EVALUATING MEDICATION ADHERENCE AND INHALER USE IN COPD PATIENTS

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Abstract: Chronic obstructive pulmonary disease (COPD) is one of the major cause of disability and death all over the world.[1] COPD is a chronic disease which results in a progressive loss of airway function. According to World Health Organization (WHO) estimates, 65 million people have moderate to severe COPD. The major factors resulting in emergency hospitalization among COPD patients has been identified as poor adherence to medication and disease management programs. Adherence is crucial for optimizing clinical outcomes in COPD, with nonadherence resulting in a significant health and economic burden. AIM: To assess the medication adherence and to identify the problems associated with the use of Inhalers in COPD patients. METHODOLOGY: This study was an observational study conducted over a period of 6 months in a tertiary care hospital setting. Patients admitted in inpatient ward were involved in study and were briefed about the study and consent was obtained to participate in the study. Morisky Green Levine Medication Adherence Scale (MGL) and Test of Adherence to Inhalers (TAI) questionnaires were used in the study. RESULTS: A total of 92 patients participated in the study among which majority were male patients. The mean age of the study population was 65.35±9.67 years. MGL medication adherence scale showed that majority of patients had medium adherence (71, 77.17%) followed by low adherence (14, 15.21%). 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 poor adherence (68, 77%) and unconscious non-compliance (81,39%). CONCLUSION: Lack of medication adherence needs to be identified and addressed by using simplified treatment regimens, increasing patient knowledge about self-management, and enhancing provider skills in patient education, communication, and adherence counselling.

Keywords: COPD, Adherence, Inhaler.

1. INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is one of the major causes of disability and death all over the world.[1] COPD is a chronic disease which results in a progressive loss of airway function. According to the Global Initiative for Chronic Obstructive Lung Disease (GOLD) COPD is defined as a common, preventable, and treatable disease characterized by persistent respiratory symptoms and airflow limitation that is due to airway and/or alveolar abnormalities, usually caused by significant exposure to noxious particles or gases. The chronic airflow limitation is the characteristic feature of COPD. It is caused by a mixture of small airways disease (e.g., obstructive bronchiolitis) and parenchymal destruction (emphysema). The relative contributions of which vary from person to person.[2] According to World Health Organization (WHO) estimates, 65 million people have moderate to severe COPD.[3]

Nonadherence in patients with chronic diseases is estimated to cost $300 billion in the US annually, with COPD among the conditions with the lowest levels of adherence.[4]The non-adherence of COPD patients to their treatment recommendation is found to be both intentional and unintentional. The major factors resulting in emergency hospitalization among COPD patients has been identified as poor adherence to medication and disease management programs.[5] Adherence is crucial for optimizing clinical outcomes in COPD, with nonadherence resulting in a significant health and economic burden. Adherence in patients with COPD is affected by multiple factors associated with the patient, their clinician, and society. Patient-related factors include health beliefs, cognitive ability, self-efficacy, comorbidities, psychologic profile, and conscientiousness. For example, depression is a major cause of nonadherence in COPD patients

but is seldom recognized or acknowledged. Treatment-related factors include the need to use multiple inhalers, each requiring a different technique for administration, posing challenges for the older COPD patient. Societal factors include the patient prescriber relationship, social support, access to medication, device training, and follow-up.[4] Suboptimal medication adherence is common among COPD patients, due to a number of factors that involve the medication, the delivery device, the patient, and the medical care as the management of COPD is complex because it also involves behavioural and lifestyle changes such as smoking cessation along with medical therapy.[4,5] Lack of medication adherence needs to be identified and addressed by using simplified treatment regimens, increasing patient knowledge about self-management, and enhancing provider skills in patient education, communication, and adherence counselling.[4]

2. METHODOLOGY

STUDY SITE

The study was conducted at inpatient ward of Department of Pulmonary Medicine of ESIC-MC PGIMSR & Model Hospital, which is a 500-bedded multispecialty tertiary care teaching hospital, Rajajinagar, Bengaluru.

STUDY DESIGN & DURATION

This study was an observational study conducted over a period of 6 months.

STUDY DURATION

Planning	November – December 2017
Data Collection	January – March 2018
Interpretation and Thesis writing	April 2018

SAMPLE SIZE

A total of 92 patients admitted to 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 management.

Exclusion Criteria

➢ Patients not willing to participate in the study.

➢ Patients who are admitted in comatose or unconscious condition or not able to provide information.

Data

The data was collected from the inpatient wards of the Department of Pulmonary   medicine. The different sources of data used were:

➢ Case report form.

➢ Patient case sheet/medication chart.

➢ Questionnaires.

STUDY TOOL

➢ *Patient data collection form:* A data collection form will be developed to collect patient's demographic and disease specific aspects.

➢ *Morisky Green Levine Medication Adherence Scale (MGL):* It is a 4-item questionnaire, self-reported scale to assess the medication-taking behavior.

➢ *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 compliance to 5: best compliance and questions (11-12) for health care professionals are scored with 1 or 2 points.

STUDY PROCEDURE:

Patients admitted in the inpatient ward meeting the inclusion criteria were included in the study. The purpose of the study was explained and willingness to participate was ascertained. The demographic and disease information were collected by interviewing and referring patient's medical records along with the questionnaires used on a designed case report form. The study included two questionnaires, Test of Adherence to Inhalers (TAI) questionnaire, Morisky Green Levine Medication Adherence Scale (MGL). 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 was analysed using mean, standard deviation and percentage.

3. RESULTS

This study included a total of 92 patients admitted to the inpatients ward of Pulmonary Medicine of ESIC-MCPGIMSR &Model Hospital, which is a 500-bedded multispeciality tertiary care teaching hospital in Bengaluru. The data for study were collected for a period of three months. Majority of patients in the study were males (68, 73.9%) as shown in figure 1.
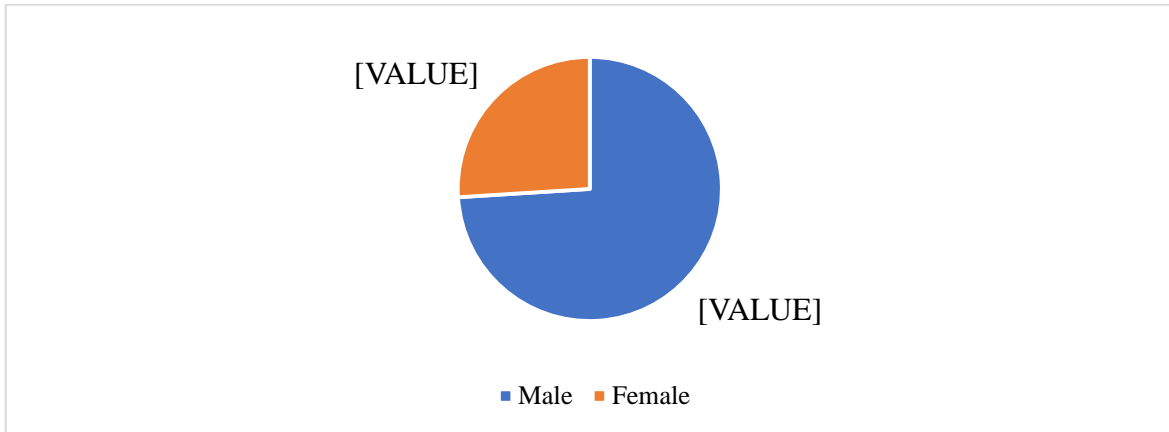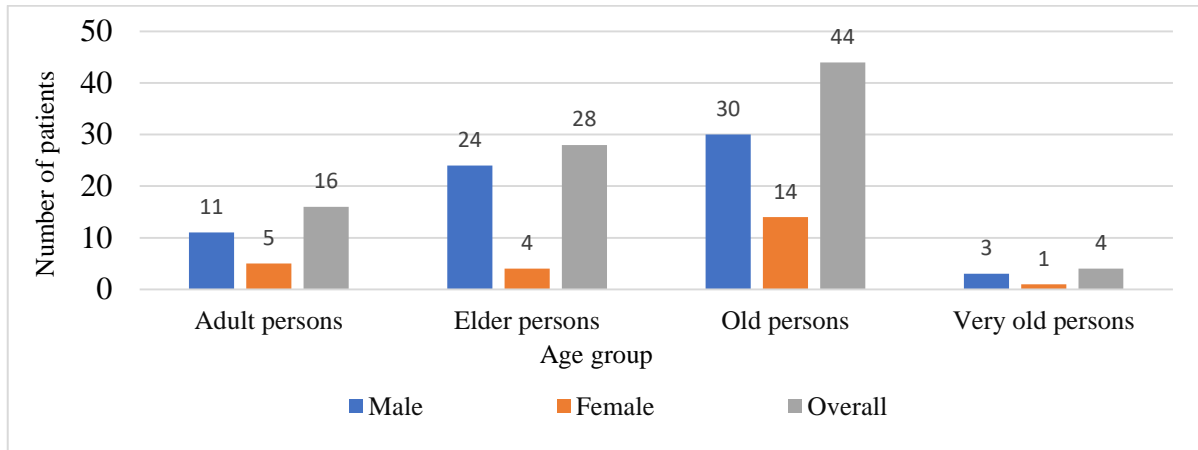

Figure 1: Distribution of study population by gender

The mean age of the study population was 65.35±9.67 years. Majority of the patients belonged to age group of old persons (44, 47.82%) and least number of patients in very old persons (4, 4.34%). Detailed distribution is shown in figure 2.
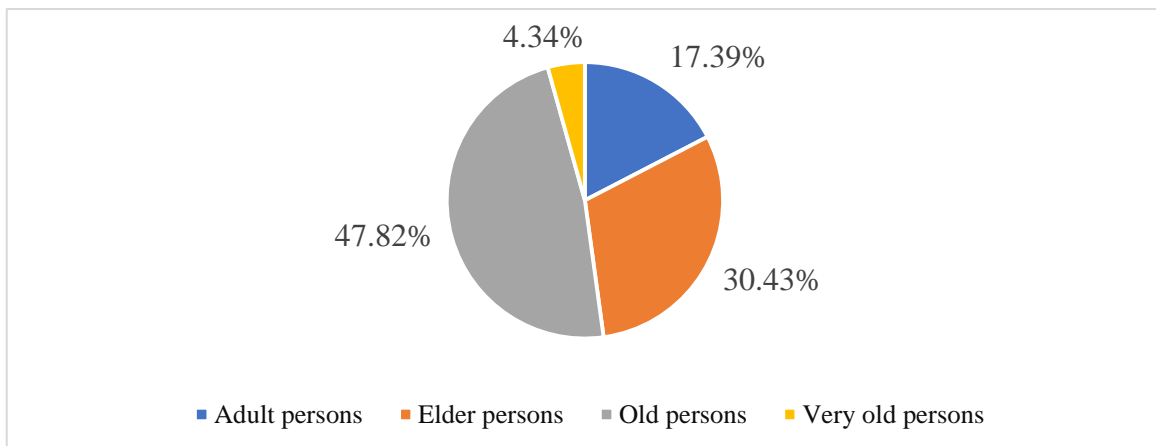

Figure 2: Distribution of age groups according to UN age classification

In all four age groups the distribution of male patients were comparatively more than females in the study population. The highest number of male (30, 44.11%) and female (14, 58.33%) patients were found in old persons group whereas the least number of male (3, 4.41%) and female (1, 4.16%) were in very old persons group. Detailed distribution is shown in figure 3.

Figure 3: Distribution of study population by age group and gender

Morisky Green Levine medication adherence scale showed that majority of patients had medium adherence (71, 77.17%) followed by low adherence (14, 15.21%) and least number of patients were found for high adherence (7, 7.06%) as shown in figure 4.
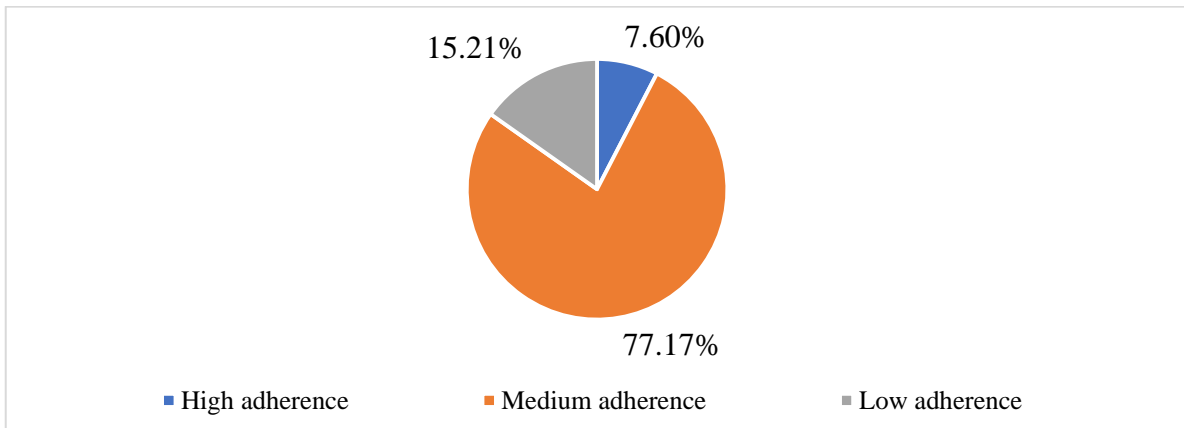
Figure 4: Distribution of Morisky Green Levine Medication Adherence Scale

Majority of patients were found using both (47, 51%) inhaler as well as nebulizer in their daily routine of medication regimen, followed by inhaler use (39, 42.30%) and nebulizer use (4, 4.34%) as shown in figure 5.
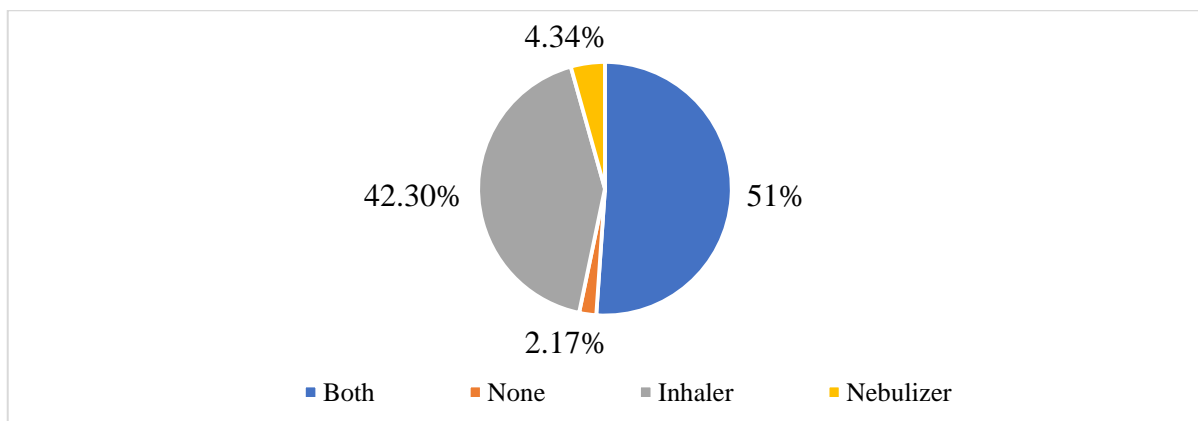
Figure 5: Distribution of device use.

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 poor adherence (68, 77%), followed by intermediate adherence (16, 18%) and least number of patients had good adherence (4, 5%). Detailed distribution is depicted in figure 6.
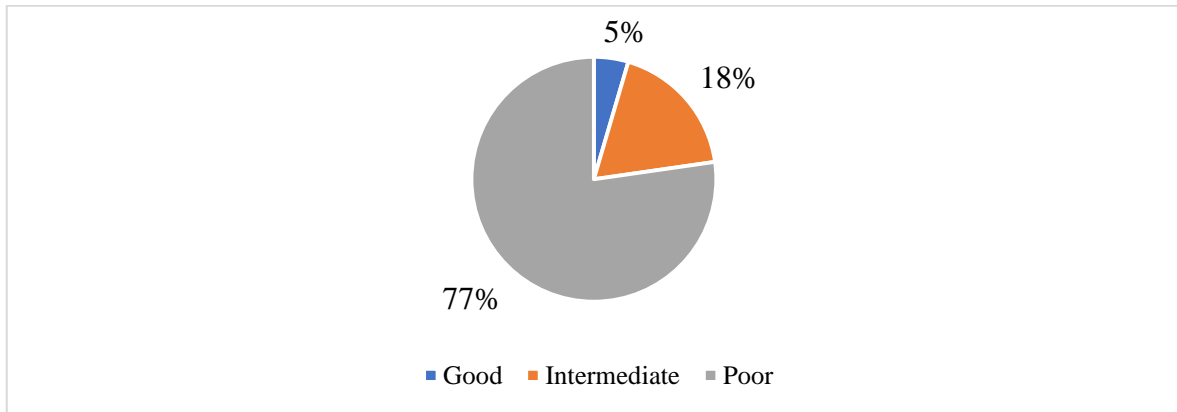
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Figure 6: Distribution by level of adherence.

Majority of patients had unconscious non-compliance (81,39%), followed by Sporadic non-compliance (78, 38%) and deliberate non-compliance (48, 23%) as shown in figure 7.
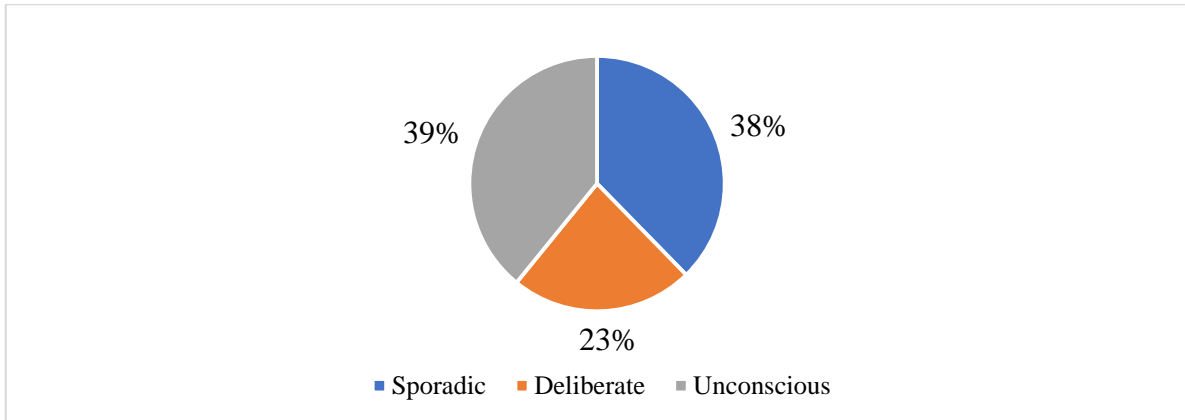

Figure 7: Distribution by type of non-compliance.

A deficient inhalation technique, prevents the drug from reaching the lower respiratory tract in sufficient quantities and critically decreases its intrapulmonary delivery. List of critical errors in device inhalation technique as per TAI questionnaire. 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. Majority errors were found in category C (20.63%) followed by B (18.25%), E (18.25%). A detailed distribution is shown in figure 8.
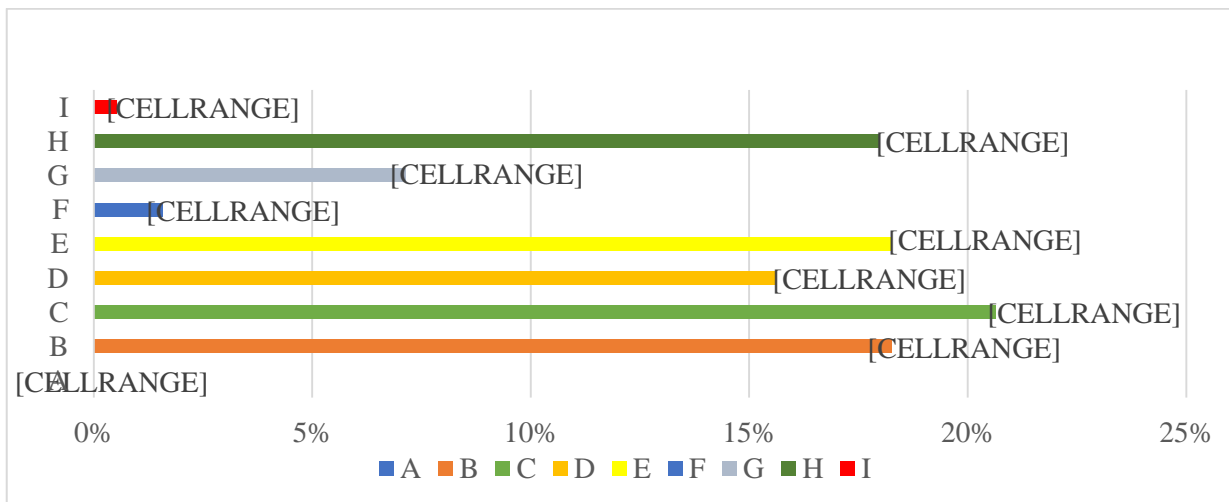

Figure 8: Distribution of errors in inhaler use techniques.

4. DISCUSSION

The study included 92 patients identified based on the inclusion and exclusion criteria. Majority of the patients included in the study were males (73.9%) which is similar to the study done by **S.K. Jindal, *et al.*,** which was a multicentric study conducted in different parts of India in both urban and rural population. [1]

In the present study, the average age of the study population was found to be 65.3 ± 9.67 years which was found to be almost similar to the study done by **David Lieberman, *et al.*,** patients enrolled in the study were classified based on United Nations 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 this study, 47.82% patients belonged to the old persons group followed by 30.43% of elder persons, 17.39% of adult persons and 4.34% of very old persons. In all the age groups, distribution of male patients were comparatively more than females in the study. Similar studies using this classification for patient's distribution in COPD were not found.[6]

Morisky Green Levine Medication Adherence Scale (MGL) was used to assess the medication taking pattern of the patients and it was categorized into high adherence (score = 4), medium adherence (score =2-3) and low adherence (score = 1). MGL interpretation indicated that among the patients enrolled in the study most patients were having medium adherence to medication. Among the study subjects 77.17% had medium adherence, 15.21% had low adherence and 7.06% had high adherence to medication use. When these results were compared with study conducted by **Antonia Pierobon, *et al.*,** score highlighted that only 16.7% of COPD patients reported low adherence. [7] When the patients were distributed for the inhalation medicine delivery device, it was classified as patients using inhalers only, nebulizers only, both inhaler and nebulizer and none. Among the patients 51% were found using only inhalers, 4.34% only nebulizers, 42.30% use both inhaler and nebulizers and 2.17% use none of the devices. The adherence to inhaler in patients were assessed using TAI questionnaire which assess both the level of adherence and type of non-compliance. The results of level of adherence showed that 79.06% had poor adherence, 18.60% intermediate adherence and 4.65% good adherence. Majority of patients had poor adherence to inhalers among the study population. To assess the level of non-compliance, it was categorized into sporadic, deliberate and unconscious non-compliance. Sporadic non-compliance refers to patients who forgets to take their medication, deliberate non-compliance refers to patient who does not take their medication because they do not want to and unconscious non-compliance refers patient who does not take their medication properly because they do not know the therapeutic regimen and how to use their inhaler. Among the study population most patients had unconscious non-compliance (39.13%) followed by sporadic non-compliance (37.68%) and deliberate non-compliance (23.18%). When these results were compared with a study of validating the TAI for COPD and asthma patients conducted by **Vicente Plaza, *et al.*,** showed results as 37.5% had good adherence, 29.8% intermediate adherence, 32.7% poor adherence for level of adherence and for type of non-compliance it showed that 58.2% had sporadic non-compliance, 41.3% deliberate non-compliance and 26.6% unconscious non-compliance. [8] On the basis of the observational assessment of inhaler use by patients, errors in the techniques of using inhaler were found. 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 20.63% followed by 18.25% in B and E, 17.98% in H, 15.6% in D, 7.14% in G, 1.58% in F and 0.52% in I, similar study using TAI questionnaire for assessing the error in the inhaler techniques were not found.

5. CONCLUSION

Adherence to medication plays a very vital role in optimizing significant clinical outcomes. Adherence could be improved by using simplified treatment regimens, increasing patient knowledge about self-management, and improving the quality of information given to the patient by the provider about the patient education which includes about the disease and techniques of inhaler use, communication, adherence counselling. Ensuring appropriate systems, services and support for these patients should be a priority for healthcare providers for achieving optimal outcomes, reducing disease burden for patients and promoting cost-effective care.

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