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EVALUATION OF MEDICATION ADHERENCE IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISORDER AT A TERTIARY CARE HOSPITAL

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ABSTRACT

Background: The prevalence of Chronic Obstructive Pulmonary Disorder is increasing. Hence it is important to evaluate the medication adherence in patients with COPD to maximize therapeutic efficacy and ensure optimal patient outcome. **Objectives:** The main objective is to evaluate the medication adherence in patients with COPD and also to identify the problems associated with the use of inhalers, to determine the etiological factors and to assess the quality of the life of the patient. **Methods:** This prospective observational study was conducted at a tertiary care hospital over a period of 6 months for inpatients admitted with COPD. Data were collected using a self-designed data collection forms and questionnaires and analyzed using appropriate statistical methods. **Results:** Among 100 study subjects for evaluation of medication adherence, 56% were found to be male while 44% were found to be female. Medication adherence assessment using Morisky Green Levine adherence scale indicated that majority of patients had medium adherence (60%) to medications. When the level of adherence to inhalers was assessed using TAI questionnaire majority of patients had poor adherence (61%). The mean CCQ score was 3.523 indicating poor QOL. . On assessing the etiological factors of COPD in the study subjects, smoking (41%) was found to be the most common factor followed by environmental pollution (22%). **Conclusion:** In this study unintentional non-adherence (77%) was found to be more than the intentional non-adherence (23%) where forgetfulness was found to be the main reason.

KEYWORDS: Chronic Obstructive Pulmonary Disorder, Quality Of Life, Medication adherence, etiology.

INTRODUCTION

According to World Health Organization (WHO) Chronic Obstructive Pulmonary Disease (COPD) is a lung disease characterized by chronic obstruction of lung airflow that interferes with normal breathing and is not fully reversible.

COPD is currently the 4th leading cause of death and it is expected to be the 3rd and 5th leading cause of mortality and morbidity, respectively, in 2020.[1] India contributes a significant and growing percentage of COPD mortality which is estimated to be amongst the highest in the world; more than 64.7 estimated age standardized death rate per 100,000 amongst both sexes.[2] According to the analysis report of the 'Indian Study on Epidemiology of Asthma, Respiratory Symptoms and Chronic Bronchitis in Adults' (INSEARCH) Phase I and II analysis, the prevalence of COPD in India were estimated to be 3.67%. The study population had rural and urban representation of both genders and the gender distribution shows that the prevalence in males and females was 4.46% and 2.86% respectively. COPD possess an enormous burden in terms of morbidity, mortality, direct and indirect costs.[3]

COPD imposes a significant burden on individuals with the disease, which can include a range of symptoms like breathlessness, cough, sputum production, wheezing, and chest tightness of varying severities.[4]

The severity is classified as mild, moderate and severe based on the post bronchodilator FEV1 and the frequency of the exacerbation. Frequent exacerbations are associated with increased morbidity and mortality, a faster decline in lung function, and poorer health status, so prevention or optimal treatment of exacerbations is a global priority.[5] Pharmacotherapy used in COPD includes Bronchodilators like beta 2 agonist (SABA and LABA), Anti cholinergic agents, methyl xanthine's,

corticosteroids, antibiotics, mucolytic, expectorants, antioxidants.[6]

Two distinct patterns of behavior are associated with medication non-adherence; intentional and unintentional. Intentional non adherence is the deliberate discontinuation or reduction in use of therapy during periods of symptom remission, often resulting from an erroneous understanding of the disease course and the goals of the treatment. Unintentional non adherence occurs when patients do not adhere to the treatment advice due to reasons out of their control, often relating to cognitive impairments, language barriers and physical disability. In the case of COPD, impaired vision and musculoskeletal problems effecting patients ability to use inhaled medications can be attributable.

The most commonly identified reason for unintentional non adherence is complex medication regimens and poly pharmacy. Multiple devices, poor awareness and understanding of the nature of COPD, confusion about prescribed medication regimens, and high rates of depression have also been shown to negatively influenced adherence.[7]

Thus the main aim of the study is to identify the factors that causes non adherence and by managing them rationally, progression of the disease can be slowed. An observational and prospective study is done to evaluate the medication adherence in COPD patients.

MATERIALS AND METHODS

Duration of study

The study was conducted for a period of 6 months.

Site of study

The study was conducted at Sapthagiri General Hospital.

Study design

This study was a hospital based observational study.

Sample size

A total of 100 patients admitted to the inpatient ward of Department of Pulmonary medicine, satisfying the inclusion and exclusion criteria during the data collection period were included in the study.

Study criteria

Inclusion criteria

- Patients admitted to IP ward for COPD.
- Admitted for COPD of various etiologies and with or without comorbidities.

Exclusion criteria

- Patients in the IP ward admitted with diagnosis of COPD who are not willing to participate in the study.
- Patients who are admitted in comatose and unconscious condition and not able to provide information.
- Prescriptions from pregnant women and with insufficient data are excluded.

Study tool

- Data collection form: A data collection form will be developed to collect patients demographic and disease specific aspects.
- Clinical COPD questionnaire (CCQ): It is a practical health status instrument which tells about a activity limitation and emotional dysfunction in patients with COPD. It is a self – administered questionnaire which has three domain symptoms, mental and functional state with a total of ten questions. The overall clinical COPD control score as well as the score on each of the three domains varies between 0 (very good control) to 6 (extremely poor control).
- Morisky Medication Adherence Scale (MMAS 4): This questionnaire is used to assess the adherence to medication in patients. The MMAS consists of four items with a scoring scheme of "Yes" = 0 and "NO" = 1. The items are summed to give a range of scores from 0 – 4.
- Test of Adherence to Inhalers (TAI): It is a 12-item questionnaire designed to assess the adherence to inhalers. It has two domains, patient (1-10 questions) and health care professional (11 -12 questions). Scoring of each question (1-10) is from 1: worst complains to 5: best complains and questions (11-12) for health care professionals have scored with 1 or 2 points.

Study procedure

Patients admitted in the inpatient ward with COPD were included in the study, by considering the inclusion and exclusion criteria. The purpose of the study was explained to the patient. Data was collected by interviewing and referring patient's medical records along with it questionnaires such as CCQ, MMSA4 and TAI were filled. The data collected were entered into Microsoft excel and interpreted using appropriate statistical analysis to evaluate the objectives of the study.

Statistical analysis

Categorical variables will be presented as tables and graphs. The collected data were analyzed using mean, averages and percentages.

RESULTS

This study included a total of 100 patients admitted to the inpatients ward of Department of Pulmonology of Sapthagiri Hospital. The data for the study was collected for a period of six months.

Majority of the patients were found to be Male (56%)

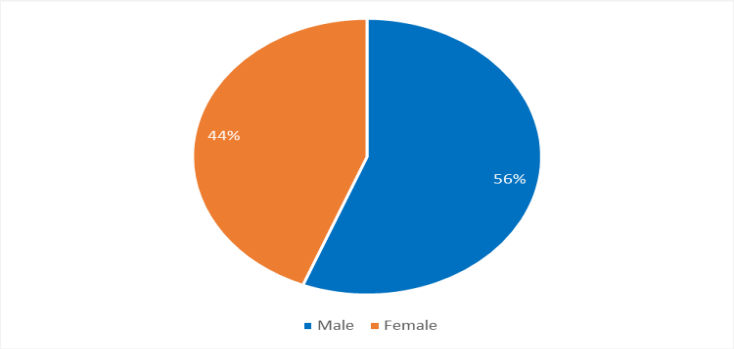

Figure 1: Distribution of study population of gender.

Majority of patients belonged to the age group of old person (57%) and the least number of patients belonged to very old person age group (6%). Detailed distribution is shown in Figure 2.

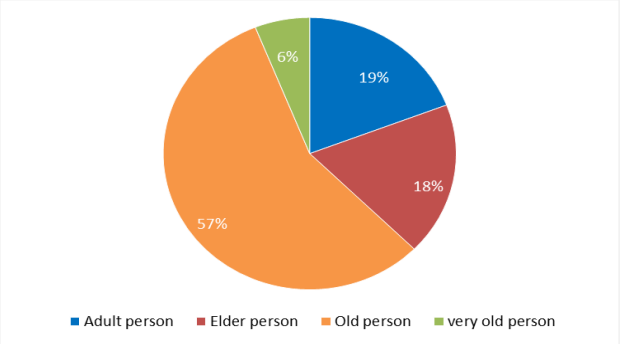

Figure 2: Distribution of* age *group according to UN age classification.

When smoking habits of patients were assessed, majority were found to be smokers (53%). Distribution is shown in figure 3.

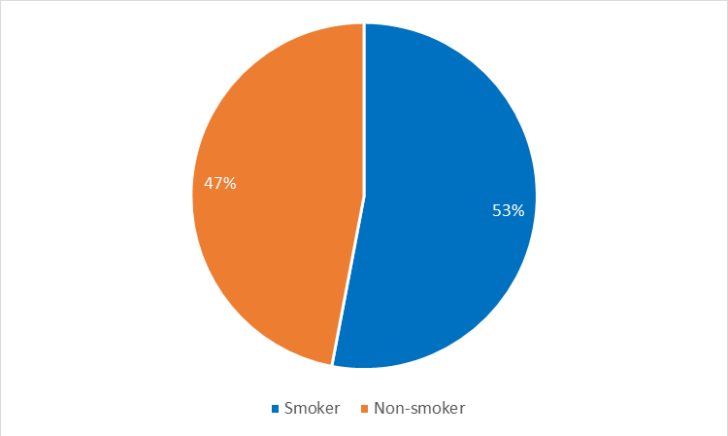

Figure 3: Distribution of study population by smoking habits.

When comorbidity was assessed in the study subjects, majority of the patients were found to have comorbidity (67%). Detailed distribution is shown in Figure 4.

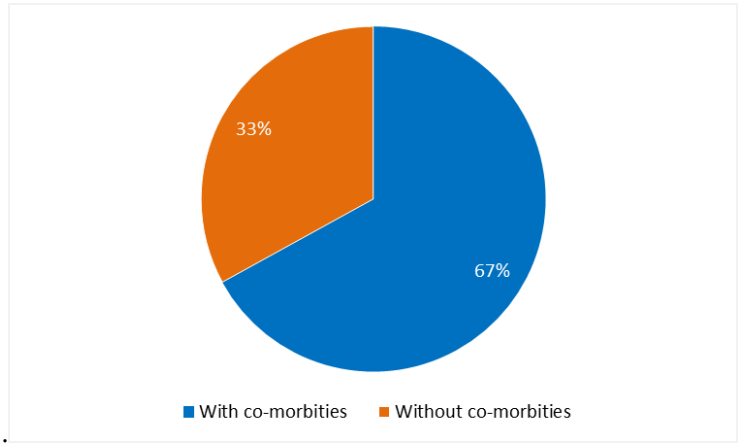

Figure 4: Distribution of study population based on Comorbidity status.

Majority of the patients in the study was found to have multiple comorbidities (61%) as shown in Figure 5

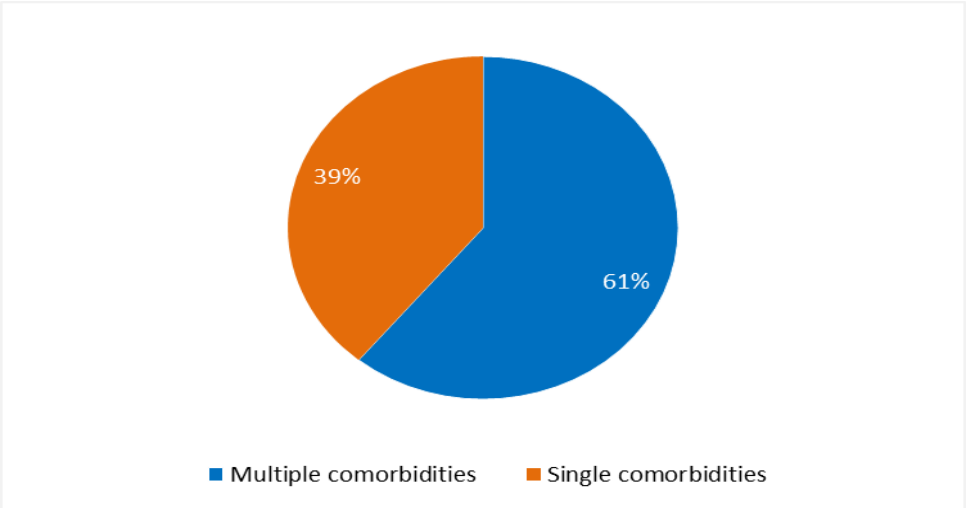

Figure 5: Distribution of comorbidities.

On assessing the results, the most common etiological factor was found to be smoking (41%), followed by environmental pollutions (22%), Seasonal variations (15%), Respiratory infections (12%), age (6%) and occupational hazards (4%). Detailed distribution s given in Figure 6.

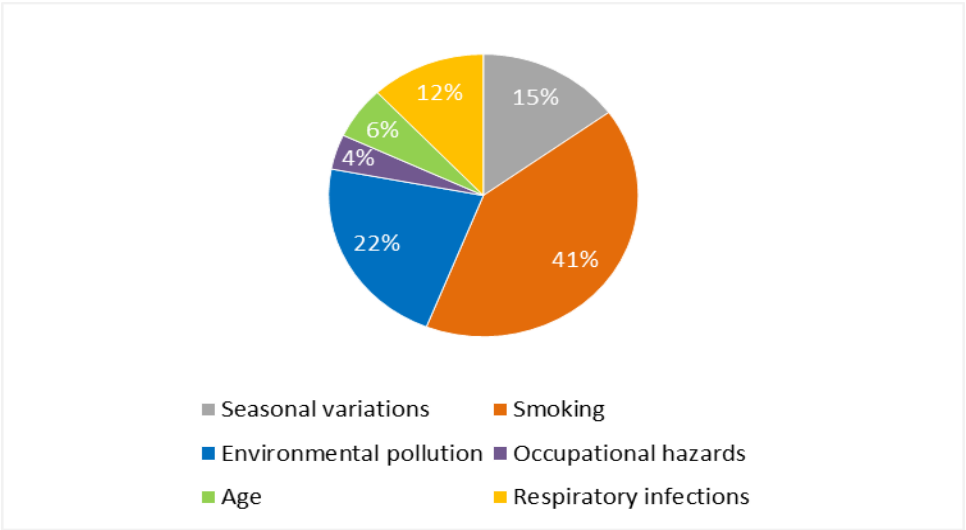

Figure 6: Distribution of the etiological factors.

According to the clinical COPD questionnaire administered to all the patients enrolled in the study to assess their QOL, the finding's revealed that the total CCQ score was 3.523, Symptom score was 3.564, Functional state score was 3.404 and the Mental state score was 2.994.

Detailed distribution is given in Table 1

Table 1: Distribution of CCQ score.

Sl.no	CCQ	Mean
1.	Total CCQ Score	3.523
2.	Symptom Score	3.564
3.	Functional State Score	3.404
4.	Mental State Score	2.994

Total CCQ score was calculated in both males (54%) and females (46%).

A detailed distribution is given in Figure 8.

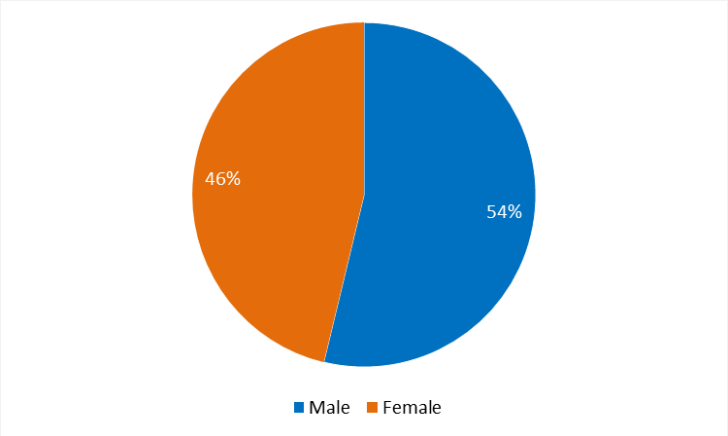

Figure 7: Distribution of total CCQ score by gender.

Morisky Green Levine medication adherence scale showed that majority of patients had medium adherence (60%) followed by low adherence (28%) and least number of patients were found to have high adherence (12%).

Detailed distribution is given in Figure 9.

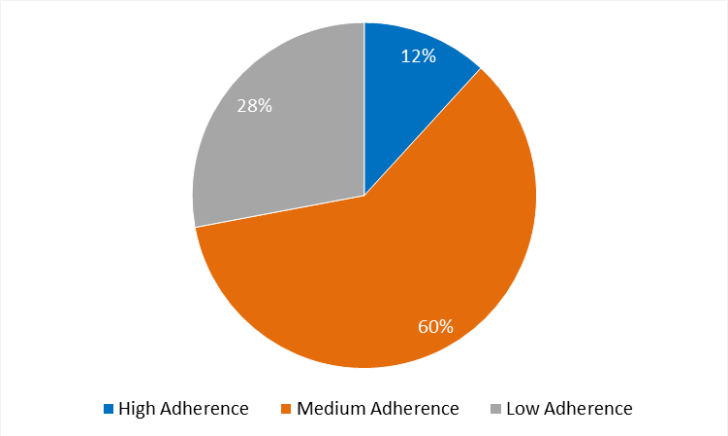

Figure 8: Distribution of Morisky Green Levine Medication Adherence Scale.

When the level of adherence and type of non-compliance to inhalers was assessed using the TAI questionnaire, result showed that majority of patients had Low adherence (61%), followed by intermediate adherence (27%) and least number of patients had good adherence (12%). Detailed distribution is depicted in figure 10.

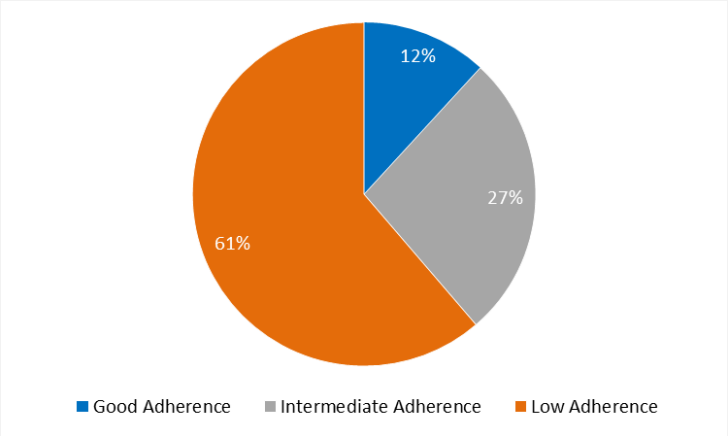

Figure 9: Distribution of level of adherence based on TAI questionnaire

An error in the inhalation technique can prevent the dug from reaching the lower respiratory tract in sufficient quantity thus developing a failure in the treatment. List of critical errors in device inhalation technique as per TAI questionnaire were categorized into A-I.

A- Does not take off the cap, B- Does not hold the inhaler upright, C- Presses before inhaling, D- Interrupts the inhalation, E- Inhales too quickly or too forcefully, F - Loads the MDI in the holder incorrectly, G- Presses the MDI several times in a single inhalation, H - Does not hold their breath after inhaling, I - Coughs while inhaling. Majority errors were found in category C (25%) followed by E (21%), H (14%). A detailed distribution is shown in figure 11.

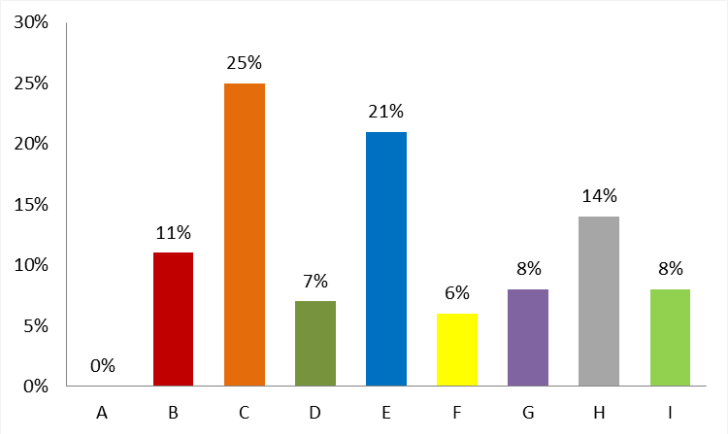

Figure 10: Distribution of errors in inhaler use technique.

Majority of patients were found using inhaler (47%) followed by nebulizer use (26%) as shown in figure 12.

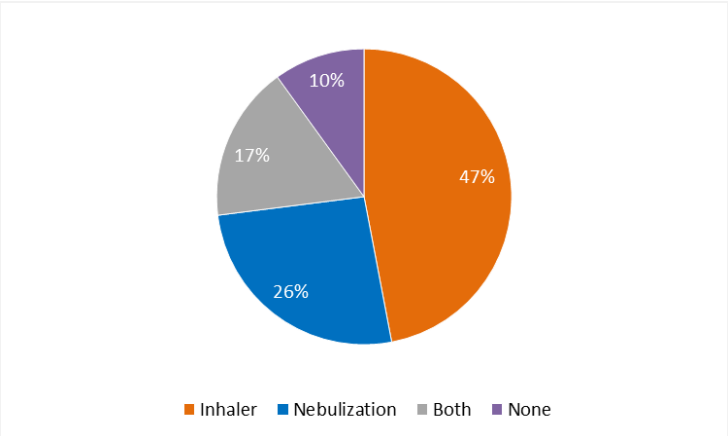

Figure 11: Distribution of device use.

On analyzing the treatment charts of the 100 study subjects, the medicines used for management of COPD included Bronchodilators (42%), Corticosteroid (20%), Antibiotic (16%), Cough preparations (15%), and H2 receptor blockers (7%). Detailed distribution is depicted in figure 13.

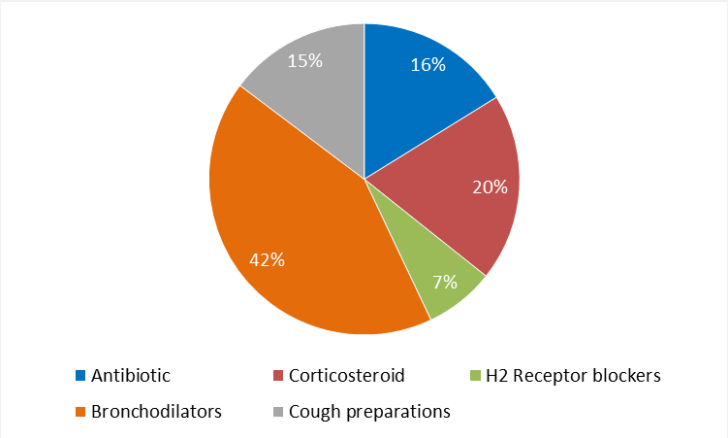

Figure 12: Distribution of medicines used in management of COPD.

When the cause of non-adherence was assessed in the study subjects, it was observed that majority of the patients had unintentional non-adherence (77%). Detailed distribution is given in Figure 14.

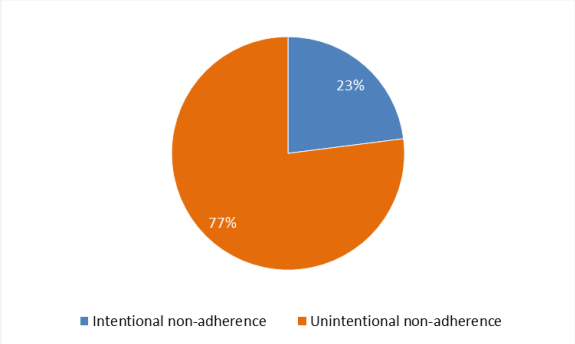

Figure 13: Distribution based on Non-adherence.

DISCUSSION

This study was conducted for a period of 6 months in which the data collection was conducted from September 2019 to November 2019 in the inpatient wards of the department of pulmonary medicine of Sapthagiri Medical College and Research center, Hessarghata main road, Bangalore. The study included 100 patients based on the inclusion and exclusion criteria. Majority of the patients included in the study were male (54%) which is similar to the study done by Johnson George, et al…, which was a cross sectional study conducted at Victoria college of pharmacy, Monash university, Parkville, Australia.[8]

In our study, the study population was classified based on United Nation classification for medical and social care of old age persons which is divided into four age groups ,adult persons (age 45-59) , elder persons (age 60-64) , old persons (age 65-90) and very old persons (age +90). In our study majority of the patients belongs to old age group (67%) followed by adult persons (19%), elder persons (18%) and very old persons (6%). This study was almost similar to the study done by Robert A.Stone, et al …, where responses are investigated from the patient questionnaire data and the results shown that old age persons have severe disease and symptoms.[9]

In the present study 53% of the patients were found to be smokers whereas 47% of the patients were non-smokers. This study was found to be similar to a study done by Jindal S.K, et al …, in which the result showed that among the 35295 subjects 4.1% of the patient was diagnosed with COPD with a smoker to non-smoker ratio of 2.65:1.[10]

The study results showed that 67% patients had comorbidities and 33% patients were not having comorbidities. Among the patients with comorbidities 61% of the patients have multiple comorbidities and 39% of the patients have single comorbidities which was found to be similar to the study conducted by Chantal Raherison, et al…, where multiple comorbidity was found to be most common in COPD patients.[11]

On assessing the etiological factors in the current study, the most common factor was found to be smoking

(41%), followed by environmental pollutions (22%), seasonal variations (15%), respiratory infections (12%), age (6%) and occupational hazards (4%). This study was found to be similar to a study done by Gashaw Garedew Woldeamanuel, et al.., in which the result showed that prevalence of COPD in smokers was found to be higher.[12]

Clinical COPD Questionnaire is a comprehensive disease specific health status measure of HRQL in patients hospitalized for COPD including symptom state, functional state and mental state domains. The main outcome measure of HRQL is the mean CCQ value, the higher value of CCQ indicate lower quality of life. All domains of CCQ questionnaire were scored and the mean of total CCQ scored was 3.523, highest score was found in the domain of symptom score which was 3.564, lowest score was found in the domain of mental state score which was 2.994 and the functional state score was 3.404. In the present study the total CCQ in males and females were found to be 54% and 46%. This study was almost similar to the study conducted by Josefin Sundh, et al…, where the mean CCQ score was found to be lower that is 2.05 which indicates a higher quality of life in patients than our current study population.[13]

Morisky Green Levine Medication Adherence Scale (MGL, MMAS-4) is a validated assessment tool used to measure non-adherence in a variety of patient populations and it was categorized into high adherence(score=4), medium adherence (score =2-3) and low adherence (score=1). The current study indicated that most patients were having medium adherence to the medication.60% of the study subjects had medium adherence, 28% had low adherence and 12% had high adherence to the medications used in the patient population. When our results are compared with the study conducted by Antonia Pierobon, et al…, it was found that only 16.7% of COPD patients reported low adherence among the 117 study subjects.[14]

To validate the 'Test of Adherence to Inhalers' (TAI), a 12-item questionnaire designed to assess the adherence to inhalers in patients with COPD. The results of the study showed that 61% had low adherence, 27% had intermediate adherence and 12% had good adherence. In the current study most of the patients had low adherence to inhalers. When these results were compared with the cross sectional non-interventional study conducted by Jose R. Jardim, et al …, showed results as 50% of the patients had good adherence, 30% had moderate adherence and 20% had poor adherence.[15]

Patients using inhalation techniques was classified as inhalers only, nebulizers only, both inhaler and nebulizer and none and the result was found to be 47% of patients using inhalers only, 26% using only nebulizers, 17% using both inhalers and nebulizers and 10% using none of the device. Errors in the inhaler technique were found in the observational assessment of inhaler use by patients in the study population. Errors were categorized into A-I. A- Does not take off the cap, B- Does not hold the inhaler upright, C- Presses before inhaling, D- Interrupts the inhalation , E-Inhales too quickly or too forcefully, F-Loads the MDI in the holder incorrectly, G-Presses the MDI several times in a single inhalation, H-Does not hold their breath after inhaling, I-Coughs while inhaling. Highest error was found in category C which was 25% followed by 21% in E, 14% in H, 11% in B, 8% in G and I, 7% in D ,6% in F and 0% in A. when these results were compared with the study conducted by Anne c. melzer, et al…, concluded that 65.5% had poor technique for at least one device and the percentage of error varied between devices, with subjects making proportionally the most errors for MDI's.[16]

On analyzing the medication charts of 100 study subjects management of COPD includes 42% of bronchodilators, 20% of corticosteroids, 16% of antibiotics, 15% of cough preparations and 7% of H2 receptor blockers and thus bronchodilators were found to be a highly prescribed drug. When these outcomes are compared with the results of D.P.Tashkin, et al …, it was found that the responsiveness of a large cohort of patients to bronchodilators was greater than expected.[17]

In the current study the patient population was categorized into intentional non adherence subjects and unintentional non adherence subjects. On assessing the results the majority of the patients had unintentional nonadherence in which forgetfulness and polypharmacy were found to be the main reasons. When these results were compared with the study conducted by Shrestha R, et al…, it was found that unintentional non-adherence to medication attributed to 65% of patients and the major reason was forgetfulness.[18]

CONCLUSION

The study emphasizes the importance of medication adherence in patients with COPD in tertiary care hospital. The prevalence of Chronic Obstructive Pulmonary Disease is increasing and Non-adherence to medication is common. Hence, there is a need to assess the medication adherence in those patients to avoid poor health outcomes. The medication adherence in COPD patients were assessed using different questionnaires i.e. Morisky Green Levine Medication Adherence Scale (MGL), Test of Adherence to Inhalers (TAI) and Clinical COPD Questionnaire (CCQ). Medication adherence assessment using MGL indicated that majority of patients had medium adherence (60%) to medications. When the level of adherence to inhalers was assessed using TAI questionnaire majority of patients had poor adherence (61%). The mean CCQ score was 3.523 indicating poor QOL thus impairing patients' ability to be productive and undertake normal activities. On assessing the etiological factors of COPD in the study subjects, smoking (41%) was found to be the most common factor followed by environmental pollution (22%). The major cause for errors in inhalation use

technique was found to be pressing of the inhaler before inhalation (25%). In this study unintentional non-adherence (77%) was found to be more than the intentional non-adherence (23%) where forgetfulness was found to be the main reason. Counseling and awareness can be given to individuals with intermediate and poor adherence to improve their compliance to medications and thus improving the treatment outcome.

ACKNOWLEDGEMENTS

List of tables

List of figures

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