in rural and urban areas of 9.4%, with a significantly higher prevalence of COPD in rural than in urban areas (12.0% versus

7.4%, *P*, 0.01), which could be attributed to the study's different population numbers [13].

In our investigation, 7.5% of those with previously diagnosed COPD were discovered, indicating that the important diagnostic technique of spirometry is underutilised in our community. The majority of COPD patients were normal or overweight, with 25.5% obese and 5% underweight. A close finding in a Japanese study, 9.4% of patients with airflow restriction documented in a prior diagnosis of COPD, was recorded. Tunisia had 3.5% with COPD, whereas Sweden had 29% with previously recognised lung problems [14].

According to GOLD [15], our findings revealed that stage 1 disease was noticed in 26 cases (17.6%), stage 2 disease was noticed in 121 cases (84.5%), stage 3 disease was noticed in 76 cases (66.6%), and stage 4 disease was noticed in 28 cases (31.1%), which is consistent with the findings of Al-Omari et al. [16], who discovered that 19% had mild disease and 57 had moderate disease. COPD was recognised at a late stage in the MENA area research, which is consistent with our findings when we used GOLD 2011 and discovered that 25% of patients were in stage D when initially diagnosed [17].

Regarding smoking habits, the majority of the patients evaluated (65.5%) are current or ex-smokers, and there is no association between smoking and COPD score. One probable reason is that once the impairment develops, subsequent smoking exposure has little effect on the overall progression. Our findings are consistent with those of Kwon and colleagues [18]. They found no

Table 4 Distribution of the two studied groups according to the disease severity

FEV1 (%pred. post)	Inpatients (n = 90)		Outpatients (n = 110)	
	No	%	No	%
Mild: FEV1 ≥ 80% predicted	0	0.0	0	0.0
Moderate: 50% ≤ FEV1 < 80% predicted	22	24.4	47	42.7
Severe: 30% ≤ FEV1 < 50% predicted	46	51.1	41	37.2
Very severe: FEV1 < 30 predicted	22	24.4	22	20

Severity (by FEV1) based on Munesarao et al. [11]

Table 5 Distribution of the studied groups according to treatment

Treatment	Inpatients (n = 90)		Outpatients (n = 110)	
	No	%	No	%
Antibiotic				
No	1	1.1	99	90
Penicillin	0	0.0	1	0.9
Quinolone	4	4.4	5	4.5
Cephalosporin	83	92.2	5	4.5
Cephalosporin and quinolones	2	1.8	0	0.0
B2 agonist				
No	6	5.4	13	11.8
Oral	4	4.4	5	4.5
Inhalers	0	0	92	83.6
Nebuliser	80	88.8	0	0
Xanthines				
No	0	0.0	12	10.9
IV	0	0.0	0	0.0
Oral (SR)	90	100.0	98	89
Steroid				
No	3	3.3	15	13.6
Oral	27	30	9	8.1
Inhaler	0	0	82	74.5
IV	35	38.8	4	3.6
Nebuliser	25	27.7	0	0
Anticholinergic inhaler				
No	9	10	108	98.1
Tiotropium bromide	0	0.0	1	0.9
Ipratropium bromide	81	90	1	0.9
Others				
No	0	0.0	7	6.3
Antitussive	0	0.0	1	0.9
Expectorant	15	16.6	43	39
Mucolytic	39	43.3	46	41.8
Mucolytic and expectorant	36	40	13	11.8

IV Intravenous, SR Sustained release

evidence that smoking had a negative impact on the evolution of COPD symptoms or comorbidities.

Obaseki et al. [19] discovered that heavy smokers had poorer COPD symptom ratings than nonsmokers. In addition, Ahmed et al. [20] and Shavro et al. [21]

Table 6 Distribution of the two studied groups according to treatment outcome

Outcome	Inpatients (n = 90)		Outpatients (n = 110)	
	No	%	No	%
Improved	90	100.0	38	34.5
Stationary	0	0.0	72	65.4

Table 7 Distribution of the two studied groups according to complications of COPD

Complications of COPD	Inpatients (n = 90)		Outpatients (n = 110)	
	No	%	No	%
No	0	0	59	53.6
Respiratory failure	82	91.1	30	27.2
Right-sided heart failure	8	8.8	21	19

discovered a substantial inverse relationship between smoking pack/year and COPD scores. On the other hand, Ekici et al. [22] documented improved COPD symptoms among current smokers, explaining that patients who continue to smoke may be in a less advanced stage of the illness.

Zamzam et al. [23] discovered a statistically significant negative correlation between FEV1, FEV1/FVC, PEFr, FEF25–75 percent, and SGRQ score. Furthermore, Jones et al. [24] showed that HRQoL impairment varied greatly within each GOLD stage of severity and that significant HRQoL impairment occurs even in the early stages of COPD, with minimal variation between patients in GOLD stages I and II. They did, however, come to the conclusion that COPD stage according to GOLD showed a mild correlation with SGRQ.

Previous research found that COPD patients had lower levels of physical exercise. Patients with COPD exhibited impaired physical activity in this research, as evidenced by advanced stages of dyspnea and a high BODE index score. The majority of patients (83%) had mMRC dyspnea grades 4 and 3, suggesting strong subjective dyspnea with a higher degree of impairment; it also predicts future mortality risk.

In addition, we discovered a substantial positive association between SGRQ and BODE index as well as mMRC dyspnea, with a strong linear relationship across all domains (P0. 001). Previous data show that the BODE index and its parameters have excellent discriminative capabilities, allowing them to detect deterioration of symptoms earlier and predict future mortality risk, allowing them to take appropriate and effective actions to relieve patients' symptoms, improve patients' exercise tolerance, and slow disease progression [25].

COPD pharmacological treatment is intended to alleviate symptoms, minimise the frequency and severity of exacerbations, and enhance exercise tolerance and health status. There is currently no definitive clinical trial evidence that any present COPD treatments alter the long-term deterioration in lung function. Post hoc evidence of such an impact with long-acting bronchodilators and/or

inhaled corticosteroids has to be confirmed in well controlled studies [26].

In this study, the third cephalosporin was the most usually utilised antibiotic in individuals suffering from infective exacerbation (92.2%), followed by quinolone (4.4%). In outpatients, both were utilised similarly (4.5% for each).

B2 agonists are mostly utilised in nebuliser form (88.8%) in inpatients and inhaler form (83.6%) in outpatients. In the case of xanthines, they were employed in the oral sustained release form (100%) in inpatients and (89%) in outpatients. Outpatients primarily take steroids in the form of inhalers (74.5%).

Anticholinergic inhalers were widely utilised in 81 (90%) of inpatients and 2 (0.9%) of outpatients. In the therapy of COPD, mucolytics and expectorants were extensively employed.

The diagnostic utility of bronchodilator responsiveness (BDR) in ACO remains uncertain. A “substantial” BDR (most usually characterised as a 12% and 200 mL improvement in FEV1 or FVC following bronchodilator) cannot always tell the difference between asthma and COPD. Additionally, up to 50% of COPD patients may have a high BDR that fluctuates dramatically over time. The presence of BDR is useful but not needed for ACO diagnosis, according to the majority of current criteria [27].

In this study, we used the GOLD recommendations to add irreversible airway obstruction, characterized as a post-BDR test FEV1/FVC ratio of 70% or more, as the critical 1st degree in identifying ACO in asthmatics. In our COPD patients, the results revealed that having a high or significant BDR showed a statistically significant diagnostic criterion for COPD [28].

This was consistent with the results of Toledo-Pons et al. [29], which found that no COPD subjects had extremely positive BDR, although 9.7% of asthmatic cases did. Also, they discovered a 15.5% of COPD patients had positive BDR, in comparison to 23% of ACO patients. Similarly, Song et al. [30] discovered that only a tiny number of COPD cases had a bronchodilator response greater than 400 mL.

Inhalers play a significant role in medicine delivery in COPD patients; therefore, selecting an inhaler is just as critical as selecting a therapy. The quantity of medicine reaching the infected location and the patient’s reaction to therapy are influenced by inhalation flow, aerosol velocity, and particle size [31].

Pulmonary rehabilitation is a comprehensive intervention that begins with a thorough patient assessment and continues with patient-tailored therapies that include, but are not limited to, exercise training,

education, and self-management interventions aimed at behaviour change, all with the goal of improving the physical and psychological condition of people with chronic respiratory disease and promoting long-term adherence to health-enhancing behaviours. The benefits of pulmonary rehabilitation for COPD patients are substantial, and rehabilitation has been found to be the most effective therapy technique for improving shortness of breath, health status, and activity tolerance. This was consistent with our study, in which the majority of COPD patients in both groups (87.7% in inpatient and 83.6% in outpatient) got illness information and instructions [6].

Conclusion

The major objective of COPD management is to control symptoms and limit the risk of exacerbation in order to enhance the quality of life of patients. In addition to pharmaceutical management, achieving these goals necessitates the adoption of a healthy lifestyle and the avoidance of risk factors.

Abbreviations

COPD: Chronic obstructive pulmonary disease; FVC: Forced vital capacity; FEV1: Forced expiratory volume 1; VC: Vital capacity; FEF25-75: Forced expiratory flow.

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Authors’ contributions

HS examined and interpreted the patient’s pulmonary function and degree of COPD data. AA took the history and examined the patient and was a key contributor to the article. The final manuscript was read and approved by all writers.

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Availability of data and materials

On reasonable request, the datasets used and/or analysed during the current investigation are made available.

Declarations

Ethics approval and consent to participate

The study was approved by Ain Shams University’s Faculty of Medicine’s Ethical Committee Board (the reference number is not available). Each patient signed an informed consent form in writing.

Consent for publication

None.

Competing interests

The authors declare that they have no competing interests.

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