ORIGINAL ARTICLE

Association between Medication Adherence and Health-related Quality of Life in Patients Diagnosed with Chronic Obstructive Pulmonary Disease: A Prospective Study

Bandla Aswani, P. Dharani Prasad, T. Jyothiswar Reddy, Sk. Bushra, S. Vishnu Priya, P. Supriya, K. Yogeswara Naidu, A. Tharaun Kumar, K. Vignesh, G. Hemanth Kumar, B. Mahima Swaroopa

Department of Pharmacy Practice, MB School of Pharmaceutical Sciences (Erstwhile SreeVidyanikethan College of Pharmacy), Mohan Babu University, Tirupati, Andhra Pradesh, India.

Abstract

Introduction: Chronic obstructive pulmonary disease (COPD) is one of the third leading causes of death globally. The degree of drug adherence and health-related quality of life (HRQOL) in COPD patients is low. COPD significantly reduces patients' HRQOL, with symptoms and exacerbations affecting physical, emotional, and social well-being. With frequent hospitalizations and healthcare consumption driving expenditures and resource utilization, COPD is one of the world's leading causes of morbidity and mortality, and also significantly strains healthcare systems. **Purpose of the Study:** The purpose of this study is to investigate the association between medication adherence and HRQOL in COPD patients. **Materials and Methods:** This study was hospital-based cross-sectional observational study conducted in the Department of Medicine Sri Venkateswara Institute of Medical Sciences, South India, a tertiary care hospital, Tirupati, Andhra Pradesh. This study was approved by the Institutional Research and the Ethics Committee of the hospital. This observational study was performed on 70 patients diagnosed with COPD. Each patient was interviewed to answer questionnaires regarding demographic and clinical information. To assess HRQOL in COPD patients, the St George's respiratory questionnaire-COPD-specific version was used. The medication adherence reporting scale was used to measure medication adherence. Statistical analysis was conducted using the Statistical Package for the Social Sciences, version 20. **Results:** Out of 70 patients who are undergoing treatment for COPD in the medicine department, 60% (42) of the patients have medium medication adherence, 30% (21) have low medication adherence, and 10% (7) of patients have high medication adherence. HRQOL shows a positive effect on medication adherence. **Discussion:** The positive correlation observed between adherence and HRQOL may be explained by improved disease stability, as patients who follow their treatment plans are more likely to experience fewer respiratory symptoms, enhanced physical functioning, and a greater sense of control over their condition. **Conclusion:** This prospective study highlights a significant positive association between medication adherence and HRQOL in patients with COPD. Patients who consistently adhered to their prescribed medication regimen reported better outcome in both physical and mental domains of HRQOL compared to those with poor adherence.

Key words: Chronic obstructive pulmonary disease, exacerbations, health-related quality of life, medication adherence, St George's respiratory questionnaire

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is defined as "a heterogeneous lung condition characterized by chronic respiratory symptoms (dyspnea, cough, expectoration, exacerbations) due to abnormalities of the airway (bronchitis, bronchiolitis) and/or alveoli (emphysema) that cause persistent, often progressive, airflow

Address for correspondence:
Mrs. Bandla Aswani, Department of Pharmacy Practice, MB School of Pharmaceutical Sciences, Mohan Babu University, Tirupati, Andhra Pradesh, India. Phone: +91-6305918029.
E-mail: aswiniclinipharma04@gmail.com

Received: 20-05-2025
Revised: 22-06-2025
Accepted: 29-06-2025

obstruction" by the 2023 Global Initiative for chronic obstructive lung disease (GOLD) report and the World Health Organization.[1] COPD caused 3.32 million deaths worldwide, ranking as the third leading cause of death. Up to 90% of COPD-related deaths occurred among people over the age of 70 years around the world. Tobacco usage (46.0%), ambient particulate matter pollution (20.7%), and occupational exposure to gases, fumes, and particulate matter (15.6%) have all been linked to COPD.[2] According to the 2017 GBD study, COPD and other chronic respiratory illnesses accounted for 50% of all cases. More than 90% of COPD deaths occur in low and middle-income countries.[3] Symptoms include cough with mucous that lasts a long time, difficulty taking deep breaths, shortness of breath with light exercise, wheezing, discomfort when walking, chest tightness, fatigue.[4] The term "health-related quality of life" (HRQOL) describes how someone feels about their physical and mental health in relation to various medical illnesses, therapies, and other elements that could have an impact on their overall quality of life (QOL).[5] Improving COPD patients' QOL requires examining the psychological, physiological, and social elements of the illness. Several crucial instruments are employed to gauge HRQOL in individuals with COPD: [6] The St. George's respiratory questionnaire (SGRQ), the chronic respiratory questionnaire, the COPD assessment test, the EuroQol 5-Dimension questionnaire, and the medical outcomes study short form 36-item health survey.[7]

MATERIALS AND METHODS

This study was a hospital-based cross-sectional observational study conducted in the Department of Medicine, Sri Venkateswara Institute of Medical Sciences (SVIMS), South Indian a tertiary care hospital, Tirupati, Andhra Pradesh. This study was approved by the Institutional Research and the Ethics Committee of the hospital. This study used a minimum sample size of 70 participants.

Inclusion and exclusion criteria

Patients in the age group of 18 and above of both genders (male and female) were included in the study. Patients diagnosed with chronic obstructive pulmonary disease (COPD) for at least a year according to spirometric criteria of the GOLD guideline, and medical management for chronic obstructive pulmonary disease (COPD) for the past 1 year and on the same medication for the past 3 months were included in the study. Patients below the age of 18, Patients diagnosed with obstructive sleep apnea, bronchial asthma, connective tissue disorder, malignancy, chronic kidney disease, heart failure, pregnant women, and patients who are not willing to participate were excluded from the study. The patients were recruited for the study based on the inclusion and exclusion criteria after obtaining the written informed consent form from the patients or their guardians. A predesigned data collection form was utilized to collect the information from the patients diagnosed with COPD who have been on the same medication for the last 3 months. Patient demographic data (age, gender, weight, diagnosis, prescription patterns, comorbid conditions, family history, medical history, social history) were obtained from all the patients who participated in the study. The patient data collection form is used to obtain data from all patients. Data were collected from both the patient's medical record, clinicians admission notes, discharge summaries of previous hospitalizations. Collected data entered into SGRQ Questionnaire. The collected data were assessed using the medication adherence reporting scale (MARS). The collected data were entered into MS Excel worksheets and will be analyzed using Statistical Package for the Social Sciences version 26.0 V. Descriptive statistics like means with standard deviation, medians with inter quartile ranges were used for continuous variables while numbers with percentages were determined by categorical variables.

Methods

A cross-sectional observational study was conducted to assess the medication adherence and HRQOL in COPD patients. It was conducted in the Department of Medicine, SVIMS South Indian tertiary care teaching hospital, Tirupati, Andhra Pradesh. A predesigned data collection was used to collect the information about taking medications and adherence to treatment. Medication adherence was assessed using MARS Scale. HRQOL in COPD patients was assessed using the SGRQ-COPD-Specific Version (SGRQ-C).

RESULTS

Out of 70 patients who are undergoing treatment for COPD in the medicine department, 60% (42) of the patients have medium medication adherence, 30% (21) have low medication adherence, and 10% (7) have high medication adherence. HRQOL shows a positive effect on medication adherence.

Frequency of gender distribution

Majority of the subjects included in the study were found to be males (79.57%) when compared with females (21.42%). Our results indicated that the incidence of COPD is more in males due to the risk factor smoking, and it is shown in Table 1.

Frequency of age distribution

Majority of the subjects were in the age group of 50–60 years (38.15%), followed by 60–70 years (24.28%). Very few subjects were found in the age group of 20–30 years, as shown in Table 2.

Table 1: Gender-wise distribution of subjects

Gender	Percentage
Male	79.57
Female	21.42

Table 2: Age-wise distribution

Age group (years)	Percentage
20–30	Very few
50–60	38.15
60–70	24.28

Distribution of sample based on respiratory rate

Majority of the subjects involved in this study have a normal respiratory rate between 15 and 25 breaths/min (88.50%). Few subjects have a respiratory rate between 25 and 35 breaths/min (11.40%). Subjects with a respiratory rate <25 breaths/min have serious health conditions, as shown in Table 3.

Distribution of sample based on COPD and acute exacerbation of COPD (AECOPD)

In this study, 58.2% of the study population was diagnosed with AECOPD, as shown in Table 4.

Distribution of sample associated with comorbidities

The most common comorbid conditions seen in the study subjects were hypertension (48.5%) and diabetes (22.8%). The percentage of subjects with both obstructive airway disease and respiratory failure (11.4%). The presence of comorbid diseases along with COPD significantly reduced HRQOL in COPD patients in this study, as shown in Table 5.

Medications prescribed in COPD patients

Most of the medications, such as bronchodilators, used in patients diagnosed with COPD are long-acting beta-agonists (LABA) and corticosteroids 55 (78.5%), mucolytic agents 43 (61.4%) long-acting muscarinic antagonists (LAMA) 22 (31.4%), and LAMA and long-acting beta agonists 3 (4.28%). Cephalosporins 53 (75.7%) are the majority of antibiotics used in COPD patients. Mucolytic agents are agents that break up mucus in the lungs. 42 (60%) of the population is using penicillin, and 21 (30%) of the population is using macrolides, as illustrated in Table 6.

Frequency of MARS scale

Out of 70 patients who are undergoing treatment for COPD in medicine department, 60% (42) of the patients have medium medication adherence and 30% (21) has low medication adherence and 10% (7) of patients have high medication adherence and it is described in Table 7.

Table 3: Respiratory rate distribution

Respiratory rate (breaths/min)	Percentage	Remarks
15–25	88.50	Normal
25–35	11.40	Indicative of serious condition

Table 4: COPD versus AECOPD distribution

Condition	Percentage
Acute exacerbation of COPD	58.2
COPD without exacerbation	41.8

COPD: Chronic obstructive pulmonary disease, AECOPD: Acute exacerbation of COPD

Table 5: Comorbidities in COPD patients

Comorbidity	Percentage
Hypertension	48.5
Diabetes	22.8
Obstructive airway disease+resp. failure	11.4

COPD: Chronic obstructive pulmonary disease

Table 6: Medications prescribed to COPD patients

Medication type	No. of patients	Percentage
Long-acting beta agonists+corticosteroids	55	78.5
Mucolytic agents	43	61.4
Long-acting muscarinic antagonists	22	31.4
LAMA+LABA combination	3	4.28
Cephalosporin's (antibiotics)	53	75.7
Penicillin (antibiotic)	42	60
Macrolides (antibiotic)	21	30

Frequency of SGRQ score in COPD patients

Out of 70 patients of the patients who are undergoing treatment for COPD in medicine department, 3 (4.28%) patients were found to have mild score indicate high QOL and 41(58.57%) patients found to have moderate score indicate moderate QOL and 26 (37.14%) have high score which indicate worse HRQOL and it is shown in Table 8.

DISCUSSION

This study sheds light on the demographic and clinical characteristics of people with chronic obstructive pulmonary

Table 7: Medication adherence (MARS scale)

Adherence level	No. of patients	Percentage
High	7	10
Medium	42	60
Low	21	30

MARS: Medication adherence reporting scale

Table 8: Saint George respiratory questionnaire score

HRQOL score level	No. of patients	Percentage	Interpretation
Mild	3	4.28	High quality of life
Moderate	41	58.57	Moderate quality of life
High	26	37.14	Worse health-related quality

HRQOL: Health-related quality of life

disorder (COPD). The bulk of the participants were between the ages of 50 and 60, which is consistent with earlier research indicating that COPD is more common in older persons. The study also discovered that males were more likely than females to have COPD, which could be attributable to males' higher smoking rates.[8]

The majority of the participants' respiration rates were normal, but a considerable number had respiratory rates >25 breaths/min, indicating serious health issues.[9] The study also found that 58.2% of the study group was diagnosed with AECOPD, which underscores the necessity for appropriate management measures to prevent exacerbations. Comorbidities, such as hypertension and diabetes, were widespread among research participants, and they significantly affected HRQOL in COPD patients. This finding is consistent with prior research indicating that comorbidities might have a considerable influence on the HRQOL of COPD patients.[10] In this study, most of the medications, such as bronchodilators, used in patients diagnosed with COPD are LABA and corticosteroids (78.5%), LAMA (31.4%), and LAMA (4.28%). Cephalosporins (75.7%) are the majority of antibiotics used in COPD patients. Mucolytic agents are agents that break up mucus in the lungs. 61.6% of the population is using mucolytic agents, 60% of the population is using penicillin, and 30% of the population is using macrolides. In this study, patients with COPD who were not receiving steroid inhalers, LAMA, or LABA had significantly better HRQOL.[11] This finding could be attributed to the bothersome side effects of these medications, such as oropharyngeal candidiasis, skin thinning, pneumonia, and cataract with inhaled corticosteroids dry mouth, constipation, and urinary retention with LAMA[12] and tremor, palpitations, and hypokalemia with LABA.[13]

The study also used the MARS scale to assess COPD patients' drug adherence. The findings revealed that 60% of the patients had medium medication adherence, whereas 30% had poor medication adherence, and these results showed similarity with other studies.[14] This emphasizes the need for interventions to enhance drug adherence in COPD patients. The SGRQ score was used to evaluate the HRQOL of COPD patients.[15] The findings revealed that the majority of the patients had moderate to severe scores, implying a considerable influence on their HRQOL.[16] This study found a strong relationship between the high number of prescribed medications and poor HRQOL, and is in agreement with the study conducted by Colombijn *et al*.[8] Older participants have also demonstrated worse HRQOL when compared to younger ones in our investigation. Previous studies reported similar findings by Shah *et al*.[13]

CONCLUSION

Finally, this study emphasizes the necessity of studying the demographic and clinical characteristics of COPD patients. The data indicate that COPD is more common in older persons and males, and that comorbidities can have a considerable influence on HRQOL. The study emphasizes the importance of appropriate management strategies for preventing exacerbations and improving drug adherence. The study subjects often used bronchodilators, corticosteroids, and mucolytic medicines, and the majority of patients had medium-to-low medication adherence. The SGRQ score showed a significant impact on HRQOL in COPD patients. These findings have implications for healthcare practitioners and governments, emphasizing the importance of tailored measures to enhance COPD treatment. Interventions aimed at improving adherence through patient education, simplified dosing regimens, or behavioral support may lead to meaningful improvements in QOL and overall disease management in this population. Future research should explore the long-term impact of adherence-enhancing strategies and their cost-effectiveness in routine clinical practice.

REFERENCES

1. Agustí A, Celli BR, Criner GJ, Halpin D, Anzueto A, Barnes P, *et al*. Global initiative for chronic obstructive lung disease 2023 report: GOLD executive summary. Eur Respir J 2023;61:2300239.
2. Su WC, Juan HL, Lee JI, Huang SP, Chen SC, Geng JH, *et al*. Secondhand smoke increases the risk of developing chronic obstructive pulmonary disease. Sci Rep 2024;14:7481.
3. Kohansal R, Martinez-Camblor P, Agustí A, Buist AS, Mannino DM, Soriano JB, *et al*. The natural history of chronic airflow obstruction revisited: An analysis of the Framingham offspring cohort. Am J Respir Crit Care Med 2009;180:3-10.
4. Raad D, Gaddam S, Schunemann HJ, Irani J, Abou Jaoude P, Honeine R, *et al*. Effects of water-pipe smoking

on lung function: A systematic review and meta-analysis. Chest 2011;139:764-74.
5. Ibrahim S, Manu MK, James BS, Kamath A, Shetty RS. Health related quality of life among patients with chronic obstructive pulmonary disease at a tertiary care teaching hospital in southern India. Clin Epidemiol Glob Health 2021;10:10-4.
6. Ghobadi H, Ahari SS, Kameli A, Lari SM. The relationship between COPD assessment test (CAT) scores and severity of airflow obstruction in stable COPD patients. Tanaffos 2012;11:22-6.
7. Laniado-Laborín R. Smoking and chronic obstructive pulmonary disease (COPD). Parallel epidemics of the 21 century. Int J Environ Res Public Health 2009;6:209-24.
8. Shah AM, Shah RB, Kachoria S. Health-related quality of life and associated factors in patients with chronic obstructive pulmonary disease. Drugs Ther Perspect 2019;35:241-9.
9. Yang M, Du Y, Chen H, Jiang D, Xu Z. Inhaled corticosteroids and risk of pneumonia in patients with chronic obstructive pulmonary disease: A meta-analysis of randomized controlled trials. Int Immunopharmacol 2019;77:105950.
10. Halpin DM, Dahl R, Hallmann C, Mueller A, Tashkin D. Tiotropium handihaler(®) and respimat(®) in COPD: A pooled safety analysis. Int J Chron Obstruct Pulmon Dis 2015;10:239-59.
11. Rossi A, Khirani S, Cazzola M. Long-acting beta2-agonists (LABA) in chronic obstructive pulmonary disease: Efficacy and safety. Int J Chron Obstruct Pulmon Dis 2008;3:521-9.
12. Bhattarai B, Walpola R, Mey A, Anoopkumar-Dukie S, Khan S. Barriers and strategies for improving medication adherence among people living with COPD: A systematic review. Respir Care 2020;65:1738-50.
13. Fazekas-Pongor V, Fekete M, Balazs P, Arva D, Penzes M, Tarantini S, *et al*. Health-related quality of life of COPD patients aged over 40 years. Physiol Int 2021;108:261-73.
14. Esteban C, Arostegui I, Aramburu A, Moraza J, Aburto M, Aizpiri S, *et al*. Changes in health-related quality of life as a marker in the prognosis in COPD patients. ERJ Open Res 2022;8:181-7.
15. Horner A, Burghuber OC, Hartl S, Studnicka M, Merkle M, Olschewski H, *et al*. Quality of life and limitations in daily life of stable COPD outpatients in a real-world setting in Austria - Results from the CLARA project. Int J Chron Obstruct Pulmon Dis 2020;15:1655-63.
16. Colombijn JM, Bonenkamp AA, Sluijs AV, Bijlsma JA, Boonstra AH, Özyilmaz A, *et al*. Impact of polypharmacy on health-related quality of life in dialysis patients. Am J Nephrol 2021;52:735-44.

Source of Support: Nil. **Conflicts of Interest:** None declared.