Original Research Article

Impact of clinical pharmacist intervention in chronic obstructive pulmonary disease management

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ABSTRACT

Background: Chronic obstructive pulmonary disease (COPD) is a common, preventable, and treatable disease characterized by persistent respiratory symptoms and airflow limitation. In 2016, COPD is the third leading cause of death globally and is projected to increase by more than 30% in the next 10 years. The main threat to the prognosis lies in the lack of disease knowledge, poor medication adherence, and health-related quality of life. Clinical Pharmacist is a key profession to improve patient care in COPD management and literature in this regard is very limited. It is important to establish the impact of a clinical pharmacist as an indicator to improve patient outcomes. Hence the aim of this was to assess the Impact of Clinical Pharmacist Intervention in COPD management in a Tertiary care hospital.
Methods: The study was conducted as a prospective and interventional. A total of 53 patients were recruited in the study. The study participants were educated by a clinical pharmacist on disease state, medications, and breathing techniques. Patients have a regular follow-up after 6 months during a scheduled visit. Questionnaires were administered to all patients at baseline and 6 months to assess their medication adherence, disease-related knowledge, and HRQoL.
Results: Out of 53 study participants, the majority of COPD patients 23 (46.94%) were found to be in the elderly age group of 60-69 years. The majority of the patients were in a severe category of 48.98%. Thereafter intervention assessment of COPD related knowledge showed a 33.45% improvement. The majority of study participants showed high adherence after the intervention of 46.94 %. All aspects of the HRQoL questionnaire showed improvement after intervention. The results were statistically significant.
Conclusions: The Pharmacist-led COPD Intervention showed improvement in the three main aspects of the study. It confirms the need for healthcare systems to recognize the role of clinical pharmacists in both pharmacological therapy and non-pharmacological supportive care.

Keywords: Clinical pharmacist intervention, Patient education, Health related quality of life, Medication adherence

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a common, preventable, and treatable disease characterized by persistent respiratory symptoms and airflow limitation caused by the abnormalities of the airway majorly due to the exposure to noxious gases and environmental triggers.[1] In 2016, COPD is the third leading cause of death globally. This signifies a major public healthcare challenge as the total deaths from COPD is projected to increase by more than 30% in the next 10 years.[2] The main threat to the prognosis lies in poor medication adherence, lack of disease knowledge, and a distorted health-related quality of life (HRQoL).

The reduction of the disease burden is a multifaceted approach that involves early and proper diagnosis, prevention, pharmaceutical, and non-pharmaceutical interventions. The global Initiative for chronic obstructive lung disease (GOLD) recognizes clinical pharmacist as a key profession integrated into the patient care pathway to improve COPD management and guideline implementation.[3] Pharmacists are well-positioned to detect non-adherence and to apply strategies to improve compliance by optimizing medication therapy. Clinical Pharmacist-led patient education intervention on the disease knowledge, inhaler usage, and self-care management shows improvement in medication adherence, understanding of the disease, and overall HRQoL of COPD patients.[4] The literature on the role of clinical pharmacists in patients with COPD in a hospital set-up is very limited. It is important to establish the impact of a Clinical Pharmacist as an indicator to improve patient outcomes.

Aim and objectives

Aim of this study was to assess the impact of clinical pharmacist intervention in COPD management in a tertiary care hospital.

Objectives of this study were to identify the social demographic factors associated with COPD patients (age, gender, BMI and occupation), to classify the airflow limitation severity in COPD patients using post-bronchodilator spirometric values (FEV1, FEV1/FVC) by GOLD criteria, to measure the health-related quality of life (HRQoL) using the modified St. george respiratory ouestionnaire in COPD patients, to assess medication adherence using the modified morisky medication adherence scale, to assess the COPD related knowledge using the modified bristol COPD knowledge questionnaire.

METHODS

This prospective interventional study was conducted for a period of 6 months from January 2019 to June 2019 in an in-patient and out-patient settings of a tertiary care hospital in Chennai. Interview questionnaires for socio-demographic as well as disease knowledge, medication adherence and HRQoL were used to collect data from 53 COPD patients from the Pulmonology Department of Tertiary care hospital.

Inclusion criteria

Inclusion criteria were both genders, patient diagnosed with COPD based on GOLD criteria, patient who had acute exacerbation in the past 2 months, patient aged ≥40 to ≤70 years, patients who are fit for performing spirometry

Exclusion criteria

Exclusion criteria were severe organ failure (heart, liver, lung, kidney), suspected respiratory infection in the last 4-6weeks and active infection of TB, any condition that may be aggravated by forced expiration (e.g.: Uncontrolled HTN, MI, Stroke, etc.), pregnant and lactating women, patients who are not willing to participate.

Study tools

Patient proforma

A patient proforma is specially designed to collect the necessary information from the patient through an interview. It contains patient demographic details, patient complaints on admission, family and social history (past and present), and occupational considerations.

Modified bristol COPD knowledge questionnaire (MBCKQ)

MBCKQ is used to measure the patient knowledge on their disease condition. The questionnaire contains 9 criteria's, which gives a total of 28 questions corresponding to their response were scored of answering correct indicates+1 and scored of answering wrong indicates 0.

Modified morisky medication adherence scale

It is used for assessing patient medication adherence related only on mediation usage during their treatment period. The questionnaire contains 8 questions which includes elements of forgetfulness, symptoms severity, other situational and emotional aspects of medications adherence. It's scoring indicates Yes=1 and No=0

Modified St. george questionnaires

It is used for assessing health related quality of life. Disease specific measurements designed to identify the impact of overall health and perceived well-being in patients with chronic obstructive airway disease. It is divided into 2 parts. Part 1 (Symptoms): several scales; Part 2 (Activity and Impacts): True/False in which

scoring ranges from 0 to 100, with higher scores indicating more limitations.

Pulmonary function test

It is used for measuring FEV1, FEV1/FVC values. Mainly to classify airflow limitation in COPD based on GOLD criteria. Patients with FEV1/FVC <0.70 values, Spirometric values are scored accordingly i) FEV1 ≥80% predicted indicates Mild, ii) 50%≤FEV1<80% predicted indicates Moderate iii) 30%≤FEV1<50% predicted indicates Severe and iv) FEV1<30% predicted indicates Very Severe.

Study procedure

Baseline data for each patient were collected by a specially designed and validated patient proforma and study specific questionnaire. The assessments were reassessed at 6th month in patients. The baseline and follow up data collected are depicted in (Table 1).

Table 1: Study procedure.

Timeline	Data collected
Baseline - January (Before intervention)	Patient demographic information
	Assessment of COPD knowledge
	Assessment of medication adherence
	Disease-specific health-related quality of life
	Assessment of Pulmonary Function Test (PFT)
	Assessment of COPD acute exacerbation
Intervention Made	Disease condition
	Importance of medication adherence
	Self-care management
Final follow up – July (After inter vention)	COPD knowledge
	Medication adherence
	Disease-specific health-related quality of life
	Assessment of COPD acute exacerbation
	Pulmonary Function Test (PFT)

Ethical consideration

This study was approved by institutional ethical committee. Informed consent was obtained from all the study participants, and also ensured confidentiality.

Statistical analysis

Data were analyzed using SPSS version 23.0. All mean was expressed as mean±standard deviation. Paired t-test

was used to compare the baseline data and final data. P-value of <0.05 was considered as statistically significant.

RESULTS

Out of 65 COPD patients, based on the study criteria 53 patients were recruited. Out of which 49 patients completed the follow-up. In our study, the majority of the patients 23 (46.94%) were found to be in the age group of 60-69 years which is likely on their COPD incidence rate. Our study showed that most of the COPD patients 21 (42.86%) were smokers and also contributed to other exposure summed up to 57.14%. By far, the main cause for COPD is smoking but our study revealed that occupational and other exposures are liked to play an important role in developing COPD. However, the study participants with the previous history of asthma 5 (10%) had a high risk of developing COPD due to airway hyper responsiveness.

Symptoms and acute exacerbation

Our study showed the most common symptoms in the descending order such as dyspnoea 44 (90%), cough with sputum 39 (80%), rhonchi 29 (66%), wheeze19 (40%), crepitation 15 (30%), and generalized weakness 4 (8%).

The majority of patients 26 (53.6%) had frequent acute exacerbation; in contrast, there was less frequent exacerbation 24 (48.98%) were seen in the study participants after the intervention.

Spirometry values and GOLD categorization

The mean spirometry values FEV1/FVC ratio and FEV1 were 0.5714 and 1.14 in before intervention respectively. After the intervention, the values were found to be 0.5806 and 1.19 respectively. The study showed improvement but it was not significant with p values <0.18 as seen in (Table 2) and was supported by Khdour R et al.[10]

Table 2: Spirometry values.

Parameter	FEV1/FVC	FEV1
Before intervention	0.5714	**1.14**
After intervention	0.5806	**1.19**
p-value	0.18	**0.1509**

Table 3: GOLD categorization of COPD severity.

Class	Mild	Moderate	Severe	Very severe
No of patients	5	15	24	5
Percent age (%)	10.20	30.61	48.98	10.20

The study participants were categorized based on the severity of four groups mild, moderate, severe, and very severe as seen in (Table 3). Out of which the predominant number of study participants are staged to be in the severe category 24 (48.98%) which was likely due to factors like age, environmental exposure, socioeconomic status, etc.

COPD related knowledge

Our study showed that pharmacist-led intervention significantly improved (P<0.001) the knowledge using Modified BCKQ about the disease, symptoms, and medications. At the baseline measurement, patient knowledge of medications (33.52%) was poor as depicted in (Table 4) and (Figure 1).

Table 4: COPD knowledge in the study participants.

Class	Knowledge (%)	SD
Before intervention	33.52	11.73
After intervention	66.97	6.001
P-value	<0.0001#	

#- Statistically significant, Data was analyzed by paired t-test
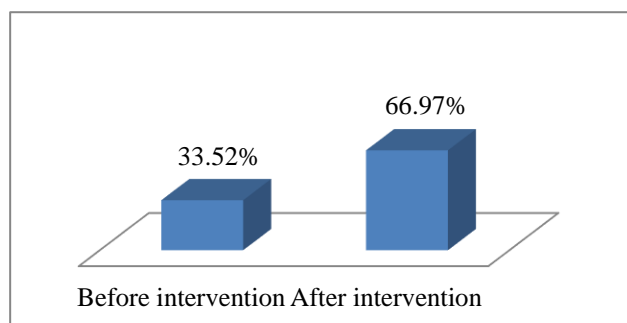
Figure 1: COPD knowledge before and after intervention.
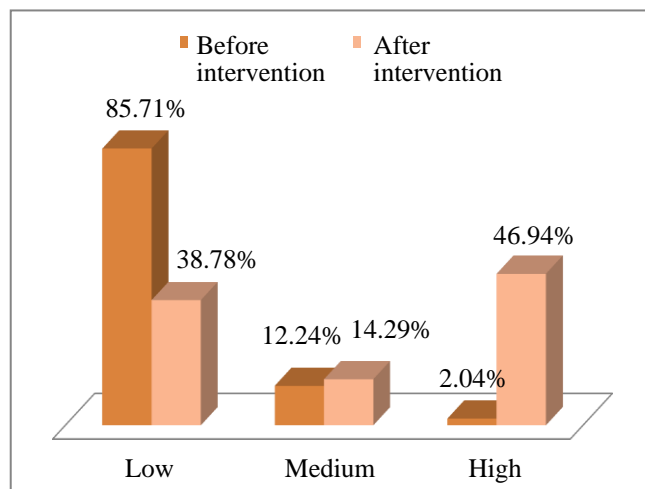
Medication adherence

Table 4: Medication adherence of study participants.

Class	Low (%)	Medium (%)	High (%)
Before intervention	85.71 (41)	12.24% (6)	2.04% (1)
After intervention	38.78 (19)	14.29% (7)	46.94% (23)
P-value	<0.0001#		

#- Statistically significant, data was analyzed by paired t-test

Our study found that a higher number of adhering subjects (adherence 46.94%) in the study participants after the intervention. Improvement in medication adherence can be directly beneficial to a patient's clinical condition and medication counseling contributes to improved medication adherence to prescribed medicines (Table 5) and (Figure 2).

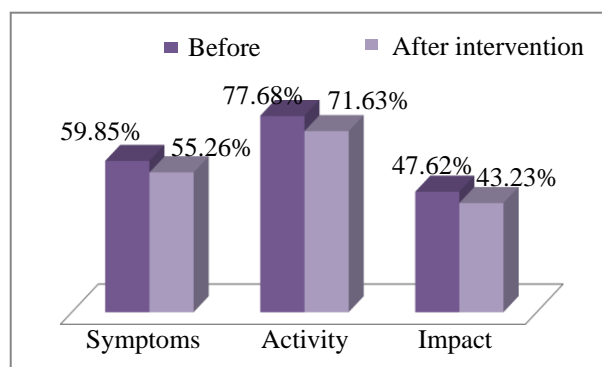**Figure 2: Before and after intervention of medication adherence.**

Health-Related quality of life

Our study demonstrated that patients had a low HRQoL at baseline; however, after the intervention, the quality of life improved clinically at 6 months, with statistical significance. The present findings are shown in (Table 6) and (Figure 3), HRQoLimprovement in COPD patients in response to self-management programs has also been demonstrated by Khdour et al.[10]

Table 6: HRQOL in COPD patients.

Class	Symptoms (%)	Activity (%)	Impact (%)
Before intervention	59.85	77.68	47.62
After intervention	55.26	71.63	43.23
P-value	<0.0001#	<0.0001#	<0.0001#

#- Statistically significant, Data was analyzed by paired t-test

Figure 3: Before and after the intervention of HRQOL in COPD patients.

DISCUSSION

Out of 65 COPD patients, based on the study criteria 53 patients were recruited. Out of which 49 patients completed the follow-up. Reasons for dropping out, in the descending order of importance were, a) lost to follow-up b) withdrawal at different levels of the study.[23] (46.94%) were found to be in the age group of 60-69 years, the reason being lung function progressively declines with increasing age as a consequence of structural and physiological changes to the lung. The high incidence rate among the elderly is similar to the study conducted by Brandsma C et al.[5] 10 % of the patient had a previous history of asthma, apart from the overlap between asthma and COPD, it is now a well-established fact that asthma is a risk factor for the development of COPD which is similar to the study conducted by Sarkar S et al.[6] Family history of COPD is a strong risk factor for COPD, independent of family history of smoking, personal lifetime smoking, or childhood Environmental Tobacco Smoke (ETS) exposure which is supported by the study done by Hersh CP et al.[13] The majority of the individuals with COPD perceived symptoms burden (dyspnoea 44 (90%, cough with sputum 39 (80%) as a significant ongoing challenge to perform their day to day activities which ultimately affects the patient's quality of life. However, with effective patient self-care counselling given by clinical pharmacist had an improvement compared to the baseline values, this outcome is supported by the study conducted by Zamzam MA et al.[7]

Acute exacerbation of COPD is associated with reduced mobility and limits daily activities, thereby negatively affecting HRQoL. This pharmacist intervention approach dramatically improves the patient's quality of life and it may decrease health care cost by treating COPD exacerbations this study was similar to the study conducted by Koff et al.[8]

Our study shows that co-morbidities have a greater negative impact on COPD patients in terms of quality of life, exacerbations, and mortality. Co-morbidities make the management of COPD difficult and need to be evaluated and treated adequately. Thus, the diagnosis and management of co-morbidities is an important challenge in the treatment of COPD. The study results were similar to the study conducted by Siva k et al.[9]

Spirometry is an essential test for persons with suspected chronic obstructive pulmonary disease to confirm the diagnosis, measure the severity of airflow obstruction, and assess the progression of the disease. In our study, the FEV1 and FEV1/FVC ratio was recorded at baseline, and the 6-month assessment point. Statistical analysis revealed no significant differences between the baseline and the 6-month assessment point (p value). This is because COPD is a progressive disease characterized by irreversible damage; FEV1 is difficult to change and therefore is not expected to be sensitive to pharmacist-led intervention programs.

There was a lack of knowledge about symptoms, management, and relaxation techniques among the COPD patients. The results of the present study demonstrated that knowledge of medications and disease conditions improved steadily throughout the study period. Improved knowledge in COPD patients in response to educational intervention and disease management helps to improve patient care. Therefore, educational modules to improve self-care are vital components of any effective management strategy. This is in agreement with a study by Thomas et al which demonstrates that clinical pharmacist-led patient education improved the knowledge, attitude, and practice in COPD patients.[11]

High Medication adherence was found in 46.94 % (23) COPD patients after intervention, Continuous HRQOL monitoring would aid in estimating the adherence of patients because patients may fail to take their medication when they are feeling well. Therefore, HRQoL monitoring within routine clinical practice would aid in the improvement of medication adherence and health outcomes in COPD patients. The study results described in Table 5 and Figure 2 were similar to the study conducted by Restrepo D et al.[12]

Patients suffering from chronic obstructive pulmonary Disease have an impaired quality of life especially on physical health compared with psychological and social health owing to the frequent experience of symptoms and limitations on their physical activities. Three main factors that are used in the modified SGRQ to govern the QOL are symptoms, activity, and impact. After intervention we found improved HRQoL in our study patients. We suggested that the clinical pharmacist intervention with more robust patient follow-up yields betterment in the health-related quality of life in COPD patients.

Limitation

Limitations of the present study include smaller sample size and limited geographic representation. Further studies including more geographic representation and increased sample size should be carried out to have a holistic view in regards to this study. However, this study is an important advancement in knowledge as very few studies are available pertaining to this topic from India, highlighting the medication adherence, medication knowledge and health related quality of life among COPD patients.

CONCLUSION

An approach to COPD management is multi-factorial and consists of non-pharmacological as well as pharmacological strategies to reduce symptoms, improve quality of life, reduce exacerbations, and slow disease progression. Chronic disease management would be assumed to be most successful when care is given through collaboration of health care team members and patients and includes patient education and monitoring.

The study was designed to measure the Impact of Clinical Pharmacist Intervention on COPD management in a wide range of clinical and humanistic outcomes of COPD management. A pharmacist-led COPD intervention has the potential to improve patient medication adherence and patient knowledge on disease condition, thus increasing the quality of life, possibly decreasing pulmonary exacerbations, and reducing utilization of acute health care resources.

Likely, our study revealed there was a strong trend for the outcomes that improved in three main aspects of the study. Betterment in medication adherence, patient's knowledge on disease condition, and health-related quality of life of the study participants signified that there is a need for healthcare systems to recognize the role of clinical pharmacists in COPD management in both pharmacological therapy and non-pharmacological supportive care.

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