International Journal of Biology, Pharmacy
and Allied Sciences (IJBPAS)
'A Bridge Between Laboratory and Reader'

www.ijbpas.com

EVALUATION OF MEDICATION ADHERENCE AND NON ADHERENCE IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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ABSTRACT

Objectives: To evaluate the medication adherence & non adherence in COPD patients.

Design: Prospective observational study.

Background: COPD is a common chronic disease of the airways characterized by the gradual and progressive loss of lung function. 50 % - 60 % of patients mostly suffering from COPD are non adherent to medications.

Methods: Our study was conducted on 111 COPD patients at a department of Pulmonology. Data is obtained after the personal interview of the patients regarding health issues, past medical and medications history, social habits, family history, reviewing patient's records and filled questionnaire (MMAS-8).

Results: Among 111 COPD patients, 53.1 % were non adherent & 46.8 % were adherent to medications. High non adherence was observed among 46-60 years age group followed by 61- 75 years age group. High non adherence is seen in male compared to female. Non

adherence is high among illiterate patients. Non adherence is high among current smokers (46.6 %). Non adherence due to difficulty using inhalers is 36.4 %.

Conclusion: Medication non adherence is high in chronic diseases such as COPD. Factors affecting medication non adherence includes smoking, economic burden, improper use of inhalers and polypharmacy. Clinical pharmacist plays a vital role in improving the medication adherence, educating patients about the disease.

Key words: COPD, Medication Adherence, Medication Non Adherence

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a common chronic disease of the airways characterized by the gradual and progressive loss of lung function. COPD is a disease state characterised by airflow limitation that is not fully reversible. The airflow limitation is usually both progressive and associated with an abnormal inflammatory response of the lungs to noxious particles or gases [1].

Global prevalence and burden of COPD: The estimated global prevalence in adults aged 40 years and over is 9-10%. Prevalence is projected to increase as a result of past high rates of tobacco use, and an ageing population. In addition to significant healthcare costs, COPD causes a significant reduction in health-related quality of life [2].

Adherence is defined as "the extent to which a person's behaviour coincides with medical or health advice [3]. Adherence has been defined as the "active, voluntary, and collaborative involvement of the patient in a mutually acceptable course of behaviour to produce a therapeutic result".

Medication non adherence is intentional or unintentional. Intentional non adherence includes active decision making that may be based on financial ability, concerns about adverse effects, or about the medication's effectiveness. Approximately 50 %-60 % of patients are non-adherent to the prescribed medicine, especially those suffering from chronic obstructive pulmonary disease. Non-adherence is classified as primary and secondary. Primary non adherence is the frequency with which patients fail to fill prescriptions when new medications are started so it is related to refilling and initiation of the medication therapy. Secondary non adherence is defined as the medication being not taken as prescribed when prescriptions are filled [4]. Medication non-adherence is the growing concern to the health care system. Patient with chronic diseases usually receive multiple medications and are at high risk of non-adherence to medications. Medical non-adherence has been identified as a major public health problem that imposes a

considerable financial burden upon modern health care systems [3, 4].

Non-adherence to medication in COPD is high with adherence to inhaled and oral medications between 41.3% and 57%. Contributing factors include medication type, prescribed dosing schedule, individual patient characteristics and whether measurements to record adherence is direct (i.e. observations and blood serum measurements) or indirect (i.e., patient self-report, medication refill data and electronic records). Underuse of medications is most common, with up to 49.4% not taking nebulised treatments as prescribed. Further, 31% employ ineffective inhaler dosing techniques and more than 50% over-utilise medications during periods of respiratory distress [2]. Research suggests that half of COPD patients failed to use any maintenance medications. To maximize treatment outcomes, maintenance medications should be used on a long-term regular basis and should not be discontinued [5].Barriers affecting medication adherence in older patients include mental state, physical health, demographics, past medical history, behavioural knowledge, beliefs of patients, drug, drug regimen, drug usage, drug handling, poor communication, lack of trust, lack of medication review, dissatisfaction with doctor's visits, lack of patient education,

lack of medication schedule, polypharmacy, closer duration of therapies and others [6].

MATERIALS AND METHODS:

Our study was a prospective observational study carried out at primary health care centre for a period of 6 months by examining health, literacy and cognition in patients with COPD. Patients were recruited from the out patients pulmonary clinics at hanamkonda, Warangal district in Telangana. Participants with all age groups, other comorbid conditions along with COPD, patients who are willing to provide the information were included in the study. patients, whose condition is serious, not willing to give information and newly diagnosed are excluded from the study. Data is obtained after the personal interview of the patients regarding health issues, past medical and medications history, social habits, family history and by reviewing patient's records and by asking questionnaire. Morisky Medication Adherence Scale (MMAS) scale is a valid tool for measuring medication adherence. The 8-item Morisky Medication Adherence Scale (MMAS-8) was developed as a self-report measure of adherence to chronic diseases[7].

MORISKY MEDICATION ADHERENCE SCALE: The scale consists of eight questions, first seven items having a dichotomous answer (yes/no) that

indicates adherent or non-adherent behaviour. For item 8, a patient can choose an answer on a 5-point Likert scale, expressing how often happens that a patient does not take his medications.MMAS-8 scores can range from 0 to 8 points. Cut-off values for categorizing patients as high, medium or low adherence rate were chosen based upon association with COPD control and quality of life. Patients who scored >2, 1-2 points and 0 on the scale were considered to have high, medium and low non adherence, respectively[8].

Morisky Medication Adherence Scale:

Table I: Morisky Medication Adherence Scale (MMAS-8)

	QUESTIONS	ANSWERS NO	YES
1	**Do you sometimes forget to take your medication?**		
2	**People sometimes miss taking their medicines for reasons other than forgetting. Thinking over the past 2 weeks, were there any days when you did not take your medicine?**		
3	**Have you ever cut back or stopped taking your medication without telling your doctor, because you felt worse when you took it?**		
4	**When you travel or leave home, do you sometimes forget to bring along your medication?**		
5	**Did you take your medicine yesterday?**		
6	**When you feel like your symptoms are under control, do you sometimes stop taking your medicine?**		
7	**Taking medication every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan?**		
8	**How often do you have difficulty remembering to take all your medications? (Please circle the correct number)** **Never/ rarely……………………….0** **Once in a while…………………….1** **Sometimes………………………….2** **Usually…………………………….3** **All the time………………………...4**		

RESULTS

Of 111 COPD patients, 59 (53.1 %) were non adherent to medications and 52 (46.8 %) were adherent. Among 111 COPD patients 58 (52.2 %) were male and 53 (47.7 %) were female. Of 58 male patients, 33 (55.9 %) were non adherent and 25 (48.0 %) were adherent. of 53 female patients, 26 (44.0 %) were non adherent and 27 (51.9 %) were adherent to medications. out of 111 COPD patients observed, non adherence was high among 46-60 years age group followed by 61- 75 years. Among 111 COPD patients observed 65 % were illiterate patients. Non adherence is high among illiterate patients 76.2 % compared to literate patients.Of 74 non adherent male patients 46.6 % were smokers, 16.6 % were non smokers and 36.6 % were smokers in the past. Among 74 male, smokers and previous smokers were highly non-adherent to medications

compared to non smokers. Out of 74 non adherent male observed 16 (48.4 %) were alcoholic and 17 (51.5 %) were non-alcoholic. Among 59 non adherent patients, 45 (76.2 %) were from rural region and 14 (23.7 %) were from urban region. Out of 52 adherent patients observed, 19 (36.5 %) were from rural region and 33 (63.4 %) were from urban region. Compared to region, adherence was more among urban areas (63.4 %) and non adherence was more among rural areas (76.2 %). of 59 patients, 37 patients (62.7 %) were non adherent without comorbidities and 22 patients (37.2 %) were non adherent with comorbidities. Non adherence was observed more in patients with comorbidities. Out of 22 COPD patients with comorbidities, hypertension was high

leading to medication non adherence followed by DM (diabetes mellitus). Among 111 patients, difficulty in using inhalers (36.4 %) and irregular refilling of medications (32.2 %) were identified as major factor leading to non adherence followed by polypharmacy (16.6 %) and cost burden (16.6 %). difficulty in using inhalers was more among age group 31-50 years and 51-70 years leading to medication non adherence. non adherence to medications was highly observed for the category of drugs such as Sympathomimetics (27 %), Anticholinergics (43.2 %), corticosteroids (21.6 %) and antibiotics (8.1 %). 52 (46.8 %) were low non adherent, 45 (40.5 %) were high non adherent and 14 (12.6 %) were medium non adherent to medications.

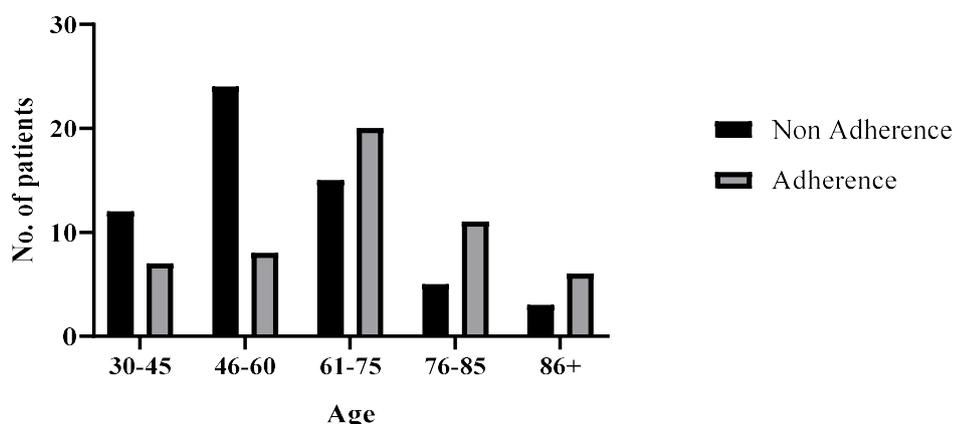**Age wise distribution of adherence & non adherence in COPD patients**

Figure I: Age wise distribution in COPD patients
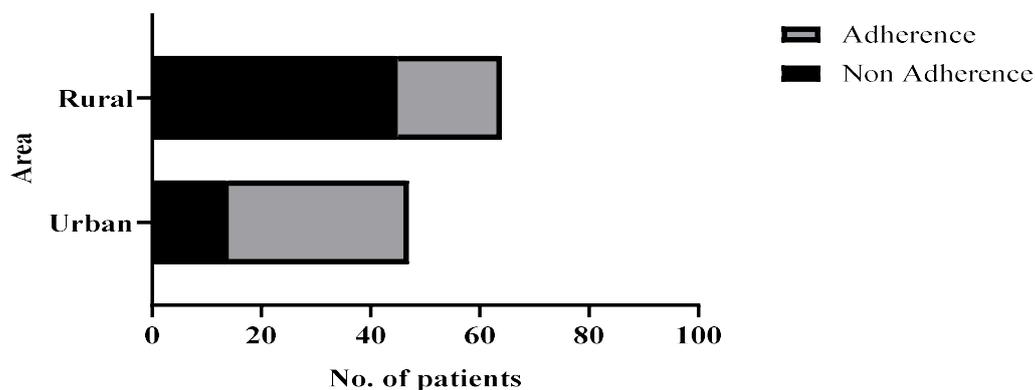
Comparision of adherence & non adherence based on area

Figure II: Comparison of adherence & non adherence based on area in COPD patients

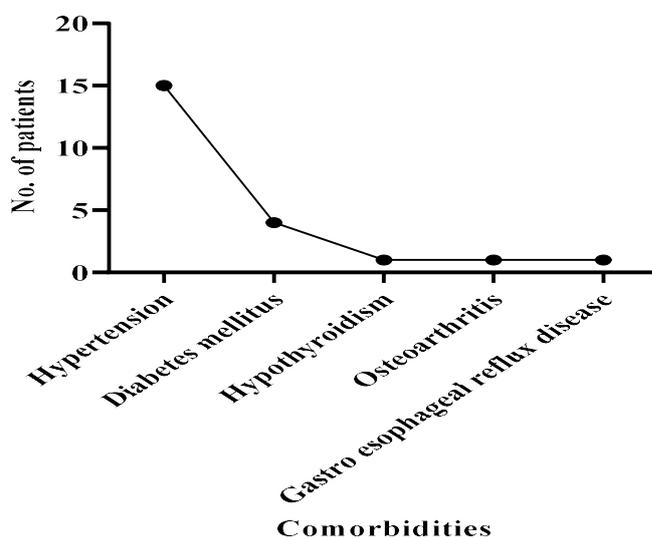**Comorbidities leading to non adherence in COPD patients**

Figure III: Comorbidities leading to non adherence

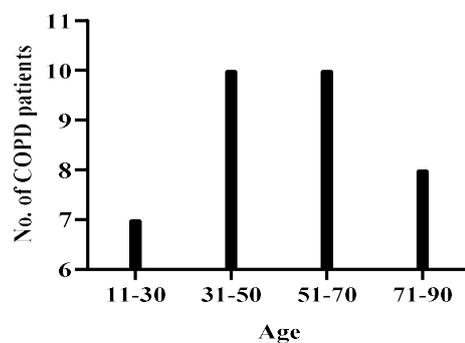**Age wise distribution based on difficulty in using inhalers in COPD patients**

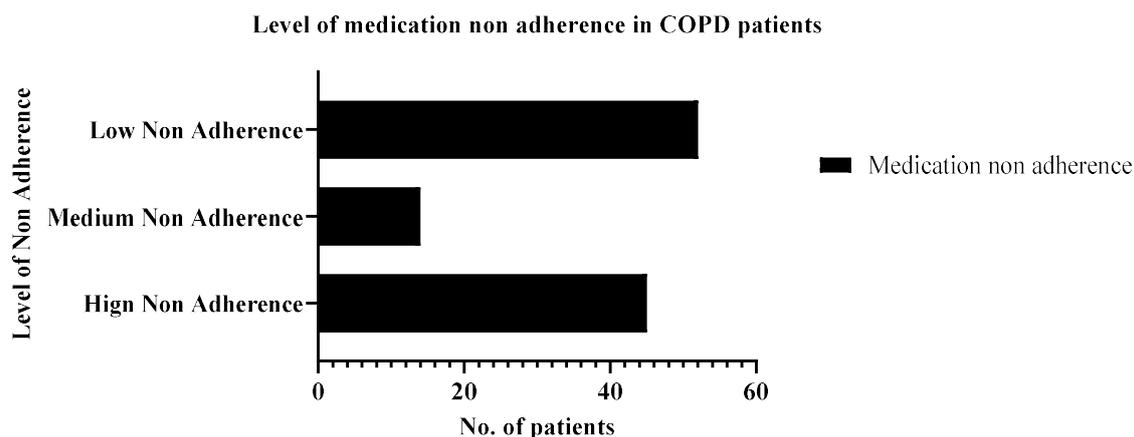**Figure IV: Age wise distribution of difficulty in using inhalers**

Level of medication non adherence in COPD patients

Figure V: Level of medication non adherence

DISCUSSION

Age: In our study, we observed that the mean age was 46-60 years.75 %of patients were non adherent to medication. In contrast to our study, According to Tamas Agh *et al*., (2011) 14.4 % of patients were non adherent to the medications. Forgetting to take the dose was the most common problem reported. Forgetting was associated most often with feeling good, interruptions or changes to normal routines, and inconvenience of dosing [9].

Gender: According to Tamas Agh *et al*., (2011), a study on COPD has showed that adherence to medications in male was 40.4% and non adherence rate was 43.6%, while compared to female the adherence rate was 60% and non adherence to the medication was 56.4%. Similarly in our study, adherence to medications in male was48% and non-adherent was 55.9 %. In female, adherence rate was 51.9 % patients and non-adherence rate was 44 % [9].

Literacy: In our study adherence and non-adherence rate among illiterate patients was 38.4 %and 76.2 % respectively. In literate patients, the adherence and non adherence rate was 61.5 % and23.7 % respectively. Illiterate patients were highly non adherent to the medication due to lack of education and awareness on the disease. Adherence to therapy in COPD is complex. Patients with COPD require adequate education on the disease, comorbidities and also on the use of different medications and devices.

Smoking status: According to study conducted by Tamas Agh *et al.,* on non adherence of COPD patients, non adherence rate in current smokers was 37.6%. In our study non-adherence rate in smokers was 46.6 %. The fact that a patient is a smoker seems to have a negative impact on adherence. A low adherence grade was observed in currently smoking patients. The patient's perceptions of COPD and the

understanding of their therapy are critical to adherence. Smokers with COPD should understand that their lung disease is associated with smoking. Consequently, patients who continue to smoke are expected to have lower adherence to drug treatment than those who quit [3, 9].

Alcohol status: In our study, non adherence rate in alcoholics was found to be 48.4 % and non alcoholics was 51.5 %. Patients with COPD are at high risk of exacerbation and we found no significant relationship between self-reported baseline alcohol intake and subsequent exacerbations [10].

Area wise: In our study we found that overall non adherence was 23.7 % in urban patients and 76.2 % in rural patients. Adherence in urban areas was found to be 63.4% and 36.5% in rural areas. Non adherence in rural areas is due to lack of awareness regarding medications and usage of inhalers.

Comorbidities: In our study we found that non adherence due to comorbidities was 37.2 %. Non adherence rate without comorbidities was 62.7 % in COPD. Comorbidities include hypertension, diabetes mellitus, hypothyroidism, osteoarthritis and GERD. Patients with COPD were often prescribed aerosolized medications to inhale for 2 to 6 times a day plus concurrent therapy for other

comorbidities that may include diabetes, hypertension [3].

Inhalers: In our study 36.4 % of patients were non adherent to the inhaled medications, which is similar to the study conducted by António Duarte-de-Araújo *et al.,* (2018) on non adherence to inhaled medications the results was found to be (31.3 %) were poorly non adherent and 16.7 % was non adherent due to medications. These may be due to medications not used in travel, symptom free period, social embarrassment. Both underutilization of medications during periods of good functioning and overutilization of medications during respiratory distress are significant problems for patients with COPD [3, 11].

Irregular refilling: In our study we found that non adherence to refilling of medications is 32.2 %. In Chronic diseases prescription refilling is necessary for monthly bases to assess the state of the disease. Low income patients were associated with high risk of cost related access barriers which is leading to medication non adherence.

Cost burden: According to Ruben D Restrepo *et al.*, non adherence due to cost burden is 4%. In our study among 111 COPD patients non adherence due to cost burden was found to be 12.6 %. Insufficient funds and the presence of

personal or family problems were reported [3].

Polypharmacy: In our study non adherence due to polypharmacy was found to be 16.6 %. Medication regimens for patients with COPD are particularly vulnerable to adherence problems because of the chronic nature of the disease, the use of multiple medications or polypharmacy. Combination of five to eight oral and inhaled time-contingent and PRN (as needed/ sos) medication requires different dosing patterns.

Drugs: In our study we observed that non adherence to the corticosteroids was 21.6 %, sympathomimetics 27 %, anticholinergics 43.2 % and antibiotics 8.1 %, which is contrast to the study conducted by Ruben D Restrepo *et al.,* where they found that 10% with corticosteroids, 32% with sympathomimetics and 46 % with anticholinergics. Non adherence to anticholinergics in our study was approximately similar to the literature. Non adherence to regimens that include oral corticosteroids and antibiotics are less when compared to other medications because they are typically prescribed for short periods of time [3].

CONCLUSION

In our study we determined overall medication adherence and non adherence and associate factors in pulmonary disease patients. We observed that non adherence rate in male was comparatively higher than female. Non adherence in illiterate patients was high than the literate patients. In patients with social habits such as smoking and alcoholics, non adherence is higher than patients without social habits. Non adherence in rural patients is higher compared to urban patients. Non adherence due to difficulty in using inhalers is higher compared to other reasons such as irregular refilling of medications, polypharmacy and cost burden.

Clinical pharmacist plays a critical role in obtaining medication history information, identifying medication errors, adverse events, drug related problems and collecting medication adherence & non adherence information by using Morisky Medication Adherence Scale. Clinical pharmacist can improve medication adherence by educating patients about the disease, medications, making reminder calls and texts, which are helpful for patients with busy lifestyle.

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