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A Retrospective Prospective Study on Assessing the Drug Use Pattern of Inhaled Corticosteroids in A Community Based Setting

Merin V Jolly[1], Seenamary Koshi[2], Jeena Mary Koshy[3], Dr. Jayakumar K.S[4]

[1,2,3]Pharm D Nazareth college of Pharmacy, Thiruvalla, kerala, India.
[4]Assistant Professor, Nazareth college of Pharmacy, Thiruvalla, kerala, India.

ABSTRACT

BACKGROUND: Inhaled corticosteroids (ICS) are extensively prescribed for managing chronic respiratory disorders, yet data on their usage patterns and associated adverse drug reactions (ADRs) in community settings are limited. This study investigates the drug use patterns of inhaled corticosteroids (ICS) among 250 residents of Pathanamthitta district. Data were collected using a structured questionnaire focusing on drug use behavior, administration techniques, and duration of ICS use. Analysis revealed that Budesonide 400 mcg was the most commonly used ICS (90.4%), with the highest prevalence observed in the 65–74 age group (24.4%) and among females (56.8%). Bronchial asthma was the most frequent indication (56.4%), and nearly half of the participants (48.8%) were long-term users. Notably, 51.6% of users reported inconsistent ICS use, and 53.6% did not follow proper administration techniques, potentially contributing to ADRs. These findings underscore the need for improved patient education and adherence strategies in community settings

OBJECTIVE: To assess the drug use pattern of inhaled corticosteroids

MATERIALS AND METHODS: This retrospective-prospective study was conducted over a period of six months in the Thiruvalla Taluk of Pathanamthitta district, following approval from the Institutional Review Board of Nazareth College of Pharmacy. A total of 250 patients using inhaled corticosteroids (ICS) were included in the study based on specific inclusion and exclusion criteria. Eligible participants included males and females aged 5–80 years using ICS for various medical conditions, excluding pregnant women, those with known allergies to ICS, and individuals unwilling to participate. Data was collected using a predesigned questionnaire and Google Forms. Key study variables included demographic details, ICS usage patterns (dosage, duration, frequency). Data collection was completed through direct interaction with participants, and responses were recorded using a structured proforma. Final data analysis was carried out using Microsoft Excel 2019, and results were presented in tables and percentages through descriptive statistics.

CONCLUSION: The result of the study points out that the most commonly used drug was Budesonide 400 mcg .The age group of 65-74 showed the highest prevalence of ICS use.The most common ICS users were female and the most prevalent medical condition was bronchial asthma. Majority of the individuals were long term users of ICS. The study highlights that 51.6% of the ICS users were not consistent in taking the medication and about 53.6% of the people were not following the proper administration techniques

which contributes to the potential ADRs.

KEYWORDS: Inhaled corticosteroids, drug use pattern, retrospective-prospective study

INTRODUCTION

The only medications that may successfully suppress the characteristic inflammation in asthmatic airways, even at extremely low doses, are inhaled corticosteroids (ICS)These are also known as glucocorticosteroids, steroids, or glucocorticoids. These are by far the most effective controls used in the treatment of asthma and COPD. Inhalers that combine long-acting β2-agonists (LABA) and ICS are frequently prescribed for COPD and asthma.1

Drug use is a complex process. In any country a large number of socio-cultural factors contribute to the ways drugs. Hence drug utilization research is an essential part of pharmacoepidemiology as it describes the extent, nature and determinants of drug exposure. Drug utilization evaluation can be used for the description of drug use pattern; early signals of irrational use of drugs; interventions to improve drug use; quality control cycle; continuous quality improvement.[2]

Facilitating the sensible use of medications in communities is the main goal of drug use research. Research on drug usage can help us better understand how drugs are used in the following ways:

- It can be used to calculate the approximate number of patients exposed to particular medications over a predetermined amount of time.
  These estimates can either focus on patients who began using the medication within the chosen period, or they can apply to all drug users, regardless of when they first started using the drug.
- It can specify how much use there is in a certain location or at a given time. When these descriptions are a component of an ongoing assessment system, meaning that changes in medication usage are tracked over time, they have the most relevance.[3]

The following are the focus of this study:

1. The prevalence of the age, gender, the medical condition and duration of the inhaled corticosteroid use
2. The prevalence of the most commonly used drug,
3. The consistency and the administration techniques of ICS in the population.

CASE STUDY:

A retrospective-prospective study was carried out in Thiruvalla Taluk, Pathanamthitta district, Kerala,India for a period of 6 months from November 2023 toApril 2024.A total of 250 patients on inhaled corticosteroids (ICS) were selected based on defined inclusion and exclusion criteria. Participants included all those who met the inclusion and exclusion criteria.The study was conducted after obtaining approval from the Institutional Review Board of Nazareth College of Pharmacy.

INCLUSION CRITERIA:

Individuals taking Inhaled corticosteroids for their medical condition,patients of both genders,considering short term and long corticosteroid users,patients between the age of 5-80years

EXCLUSION CRITERIA:

Pregnant women,patients with a history of allergic reactions to Inhaled corticosteroids,those who are unwilling to participate.

DATA COLLECTION TECHNIQUE OR PLAN OF WORK

The study was conducted among 250 inhaled corticosteroids using residents of Pathanamthitta district.Participants were asked questions to fill a prepared questionnaire to determine their drug use behaviour. The drug use pattern, that focuses on the consistency,and administration techniques ,age,gender and duration of ICS use.Data were obtained through direct participant interaction and documented using a structured proforma. The collected data were analyzed using Microsoft Excel 2019 and summarized using descriptive statistics, with results displayed in tables and percentages.

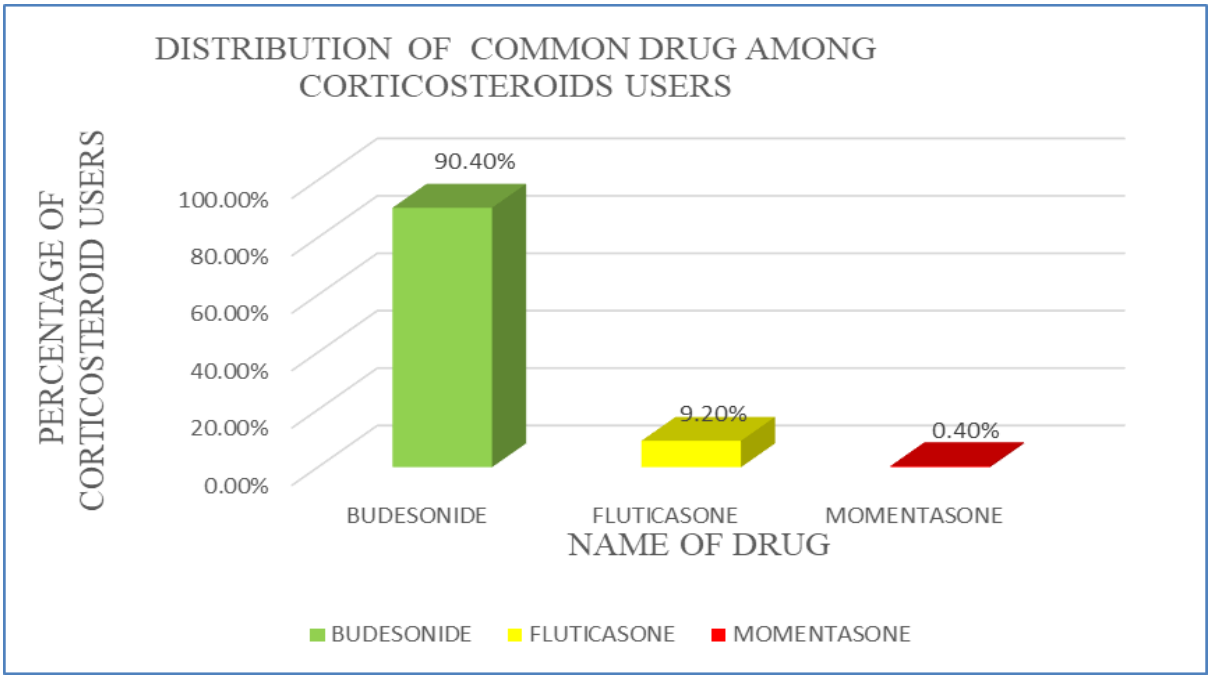
STATISTICAL ANALYSIS

The data was entered in Microsoft Excel – 2019. The results were analysed as tabular form and percentages (Descriptive Analysis).

RESULT:

TABLE 1::DISTRIBUTION OF MOST COMMON CORTICOSTEROID DRUG AMONG THE USERS

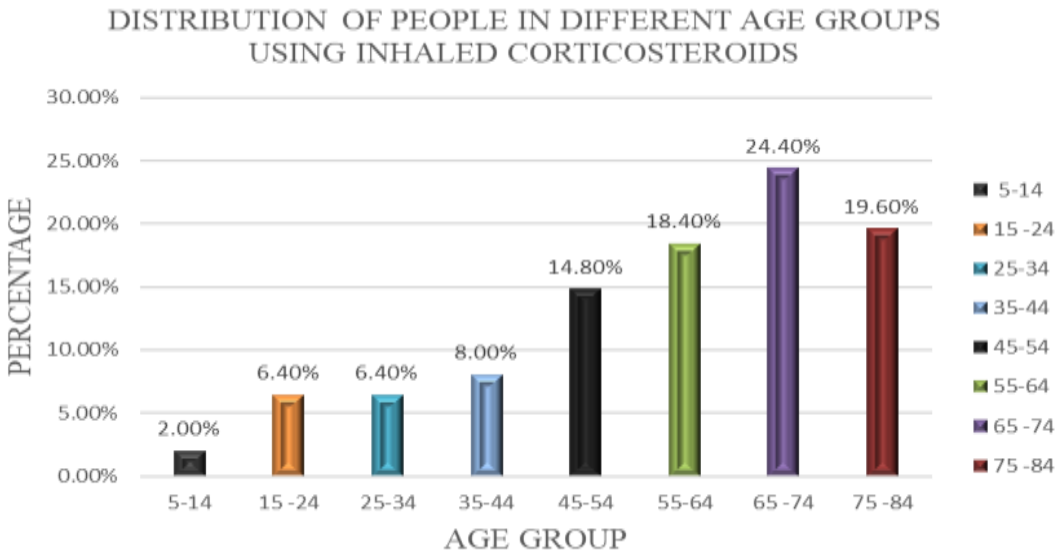
NAME OF DRUG	FREQUENCY	PERCENTAGE
BUDESONIDE	226	90.40%
FLUTICASONE	23	9.20%
MOMENTASONE	1	0.40%
TOTAL	250	100.00%



Regarding the most commonly used drug, it was found that budesonide is the most commonly used drug, it accounts about 90. 40% at a dose of 400mcg two puffs BD. which was in relation to a study done by **Peter J Barnes** on "inhaled corticosteroids" it was found that the first line treatment for asthmatic patients is Budesonide 400mcg twice daily that provides asthma control.

TABLE 2: DISTRIBUTION OF DIFFERENT AGE GROUPS USING CORTICOSTEROIDS

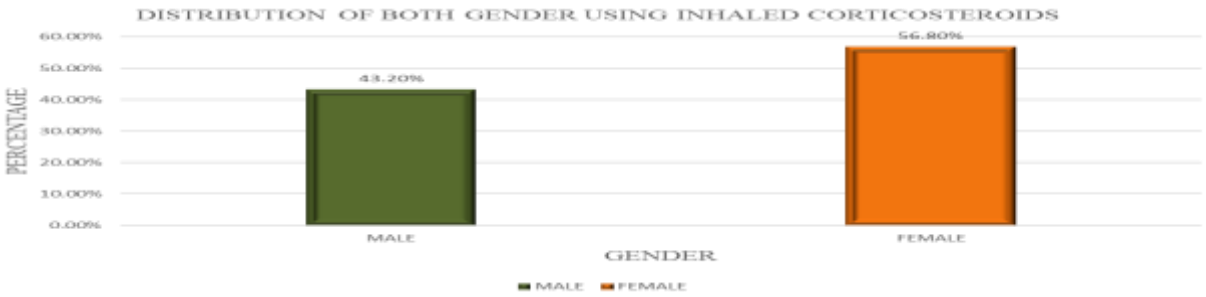
CLASS INTERVAL	FREQUENCY	PERCENTAGE
5-14	5	2.00%
15 -24	16	6.40%
25-34	16	6.40%
35-44	20	8.00%
45-54	37	14.80%
55-64	46	18.40%
65 -74	61	24.40%
75 -84	49	19.60%
Total	250	100.00%



Out of 250 subjects included in the study, majority of the subjects belonged to the age group of 65-74 years 24.40%) followed by 75-84 years (19.60%), 55-64 years (18.40%), 45-54years (14.80%), 35-44 years (8%), 25-34 years (6.4%), 15-24 (6.4%) and a minority belonged to the age group of 5-14 years (2%).

TABLE 3 DISTRIBUTION OF BOTH GENDERS USING CORTICOSTEROIDS

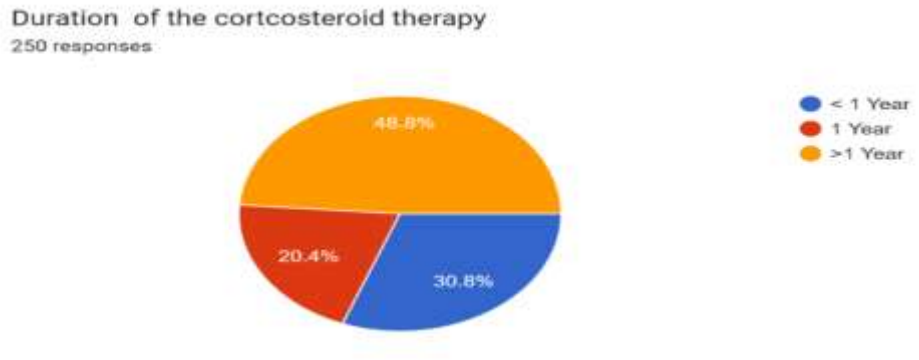
GENDER	FREQUENCY	PERCENTAGE
MALE	108	43.20%
FEMALE	142	56.80%
TOTAL	250	100.00%



Among 250 study subjects majority of the ICS users were females. Females accounts about 56.80% whereas males accounts about 43.20% This study is in accordance with the study conducted by **JR Davidsen et. al.,** on "Increased use of inhaled corticosteroids among Danish young adult asthmatics , an observational study" also showed that higher number of inhaled corticosteroid users were females

TABLE 4 DISTRIBUTION OF DURATION OF CORTICOSTEROID USE

DURATION OF CORTICOSTEROID USE	FREQUENCY	PERECETAGE
<1 YEAR	77	30.80%
1 YEAR	51	20.40%
>1 YEAR	122	48.80%
TOTAL	250	100.00%

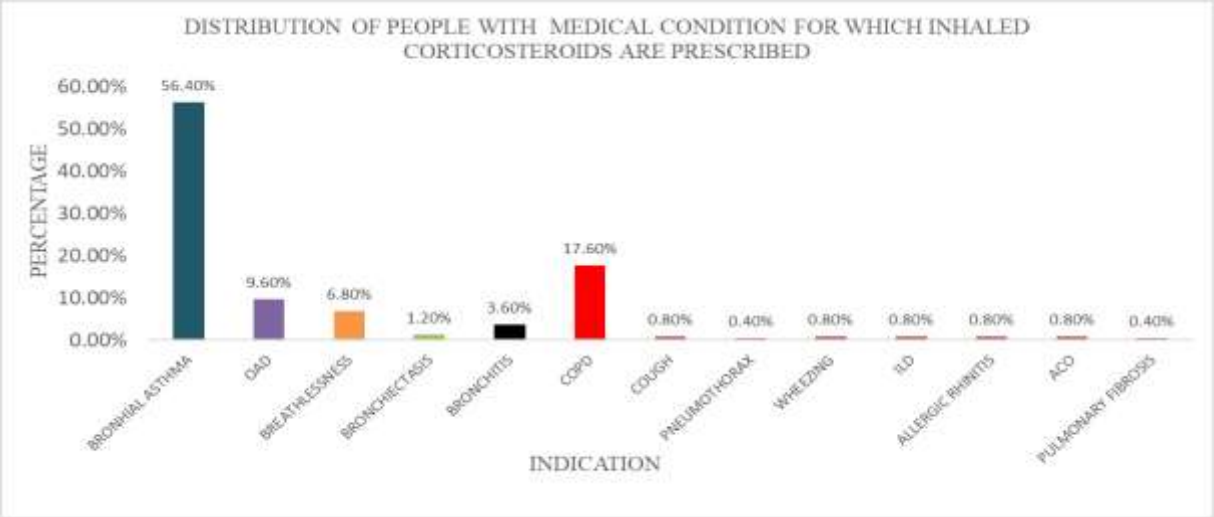


Regarding the duration of use of ICS, it was found that 122 (48.80%) out of 250 study population used inhaled corticosteroid for a period greater than 1 year. This long term use of ICS has led to side effects such oropharyngeal candidiasis, DM etc. This was in relation to the study conducted by **Wenli Shang et. al.,** on "The safety of long term use of inhaled corticosteroids in patients with asthma: A systematic review and meta analysis" showed that long term use of inhaled corticosteroids resulted in oropharyngeal candidiasis and dysphonia

TABLE 5 DISTRIBUTION OF COMMON MEDICAL CONDITION FOR WHICH INHALED CORTICOSTEROIDS ARE PRESCRIBED

COMMON INDICATION OR WHICH INHALED CORTICOSTEROIDS ARE PRESCRIBED		
INDICATION	**FREQUENCY**	**PERCENTAGE**

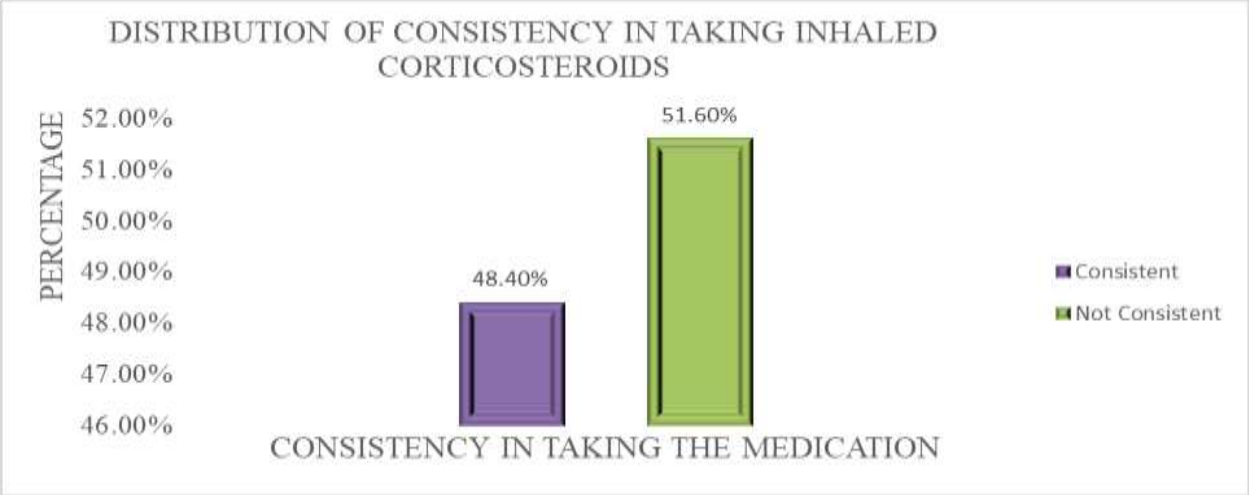
BRONHIAL ASTHMA	141	56.40%
OAD	24	9.60%
BREATHLESSNESS	17	6.80%
BRONCHIECTASIS	3	1.20%
BRONCHITIS	9	3.60%
COPD	44	17.60%
COUGH	2	0.80%
PNEUMOTHORAX	1	0.40%
WHEEZING	2	0.80%
ILD	2	0.80%
ALLERGIC RHINITIS	2	0.80%
ACO	2	0.80%
PULMONARY FIBROSIS	1	0.40%
TOTAL	250	100.00%



Among 250 study population it was found that 56.40% of people suffered from bronchial asthma for which ICS was prescribed. According to the study conducted by **Peter J Barnes** "inhaled corticosteroids" ICS are used as the first line therapy for patients with persistant asthma. ICS improves the quality of life of patients with asthma and improve lung functions.

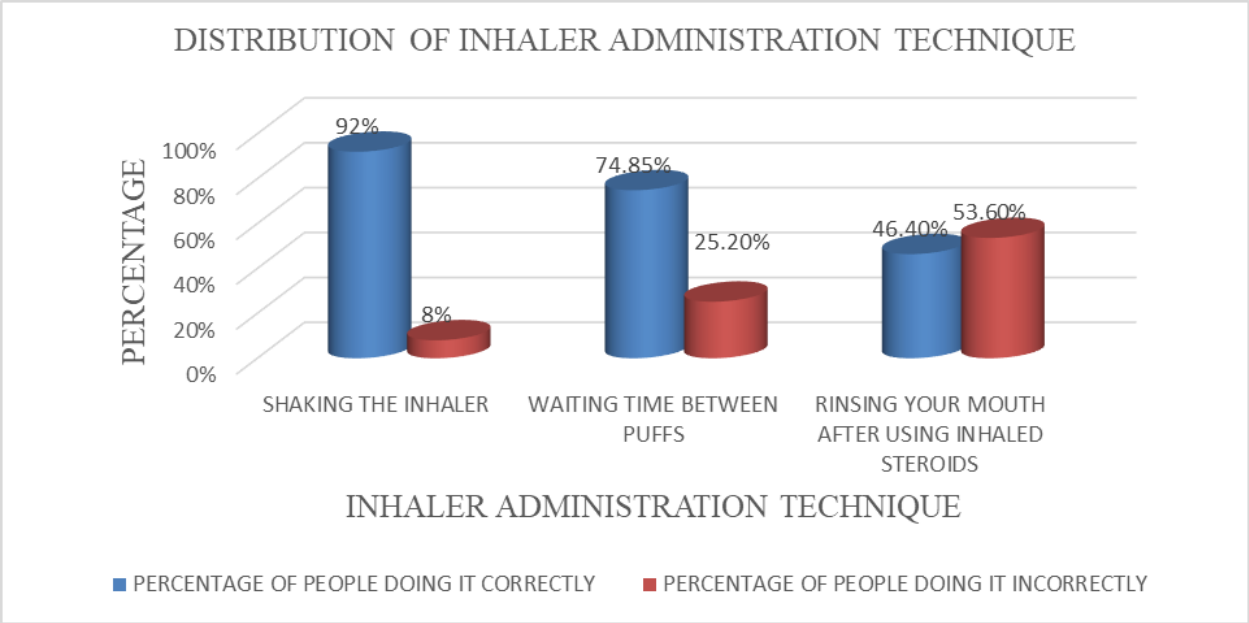
TABLE 6 DISTRIBUTION OF CONSISTENCY IN TAKING THE INHALED CORTICOSTEROIDS

CONSISTENCY IN TAKING THE MEDICATION	FREQUENCY	PERCENTAGE
Consistent	121	48.40%
Not Consistent	129	51.60%
TOTAL	250	100.00%



TAB.LE 6.3 DISTRIBUTION OF INHALER ADMINISTRATION TECHNIQUES

ADMINISTRATION TECHNIQUE			
PERCENTAGE OF PEOPLE USING INHALED CORTICOSTEROIDS	**SHAKING THE INHALER**	**WAITING TIME BETWEEN PUFFS**	**RINSING YOUR MOUTH AFTER USING INHALED STEROIDS**
PERCENTAGE OF PEOPLE DOING IT CORRECTLY	92%	74.85%	46.40%
PERCENTAGE OF PEOPLE DOING IT INCORRECTLY	8%	25.20%	53.60%
TOTAL	100%	100%	100%



From the above graph out of 250 population 51.60% were not consistent, 53.60% didn't rinse their mouth. From the study conducted by **Ashwaghosha Parthasarathi** on "Local adverse drug reaction in ambulatory asthma patients treated with inhaled corticosteroids An experience from south Indian teaching hospital" showed that Despite their doctor's advice to stick to their usual ICS dosage, two out of every five patients who reported ADRs reduced or skipped doses due to discomfort, used MDI without a spacer

DISCUSSION :

The project aimed to investigate the drug use patterns of inhaled corticosteroids (ICS).The study showed that -in terms of the

AGE-Out of 250 subjects included in the study ,majority of the subjects belonged to the age group of 65-74 years(24.40%) followed by 75-84 years (19.60%) ,55-64 years (18.40%), 45-54years (14.80%), 35-44 years (8%), 25-34 years (6.4%) , 15-24 (6.4%) and a minority belonged to the age group of 5-14 years (2%).

GENDER-In our study of 250 participants, females constituted the majority of ICS users (56.8%), while males accounted for 43.2%. This finding aligns with studies by Nowrin U. Chowdhury and Vamsi P. Guntur, which highlight that asthma tends to be more prevalent and severe in adult women compared to men. Similarly, JR Davidsen et al. also reported a higher proportion of female ICS users in their observational study among young Danish adults.. [5]

MOST COMMONLY USED INHALED CORTICOSTEROID AND DOSE-Regading the most commonly used drug , it was found that budesonide is the most commonly used drug , it accounts about 90. 40% at a dose of 400mcg two puffs BD which accounts 42.92%. in relation to a study done by **Peter J Barnes** on "inhaled corticosteroids "it was found that the first line treatment for asthmatic patients is Budesonide 400mcg twice daily that provides asthma control. It is more potent when combined with β_2-agonist . [6]

DURATION OF USE OF ICS-Regarding the duration of use of ICS, it was found that 122(48.80%) out of 250 study population used inhaled corticosteroid for a period greater than 1 year.this long term use of ICS has led to side effects such oropharyngeal effects , DM etc. In relation to the study conducted by **Wenli Shang et al** on "The safety of long term use of inhaled corticosteroids in patients with asthma: A systematic review and meta analysis" showed that long term use of inhaled corticosteroids resulted in oropharyngeal candidiasis and dysphonia.[7]

MOST COMMON INDICATION OF ICS-Among 250 study population it was found that 56.40% of people suffered from bronchial asthma for which ICS was prescribed. According to the study conducted by Peter J Barnes " inhaled corticosteroids" ICS are used as the first line therapy for patients with persistant asthma. ICS improves the quality of life of patients with asthma and improve lung functions.[6]

CONSISTENCY AND ADMINISTRATION TECHNIQUE : Our study identified that 46.5% had irregular physician visits,. In comparison, the study by Ashwaghosha Parthasarathi found that many patients reduced or skipped ICS doses due to discomfort, despite medical advice. ADRs were mainly associated with the use of budesonide, age over 41, and using a metered-dose inhaler (MDI) without a spacer..[66]

CONCLUSION:

The result of the study points out that the most commonly used drug was Budesonide 400 mcg (90.40%) .The age group of 65-74 showed the highest prevalence of ICS use(24.40%).The most common ICS users

were female(56.8%) and the most prevalent medical condition was bronchial asthma(56.40%). Majority of the individuals were long term users of ICS(48.8%). The study highlights that 51.6% of the ICS users were not consistent in taking the medication and about 53.6% of the people were not following the proper administration techniques which contributes to the potential ADRs.

ABBREVIATIONS

ICS-Inhaled corticosteroids
ADRs-Adverse drug reactions

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