



A PROSPECTIVE OBSERVATIONAL STUDY ON THE ASSESSMENT OF PRESCRIBING PATTERN AND MEDICATION ADHERENCE OF ASTHMATIC PATIENTS IN A TERTIARY CARE HOSPITAL

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ABSTRACT

Background:

Asthma is a broad term used to refer a disorder of the respiratory system that leads to episodic difficulty in breathing. It leads to airway hyper responsiveness, obstruction, hyper production of mucus and remodeling of airway walls.

Bronchial asthma is a recurrent but reversible obstruction of the airways. Asthma is a major cause of disability and health resource utilization, and reduces quality of life. This is partly caused by asthma exacerbations, which have a huge impact on patients and their families. Over the last 25 years, the increase in asthma prevalence is due to the changes in our environmental or lifestyle modification.

Aim:

To assess the prescribing pattern and medication adherence in asthmatic patients and evaluate their quality of life.

Objectives:

- To assess the prescribing pattern in asthmatic patients .
- To investigate the medication adherence in asthmatic patients .
- To evaluate the quality of life of selected population .

Materials and Methods:

The prospective observational study was carried out in 10 patients with asthma in Cosmopolitan Hospital, Trivandrum. The study was conducted after getting informed consent from the patient. Proforma was used for collecting the demographic details of the patient and patient counselling was given to them using PILs. The prescription pattern, medication adherence and quality of life of subjects was assessed. The details of the drugs prescribed were noted down. Medication adherence was assessed using AAMQ [Adherence to Asthma Medication Questionnaire] and quality of life was assessed using AQLQ [Asthma Quality of life questionnaire with standardized Activities] questionnaires both before and after counselling (follow up done after 2 weeks) and essential details were documented .

Result:

During the study 10 asthma patients were included for the study who satisfied the inclusion criteria. The prescription was analyzed and found that the mostly prescribed drugs were Leukotriene Antagonists, Corticosteroids, Methyl Xanthines and Beta-Agonists. The mostly given therapy is anti-asthmatic drug combinations rather than monotherapy. Out of 24 drugs prescribed 15 were prescribed with oral dosage form and rest via inhalational route.

In the study we have seen a significant improvement in medication adherence and quality of life in patients after receiving proper counselling.

Conclusion:

It was concluded that the mostly prescribed anti-asthmatic drug is leukotriene antagonists and the patients diagnosed with asthma mostly received oral therapy than by inhalation. There is significant improvement in medication adherence and QOL after proper counselling given to the subjects.

Keywords: AQLQ, AAMQ, QOL, Medication Adherence, Leukotriene Antagonists, Methyl Xanthines, Beta agonists, PIL (Patient Information Leaflet)

INTRODUCTION

Asthma is a common disease, affecting more than 300 million individuals all over the world and is a serious health and socioeconomic issue. Asthma is defined as the chronic inflammatory disease of the airways. It leads to airway hyperresponsiveness, obstruction, hyperproduction of mucus and remodeling of airway walls. Asthma is a chronic inflammatory disorder of the airways in which many cells and cellular elements play a role. In susceptible individuals, inflammation causes recurrent episodes of wheezing, breathlessness, chest tightness, and coughing. These episodes are usually associated with airflow obstruction^[1].

EPIDEMIOLOGY

- An estimated 14 to 15 million persons in the United States have asthma.
- Asthma accounts for 1.6% of all ambulatory care visits (13.7M) according to the National Ambulatory Medical Care Survey and results in more than 470,000 hospitalizations per year.
- Asthma is the most common chronic disease in children, affecting 4.8 million.
- In young children (0-10 years of age), the risk of asthma is greater in boys than in girls, becomes about equal during puberty, and then is significantly greater in women than in men.
- This gender reversal of the cumulative incidence of asthma with age suggests that airway caliber and/or hormonal factors influence the development of asthma.
- African-Americans and Hispanics have higher prevalences than whites, and African-Americans are twice as likely to be hospitalized^[2].

CLASSIFICATION OF ASTHMA

Based on severity:

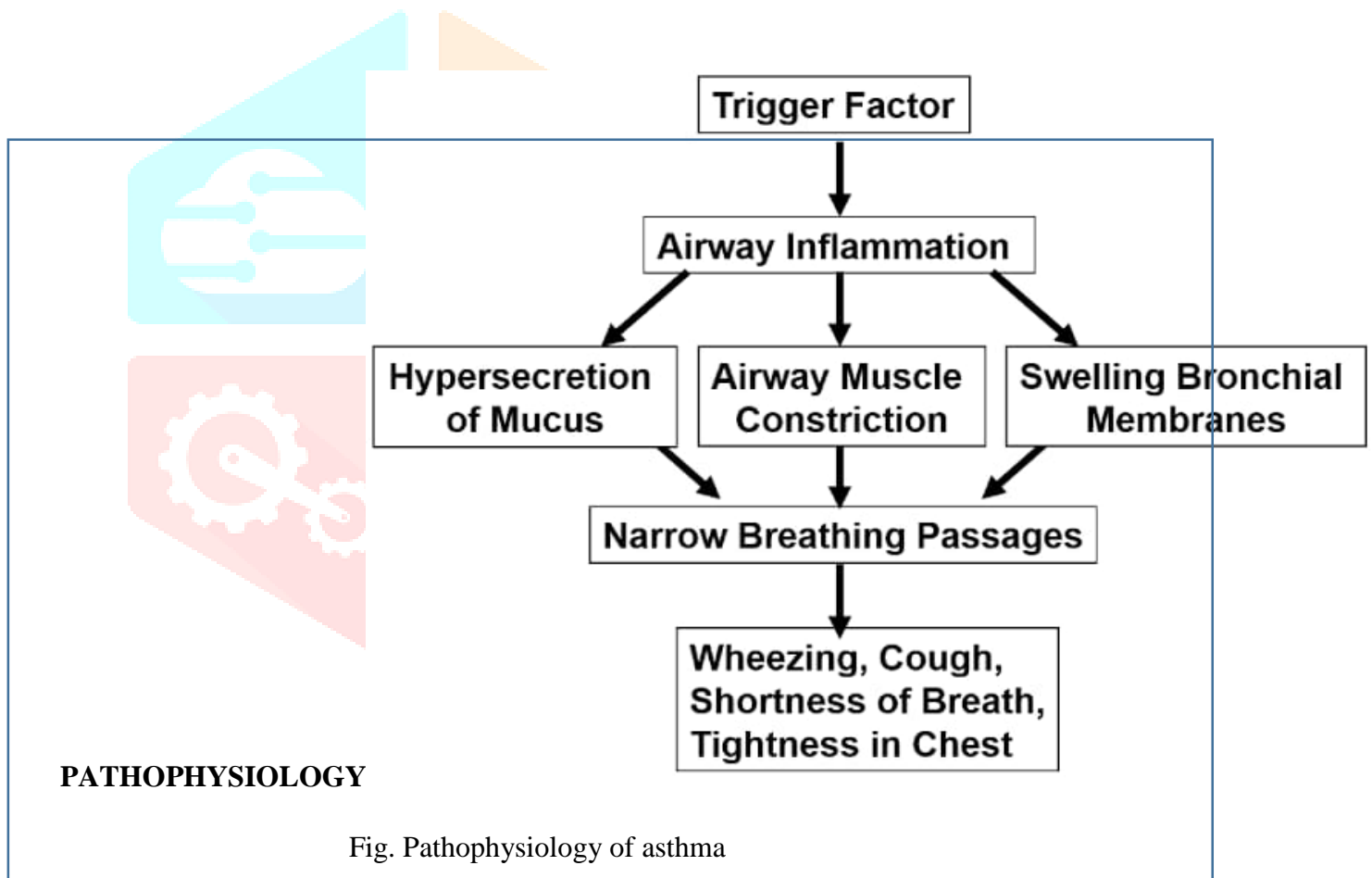
1. **Mild Intermittent Asthma:** Mild symptoms less than twice a week. Night time symptoms less than twice a month. Few asthma attacks.
2. **Mild Persistent Asthma:** Symptoms three to six times a week. Night time symptoms three to four times a month. Asthma attacks might affect activities.
3. **Moderate Persistent Asthma:** Daily asthma symptoms. Night time attacks five or more times a month. Symptoms may affect activities.
4. **Severe Persistent Asthma:** Ongoing symptoms both day and night. You have to limit your activities.

Based on cause:

1. **Acute Severe Asthma:**
2. **Allergic Asthma**
3. **Exercise Induced Bronchospasm**
4. **Nocturnal Asthma**

ETIOLOGY

- Allergens (Airborne pollens, House-dust mites, Animal danders)
- Environmental factors (Fog, Cold air, Sulphur dioxide, Nitrogen dioxide, Tobacco Smoke)
- Genetics
- Respiratory infections (Respiratory Syncytial Virus, Rhinovirus, Influenza)
- Exercise
- Air pollution and Irritants
- Strong Emotions and Stress
- Occupational Stimuli
- Drugs (beta blockers, NSAIDs such as ibuprofen, naproxen sodium)^[3]



Airflow limitation in asthma is recurrent and caused by a variety of changes in the airway. These include:

- **Bronchoconstriction:** In asthma the dominant physiological event that lead to clinical symptoms is airway narrowing and a subsequent interference with airflow. In acute exacerbations of asthma, bronchial smooth muscle contraction occurs quickly to narrow the airways in response to exposure to variety of stimuli.
- **Airway Edema:** As the disease become more persistent and inflammation more progressive, other factor further limit airflow. These include edema, inflammation , mucus hypersecretion and the formation of

mucus plugs as well as structural changes including hypertrophy and hyperplasia of airway smooth muscle.

- **Airway Hyperresponsiveness:** It is an exaggerated bronchoconstrictor response to a wide variety of stimuli. The mechanisms influencing this response are multiple and include inflammation, dysfunctional neuroregulation and structural changes.
- **Airway Remodeling:** Airway remodeling involves an activation of the many of the structural cells, with consequent permanent changes in the airway that increase airflow obstruction and airway responsiveness^[4].

RISK FACTORS

- Hereditary
- Obesity
- Smoking
- Exposure to secondary smoke
- Exposure to air pollution
- Exposure to chemicals
- Stress

SIGNS AND SYMPTOMS

- Shortness of breath
- Chest pain
- Dry Cough
- Chest Tightness
- Night Cough
- Wheezing
- Difficulty in breathing

DIAGNOSIS

Tests to measure lung function:

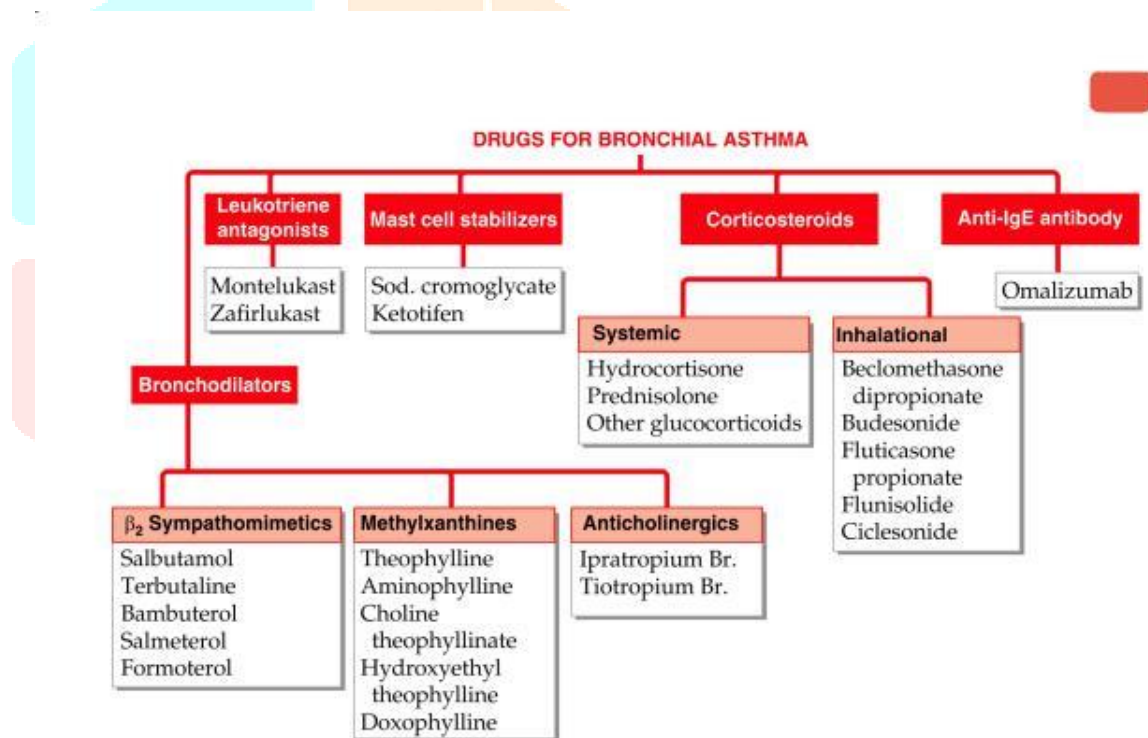
- **Spirometry:** Spirometry is the most common type of pulmonary function test.
- **Peak flow:** It is measured using peak flow meter which is a simple device that measures your ability to push air out of lungs.
- **FeNO test:** It stands for Fractional exhaled Nitric Oxide testing. It measures the amount of inflammation in the lungs.
- **Provocation Test:** It measures the sensitivity of your lungs. These type of tests may be also called challenge or trigger test. Most common types include;
 - a) Irritant Challenge
 - b) Exercise Challenge

c) Methacholine Challenge^[5]**TREATMENT OF ASTHMA**

Asthma involves inflammation and bronchoconstriction, treatment should be directed towards reducing inflammation and increasing bronchodilation. Restoration of normal airways function and prevention of severe acute attacks are the main goals of treatment. Other measures, such as avoidance of recognized trigger factors, may also contribute to the control of this disease. The lowest, effective dose of drugs should be given to minimize short-term and long-term side-effects.

Mainly two types of drugs are used in asthma treatment. It includes:

- **Relievers(Bronchodilators)** give immediate reversal of airway obstruction, largely by relaxing airway smooth muscles.
- **Controllers(Preventers)** suppress the underlying disease process and provide long-term control of symptoms. These drugs include anti- inflammatory treatments.

**INHALERS**

The choice of a suitable inhalation device is vital to asthma management. The incorrect use of inhalers will lead to suboptimal treatment. This has been demonstrated to occur in upto 75% of patients using metered dose inhaler. Factors need to be considered when choosing the appropriate device includes:

- Patient age
- Severity of disease
- Manual dexterity
- Coordination
- Personal Preference

Types of Inhalers

1. Metered-dose aerosol inhaler
2. Metered Dose Inhaler with Spacer Extension
3. Dry Powder Inhalers
4. Nebulizers^[6]

NON PHARMACOLOGICAL TREATMENT

- Removal of allergens
- Structured patient education: improved self management leading to better symptomatic control, reduction of the number of asthma attacks and emergency situations, improved quality of life.
- Physical Training (reduction of asthma symptoms, improved exercise tolerance, improved quality of life)
- Respiratory therapy and physiotherapy (ed. Breathing techniques, pursed lip breathing)
- Smoking cessation (with medical and non-medical aids, if necessary)
- Psychosocial treatment approaches
- For obese patients, weight loss^[7]

MATERIALS AND METHODS:

Data Source: All the data required for the particular study was collected from case record of the subjects and via direct patient interviews as well as from their respective care takers. All the relevant information was being gathered using proforma. The study was conducted after getting the approval of Research and Ethical Committee of Cosmopolitan Hospital, Thiruvananthapuram.

Study population: Patients were taken from the Pulmonology department of Cosmopolitan Hospital. Informed consent was obtained. The study was conducted for a period of 2 months.

Assessment of Medication Adherence and Quality of Life : Details were collected from patient case records and via direct patient interview . All the information gathered were recorded in respective questionnaire for future assessments.

Statistical Analysis: Comparison of Medication Adherence and QOL before and after counselling was analyzed by paired t test according to the nature of the data.

OBSERVATION AND RESULTS

The proposed study entitled “A PROSPECTIVE OBSERVATIONAL STUDY ON THE ASSESSMENT OF PRESCRIBING PATTERN AND MEDICATION ADHERENCE OF ASTHMATIC PATIENTS IN A TERTIARY CARE HOSPITAL” was carried out in a multi specialty tertiary care hospital .In this study the data was collected from 10 patients who fulfilled the inclusion criteria and their prescription was analyzed. Most commonly prescribed drugs were Leukotriene antagonist i.e Montelukast and ICS followed by Methyl Xanthines. This study also aims to improve quality of life and medication adherence after the subjects being counselled.

DEMOGRAPHIC DETAILS OF THE PATIENTS

The demographic details of the patients were collected and recorded.

AGE WISE DISTRIBUTION

Table 1: Age Distribution in Study Population

AGE WISE DISTRIBUTION	NUMBER OF PATIENTS	PERCENTAGE(%)
18-40	1	10%
41-60	5	50%
61-80	4	40%
81-100	0	0

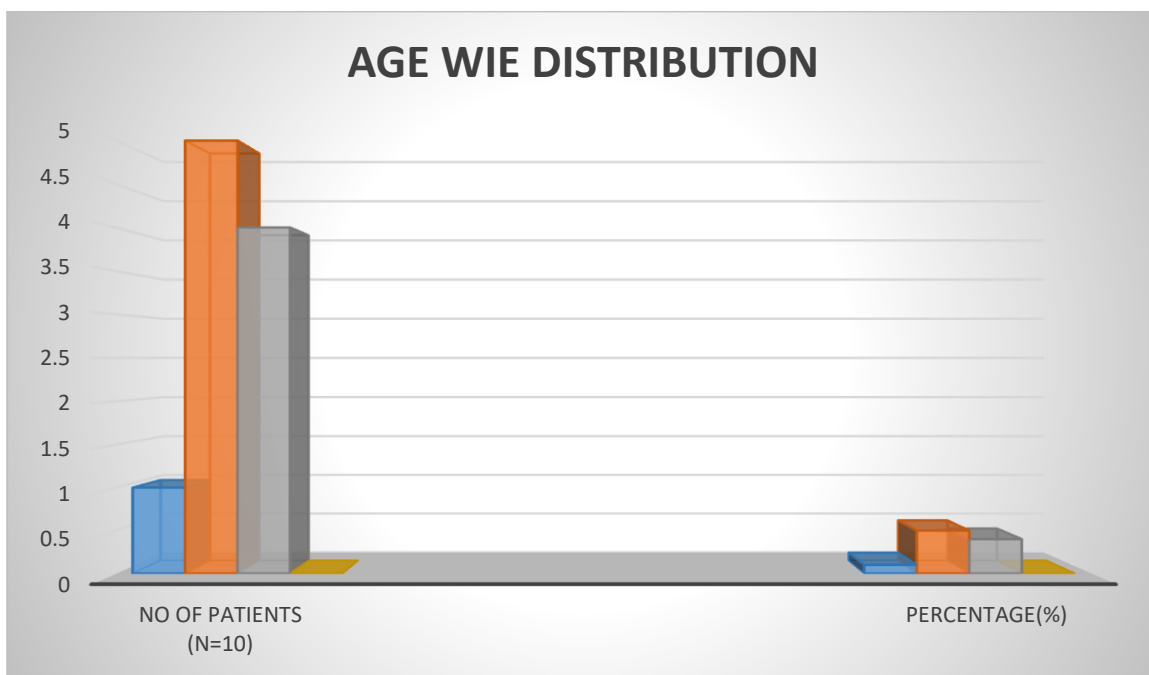


Fig 1 : Diagrammatic Representation of Age wise distribution of study population

In this study patients above age 18 were included. It was observed that majority of the patient presenting with asthma were above 40 years

PERCENTAGE DISTRIBUTION OF PATIENTS BASED ON GENDER

Percentage distribution of patients based on gender is shown in the following table

Table 2: Percentage distribution of patients based on gender

GENDER	NO. OF PATIENTS (n=10)	PERCENTAGE (%)
FEMALE	6	60%
MALE	4	40%

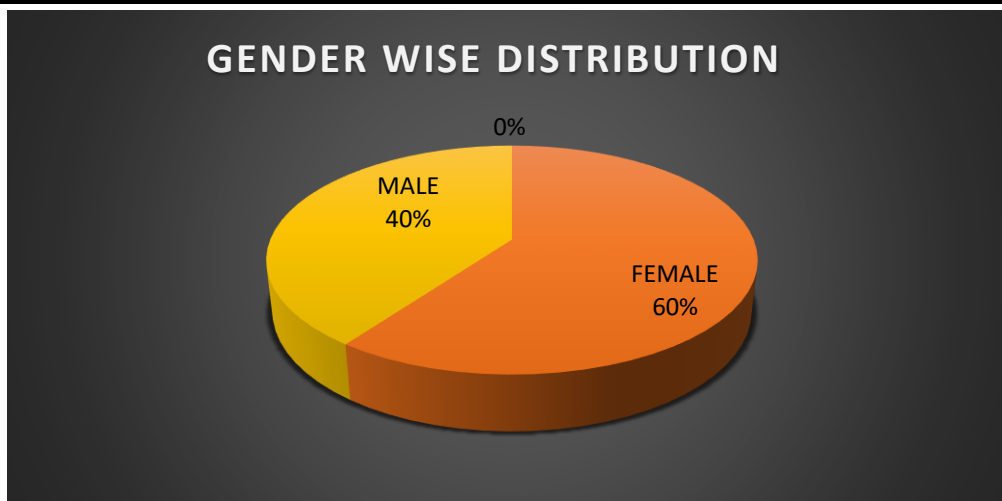


Fig 2:Diagrammatic representation of patients based on gender

Amongst a total of 10 patients included in this study, a preponderance of female patients was observed. In this study 6 patients were female (60%) and the rest 4 were male (40%) patients.

ROUTE OF ADMINISTRATION

Out of 28 prescribed, 19 (68%) were prescribed with oral dosage forms and rest 9(32%) via inhalational route. Among the 10 prescriptions route of administration of drugs were compared among these the oral route was found to be more prominent than inhaled route of administration.

ROUTE OF ADMINISTRATION	NO. OF DRGS	PERCENTAGE
ORAL	19	68%
INHALATIONAL	9	32%

Table 3: Route of administration of drug

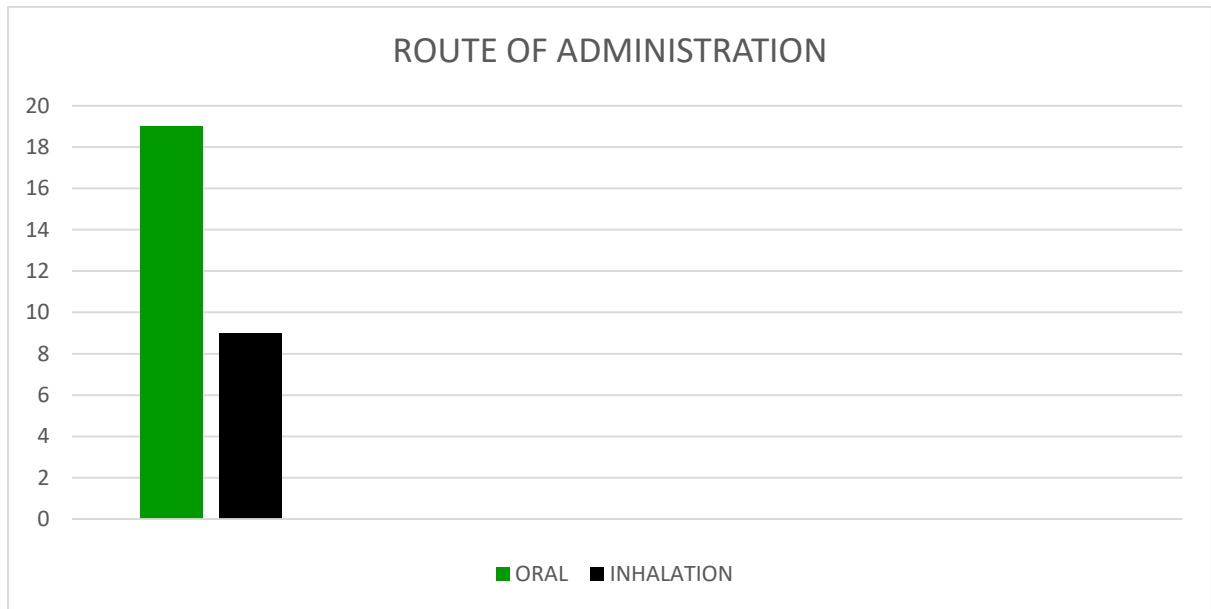


Fig 3. Diagrammatic representation of Route of Administration

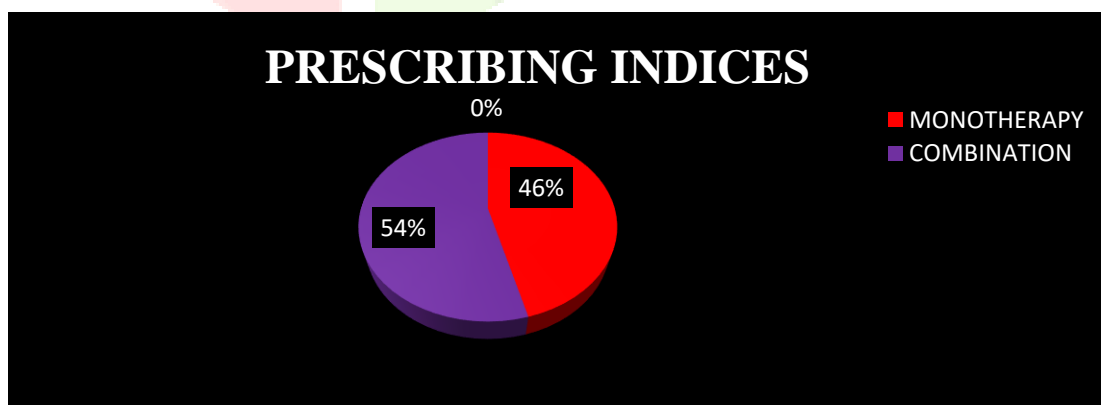
PRESCRIBING INDICES

Among 10 patients 54% combination therapy was given and 46% monotherapy was given. the results of this study showed that most of the patients received multiple drug therapy as compared to a single drug therapy.

Table 4 Prescribing indices

PRESCRIPTION INDICES	NO. OF DRUGS	PERCENTAGE
MONOTHERAPY	11	46%
COMBINATION THERAPY	13	54%

FIG 4: Comparison Between Monotherapy And Combination Therapy



DRUGS USED IN ASTHMA

The overall utilization of anti - asthmatic drugs among adults of 10 patients were found to be leukotriene antagonists (36%) inhaled corticosteroids (31%),methyl xanthines (18%), beta agonists (11%), anti cholinergics(4%).

ASTHMATIC DRUGS	LEUKOTRIENE ANTAGONISTS	INHALED CORTICOSTEROIDS	METHYL XANTHINE	BETA AGONISTS	ANTICHOLINERGICS
NO. DRUGS	10	9	5	3	1
PERCENTAGE	36%	31%	18%	11%	4%

Table 5: Drugs used in asthma

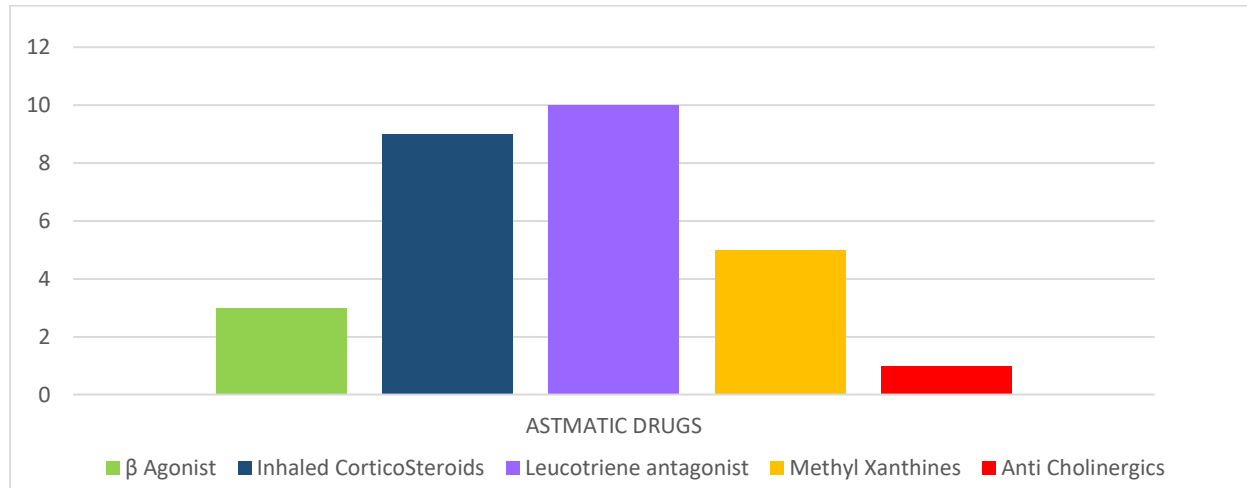


Fig 5: Graphical Representation of Drugs Used In Asthma

Parameter	Details
Total no. of prescriptions	10
Total no. of drugs prescribed	28
Average drugs per prescription	2.8
No. of asthmatic drugs as monotherapy	11
No. of asthmatic drugs as combination therapy	13

MEDICATION ADHERENCE IN PATIENTS USING INHALERS

The group of patients taking anti-asthmatic drugs were interviewed and it is found that medication adherence has been improved after counselling

MEDICATION ADHERENCE	BEFORE COUSSELLING	AFTER COUSSELLING
MEAN SCORE	23.83	47.5
STANDARD DEVIATION	3.92	5.92

Table 6: Medication Adherence In Patients Using Inhalers

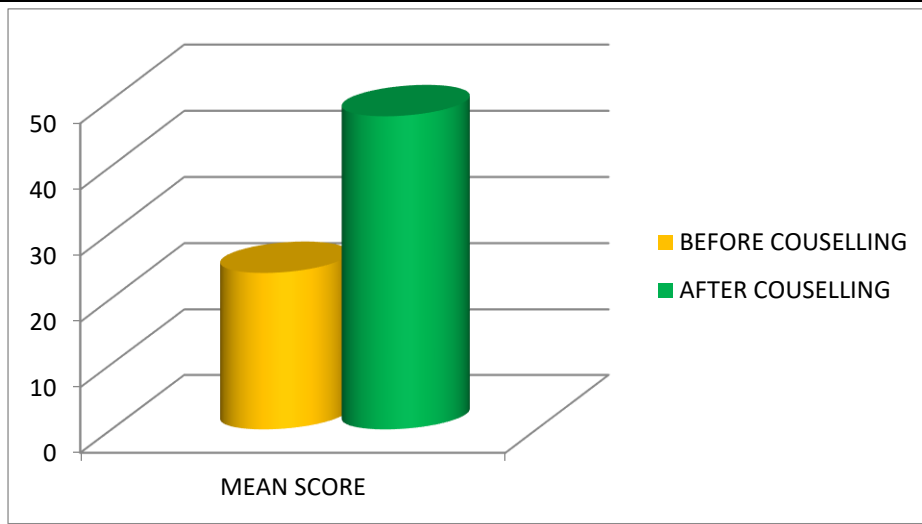


Fig:6 Medication Adherence In Inhalers

MEDICATION ADHERENCE IN PATIENTS USING ORAL DRUGS

The group of patients taking anti-asthmatic drugs was interviewed and it is found that medication adherence has been improved after counseling

MEDICATION ADHERENCE	BEFORE COUNSELING	AFTER COUNSELING
MEAN SCORE	27.5	41.25
STANDARD DEVIATION	9.81	3.59

Table 7: Medication Adherence In Patients Using Oral Drugs



Fig 7 : Diagrammatic Representation Medication Adherence In Oral Drugs

ASSESSMENT OF MEDICATION ADHERENCE BEFORE COUSELLING

Before the counselling was conducted, the mean score for medication adherence of oral drugs was found to be 27.5 and inhalation was found to be 23.83

MEDICATION ADHERENCE BEFORE COUSELLING	ORAL	INHALATIONAL
MEAN SCORE	27.5	23.83

Table 8: Medication Adherence Before Couselling

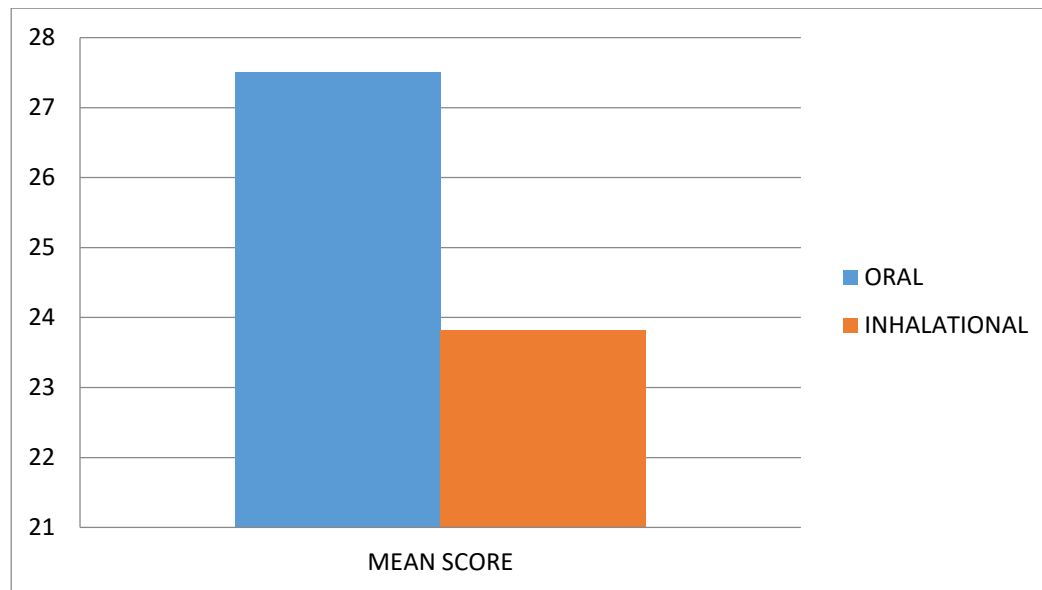


Fig 8: Graphical Representation of Medication Adherence Before Couselling

ASSESSMENT OF MEDICATION ADHERENCE AFTER COUSELLING

After the counseling was conducted, the mean score for medication adherence of oral drugs was found to be 41.25 and inhalation was found to be 47.5 that is the medication adherence was improved

MEDICATION ADHERENCE AFTER COUSELLING	ORAL	INHALATIONAL
MEAN SCORE	41.25	47.5

Table 9: Medication Adherence After Counseling

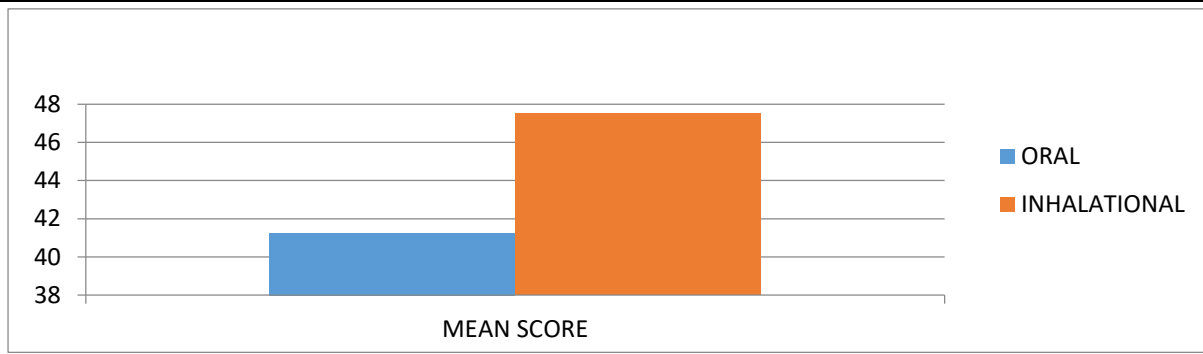


Fig 8: Graphical Representation of Medication Adherence After Counselling

QUALITY OF LIFE

Before and after the counselling was conducted, the mean score for quality of life were found to be 4.87 ± 0.768 and 6.34 ± 0.627 and the standard deviation for quality of life were found to be and

Quality of life	Before counseling	After counseling
Mean score	4.87	6.34
Standard deviation	0.768	0.627

Table 9: Quality of Life Before and After Counselling

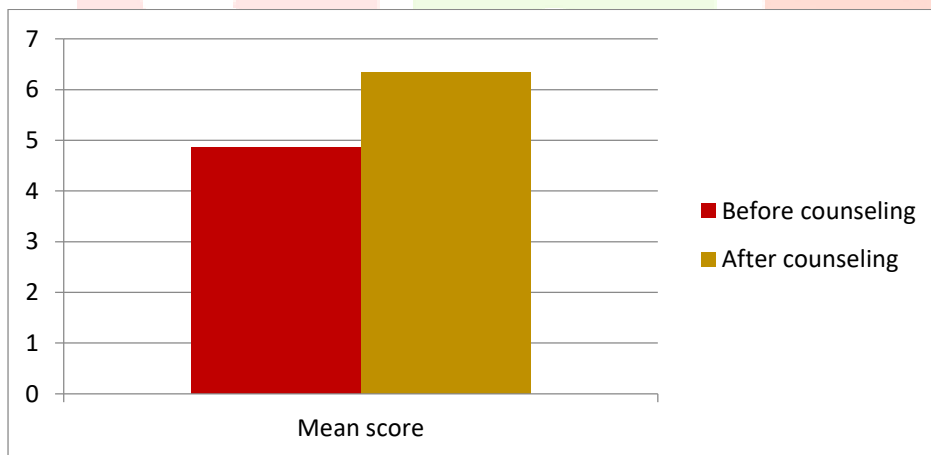


Fig 9: Graphical Representation of Quality of Life Before and After Counselling

Discussion

Asthma is characterized as a chronic inflammatory condition affecting the airways, resulting in increased sensitivity, obstruction, excessive mucus production, and structural changes in the airway walls. It is a persistent inflammatory disorder involving various cellular components, leading to repetitive instances of wheezing, shortness of breath, chest constriction, and coughing in susceptible individuals. These episodes typically coincide with restricted airflow. Asthma is usually treated with Beta agonist, Inhaled corticosteroids, Leukotriene antagonist, Anticholinergic and Methyl Xanthine .

In our study mainly 3 objectives were included in this study, which are to assess the prescribing pattern in asthmatic patients then to investigate the medication adherence in asthmatic patients and finally to evaluate the quality of life of selected population. Here we included 10 as the samples for conducting the pilot study and the 3 objectives were studied accordingly.

Medication Adherence will be assessed using AAMQ [Adherence to Asthma Medication Questionnaire] [8]. It contains 13 questions and is scored out of 65 for inhaler users and out of 50 for non-inhaler asthma patients. It is divided into 3 categories as poor, moderate and excellent adherence.

Quality of life will be assessed using AQLQ [Asthma Quality of life questionnaire with standardized Activities] [9]. It contains 32 questions and each question is scored from 1 -7. It is a 7-point Likert scale with 1 representing maximal impairment and 7 representing no impairment in quality of life.

According to our study leukotriene antagonist and inhaled corticosteroids are the most prescribed drugs while anticholinergics is less used one.

The observation of our study was found to be similar to that of *Sharad Karki et al;*(2017) **ASSESSMENT OF PRESCRIBING PATTERNS OF DRUGS USED IN ADULT ASTHMA PATIENTS IN A TERTIARY CARE HOSPITAL**. The research was conducted in the Department of Respiratory Medicine in a tertiary care hospital. In this study a total of 81 prescriptions were analyzed and the overall utilization of anti-asthmatic drugs was found to be Beta agonists, Inhaled corticosteroids, Methyl Xanthine, Leukotriene antagonists and Anticholinergics [10].

The observation of our study was found to be similar to that of *Bartosz Uchmanowicz et al;*(2016) **CLINICAL FACTORS AFFECTING QUALITY OF LIFE OF PATIENTS WITH ASTHMA**. This study conducted in the Allergy Clinic of the Wroclaw Medical University Department and Clinic of Internal Diseases, Geriatrics and Allergology. This study comprised of 100 patients and used Asthma Quality of Life Questionnaire and Asthma Control Test to measure the quality of life of patients. It is found that those asthmatic patients with better symptom control have improved quality of life [11,12].

The observation of our study was found to be similar to that of *Marjolein Engelkes et al;*(2014) **MEDICATION ADHERENCE AND THE RISK OF SEVERE ASTHMA EXACERBATIONS : A SYSTEMATIC REVIEW** This study concluded that good adherence is associated with lower risk of severe asthma exacerbations.

AAMQ is used to evaluate medication adherence, we found that 23.83 is value before counselling and 47.5 is the value found after counselling in patients using inhalers, along with that value before counselling in orally drug administering patients was found to be 27.5 and after counselling value is 41.25, this indicate that medication adherence improved after counselling process [13,14].

AQLQ is used to assess quality of life of the patients mean score before counseling is 4.87 and after counseling is 6.34, this indicate improvement in quality of patients after counselling.

CONCLUSION

The overall utilization of anti-asthmatic drugs among adults of 10 patients were found to be leukotriene antagonists (36%) inhaled corticosteroids (31%), methyl xanthines (18%), beta agonists (11%), anti cholinergics(4%). The quality

of life, as assessed by the Asthma Quality of Life Questionnaire (AQLQ), demonstrated improvement following counselling. Medication adherence was assessed using the Adherence to Asthma Medication Questionnaire (AAMQ) and exhibited enhancement subsequent to counselling intervention.

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