

## Analysis of Corticosteroid Medication Pattern in a Tertiary Care Hospital

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**ABSTRACT:** Prescription of medications like corticosteroids are common for in-patient in a tertiary care hospital, so the prescription pattern of corticosteroids in hospitals needs to be under monitoring, analyzed, feedbacks and suggestion about this specified hormonal drugs, that should be communicated to the drug prescribers in relation of their benefits and adverse

effects. The objective to evaluate drug prescribing pattern and disease pattern of corticosteroids in patient under corticosteroid therapy at departments of a teaching hospital. This study is considered as a Retrospective and prospective, randomized observational Study during 6 month which is based on 140 samples of inpatient wards at a tertiary care by the following up the cases with corticosteroids. We decided to inclusive Patients who are under corticosteroids therapy (oral/systemic), male patients and non- pregnancy women in the tertiary care hospital and inclusive of Patients who are under corticosteroids therapy (oral/systemic), male patients and non- pregnancy women in the tertiary care hospital. 81(57.85%) patients are male and 59 (42.14%) female, From this amount patients are classified in to three classes of ages as Age less than 20, Age between 21 to 5, Age more than 51(2.85% 7.14% 90%), diabetic mellitus and hypertension are the most past history and patients are diagnosed with inflectional diseases and after that respiratory disease, therefore the most indications is bronchitis that are requested to use of corticosteroids by physicians. Hydrocortisone (19.42%) and they are given totally in injection dosage form; Budesonide was given to (70%) than they are given as nebulization form. Corticosteroids are mostly prescribed for diagnosed inflectional respiratory diseases and bronchitis indications, budesonide and hydrocortisone are most prescribed corticosteroids than other type of same class by the physicians, corticosteroids are more liked to use in male than females than in age more than 51 years old.

**KEYWORDS:** Corticosteroid, Overprescribing, Budesonide, Hydrocortisone .

### I. INTRODUCTION

Pharmacy-epidemiology studies using health databases are a powerful means of assessing drug use and health impact in clinical practice but are subject to several biases. Merging with individual patient medical records reduces limitations; it provides patient characteristics which can assess the magnitude and direction of biases and prescribing details which can identify controller medications prescribed for intermittent, rather than maintenance, use and to assess the quality of prescription. Although low drug claims are frequently attributed to inadequate these patient. <sup>1</sup>, Drug utilization research is one of the most important in the health world of prescriptions, this research are essential to control the prescription and value the treatment of the patient ,drug utilization studies can be explain us must favourite of the prescribers in the prescription of the drugs that is exposed to diagnosed diseases. Whether they are help full deter mine drugs specifications as their quality and quantity, infuse in the use cycle of drugs, to facilitate the rational use of the drugs by the physicians and patients in exact proper therapy. Prescription of medications like corticosteroids are tertiary care hospital ,so the prescription pattern of corticosteroids in hospitals needs to be under monitoring analyzed, feedbacks and suggestion about this specified to the drug prescribers in relation of hormonal drugs, that should be communicated their benefits and adverse effects.<sup>3</sup>

Role of corticosteroids: Corticosteroids play a vital role in the treatment of many diseases including chronic obstructive pulmonary disease (COPD), asthma, sepsis, painful and inflamed. joints, muscles and tendons, inflammatory bowel disease (IBD), allergic rhinitis and hay fever, skin diseases such as inflammatory, rash and itching probably, it has greater applications in anti-inflammatory actions and also dermatological practice in topical form. These drugs are extensively

prescribed by the consultants because of their strong immunosuppressive and anti-inflammatory actions. Overprescribing of these drugs and, thereby, increasing adverse drug reactions." They are widely prescribed medication in dermatology clinics. This requires essential care in the selection of corticosteroid drugs for use and their dosage regimen. The anti-inflammatory properties of the corticosteroids are the primary reason for their use; the mechanisms of the same useful anti-inflammatory properties are also the reason for their adverse effects. Other application disadvantages are adrenal

#### Community use of corticosteroids

Respiratory disease is a type of disease that affects the lungs and other parts of the respiratory system. Respiratory diseases may be caused by infection, by smoking tobacco, or by breathing in secondhand tobacco smoke, radon, asbestos, or other forms of air pollution. Respiratory diseases include asthma, chronic

obstructive pulmonary disease (COPD), pulmonary fibrosis, pneumonia, and lung cancer. Also called lung disorder and pulmonary disease. Lower respiratory tract infection (LRTI), while often used as a synonym for pneumonia, can also be applied to other types of infection including lung abscess and acute bronchitis. Symptoms include shortness of breath, weakness, fever, coughing and fatigue."

Inflammation disease is when the immune system attacks the body's own tissues, resulting in inflammation. Rheumatoid arthritis is an example of an inflammatory disease; inflammation is the body's normal response to illness and infection. But sometimes inflammation can be misdirected. The immune system attacks healthy tissue instead. Gastrointestinal diseases (abbrev. GI diseases or GI illnesses) refer to diseases involving the gastrointestinal tract, namely the esophagus, stomach, small intestine, large intestine and rectum, and the accessory organs of digestion, the liver, gallbladder, and pancreas. An allergy is an immune system response to a foreign substance that's not

typically harmful to your body. These foreign substances are called allergens. They can include certain foods, pollen, or pet dander. Your immune system's job is to keep you healthy by fighting harmful pathogens. In 1977, the WHO described the marketing, distribution, prescription, and use of drugs in a society as the drug utilization research, with particular stress on the. Such studies form the consequences of medical, social, and economic aspects. Influential exploratory tools to determine the role of drugs in the society. They give rise to a strong social medical and health economics. Corticosteroids are used for so many indication but mostly they are used for anti-inflammatory activities in many cases such as COPD, asthma, gastric disorders, pneumonia and also they are use in dermal disease as rash, itching, redness and other dermal condition and it is because of the their high and may fast effects among corticosteroids that are currently and likely prescribed by the hospitals can be as the budesonides, prescribers within the hydrocortisones, dexamethasone, and prednisolone in deferential cases of the diseases or in other hands the are most available and useable by the physicians for the patients. Different class and prescription of corticosteroids the choice of specific corticosteroid is determined by various factors such as accuracy of diagnosis, age, socioeconomic status of the patients and personal experienced of the clinician. due to these various factors it is difficult to make any continuous basis is specific recommendation and hence drug utilization study on essential to provide the clinician an opportunity to review and make appropriate revision in the management of their patients since drug assessment studies are scanty on use of corticosteroid, which is required to be in continuous updated corticosteroids are several in their type and based on their action, among them dexamethasone in different dose and hydrocortisone, budesonides, prednisolone, routes are the common prescribed corticosteroids by the drug prescribers within the hospitals corticosteroids, often known as steroids, are an anti-inflammatory medicine prescribed for a wide range of conditions.

corticosteroids are available in different forms, including: tablets (oral steroids) injections - which can be into blood vessels, joints or muscles inhalers - such as mouth or nasal sprays lotions, gels or creams (topical steroids).

TABLE 1 : Dosage form of Hydrocortisone

Hydrocortisone		
Dosage Form	Tablet	Powder for Injection
Dose Available	5mg	100mg
	10mg	250mg
	20mg	500mg
		1g

TABLE 2 : Dosage form of Budesonide

Budesonide				
Dosage Form	Inhaled	Nebulizer	Tablet	Capsule
Dose Available	90mcg/actuation	0.25mg/mL	9mg	3mg
	180mcg/actuation	0.5mg/mL		
		1mg/mL		

TABLE 3 : Dosage form of Prednisolone

Prednisolone		
Dosage Form	Tablet	Oral Solution
Dose Available	1mg	1mL
	2.5mg	5mL
	5mg	
	10mg	
	20mg	
	50mg	

TABLE 4 : Dosage form of Dexamethasone

Dexamethasone			
Dosage Form	Tablet	Injection	Elixir/ Oral Solution
Dose Available	0.5 mg	4mg/mL	0.5mg/5mL

	0.75 mg	10mg/mL	1mg/5mL
	1 mg		
	1.5 mg		
	2mg		
	4mg		
	6mg		

Previous studies about corticosteroids. Corticosteroids are group of hormonal drugs which are favorite for prescribers among of the other medications because of their strong (long and short term) effect in the cycle of diseases. Corticosteroids can act in short duration of time to give the required effect along with their long duration in specific diseases. There are several research study has been done about corticosteroids with their adverse drug reaction, about their duration of action, dosage form, and also mechanism of action of the corticosteroids. All of these studies are done to find out this medication determination information's and use of them in rational informational data to give helpful hand to prescribers among of corticosteroids.<sup>2</sup> There are so many studies had done about corticosteroids to identify their properties of use in different area on the world. These studies were about corticosteroids adverse drug reactions, different actions with foods and drugs, their effectiveness and mechanism of actions in each and specific conditions and diseases

## II. OBJECTIVE

Primary objective:

- To evaluate drug prescribing pattern of corticosteroids in patient under corticosteroid therapy at departments of Bangalore Baptist Hospital, a teaching hospital in Bangalore.
- To determine the pattern of corticosteroids prescribing in the relation of patient and prescriber attributes to corticosteroid preparation prescribed.

## III. METHODOLOGY

Study design:

This study is considered as a Retrospective and prospective, randomized observational Study which is based on inpatient wards at a tertiary care by the following up the cases with corticosteroids therapy and prescription

also about corticosteroids prescription by the physicians in the different forms and roles. Within most of this studies there are same and nearby themselves results about pattern and prescription of corticosteroids that they are absorbed budesonide and hydrocortisone are including higher use than after them prednisolone is in second place of use and prescription of the corticosteroids."

In this study, Corticosteroids are among of the most widely prescribed agents in ambulatory medicine. Different chemical entities were marketed as corticosteroids in the United States and India, Most were available in various concentrations and dosage forms; thereby it is required to assess the pattern of this medication in what propose they are used. This study use to evaluate the disease pattern and prescribing pattern of corticosteroids among inpatients in the departments of a tertiary care teaching hospital and also with in this study we considering doses, frequency and dosage form of the corticosteroids.

- To evaluate the disease pattern of corticosteroids among inpatients cases under corticosteroid- therapy.

Secondary objective:

- Help To prepare a safety informational guideline about corticosteroids use to health care professionals in the hospital.
- To give vital essential information about corticosteroids to prescribers of corticosteroids.

in all the wards in BBH. This study can be includes an active search for the cases or patients which are prescribed for corticosteroids. We were be focusing on corticosteroids use in patients with corticosteroids therapy when they are prescribed by the related physician.

Source of data and Materials:

In this study we consider to collect our data from available sources Inpatient prescription, Medication chart, Medication history chart, Medicine strips, Medication history interview.

**Inclusive Criteria:**

Under this study we decided to inclusive Patients who are under corticosteroids therapy (oral/systemic), male patients and non- pregnancy women in the tertiary care hospital.

**Exclusion Criteria:**

We considered excluding the Pregnancy women and Patients in OP department in this study.

**Method of collection of data:**

Data will be collected by a customized patient data collection form, which includes the total dose of each drug administered and also the day and frequency of use of drug, all detail of diseases specifics, past history of patients in disease and current medications, this form are includes informational detail about patients personal information after completing each and

every case they are recorded in a excel form and kept for last calculation of results in percentages we objected.

**Study procedure:**

Base on this study a retrospective and prospective randomized study was planned to conduct Bangalore Baptist hospital in all inpatient wards for corticosteroids which are prescribed by physicians. A prepared customized data collection form for measuring corticosteroid use is performed. Therefore the treatment of corticosteroids will be recorded along with total detail of treatment (rote, daily dose, days of treatment, total dose) in this prepared form.

**IV. OBSERVATION**

Total 140 patients are considered in this study during six month of study on the corticosteroids pattern in a tertiary care hospital. 81(57.85%) patients are male and 59 (42.14%) female are found in this study in this study base on gender (Table 5) (fig 1)

TABLE 5 : Patient’s Demography based on the Gender.

Patient demography	No. of the participants	Percentage (%)
Total patient	140	100%
Male	81	57.85%
Female	59	42.14%

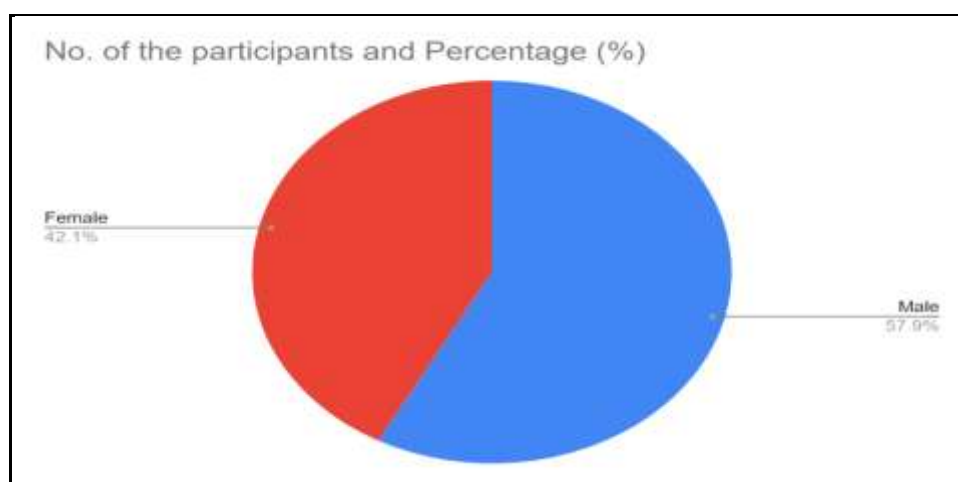


TABLE 6 : Patient Demography based on the Age

Patients are classified in to three classes of ages as Age less than 20, Age between 21 to 5, Age more than 51 (Table 6), Class one were found for 4(2.85%) patients, class two were 10(7.14%)

patients and class three were 126(90%) patients, than this statistics are shows that the corticosteroids are used mostly in age of more than 51 years old than younger ages (Fig 2)

Patient demography	No. of the participants	Percentage (%)
Total patient	140	100%
Age <20 years	4	2.85%
Age 21 - 50	10	7.14%
Age >50 years	126	90%

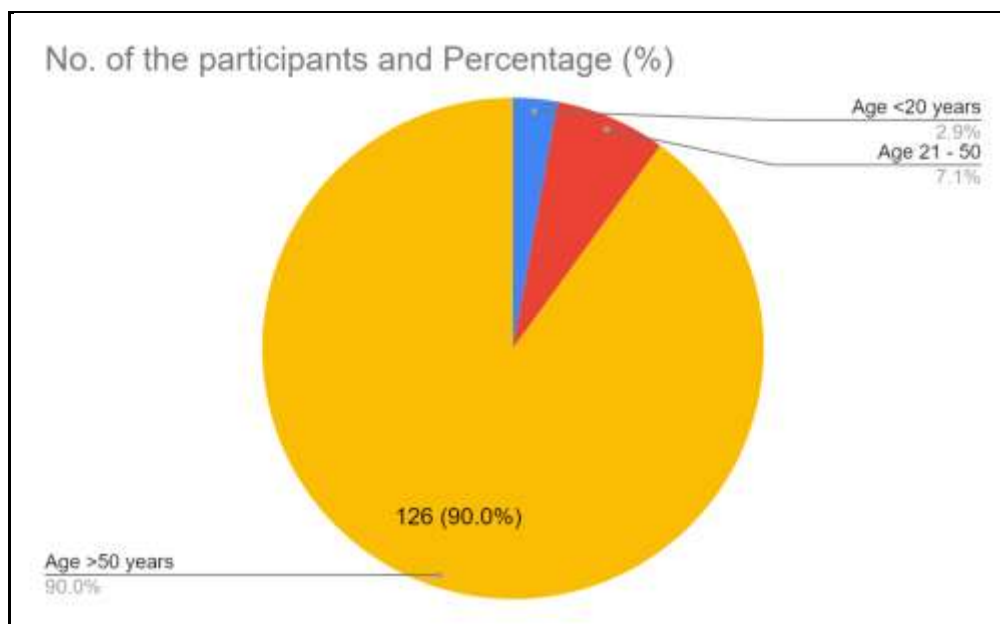


TABLE 7 : Patient Demography based on the past history

Based on this statically evidence that are observed in this study patient are presented to hospital to use of corticosteroids with past history (Table7) of the Respiratory diseases (3.57%), Diabetic mellitus (45.71%), Hypertension (38.57%), Pain and fever (5%), Accidents (7.14%),

Thyroid damages (7.85%) or any Heart diseases(5.71%), gastrointestinal disease (5.71%), other in rare conditions (21.42%); therefore diabetic mellitus and hypertension (Fig 3) are the past history that are found out in patients with corticosteroids treatment.

Patient demography (Past disease)	No. of the participants	Percentage (%)
Respiratory Diseases	5	3.57 %

Diabetic mellitus	64	45.71%
Hypertension	54	38.57%
Thyroid Disease	11	7.85%
Pain and Fever	7	5.00%
Accidents	10	7.14%
Heart disease	8	5.71%
Gastrointestinal disease	8	5.71%
Others	30	21.42%

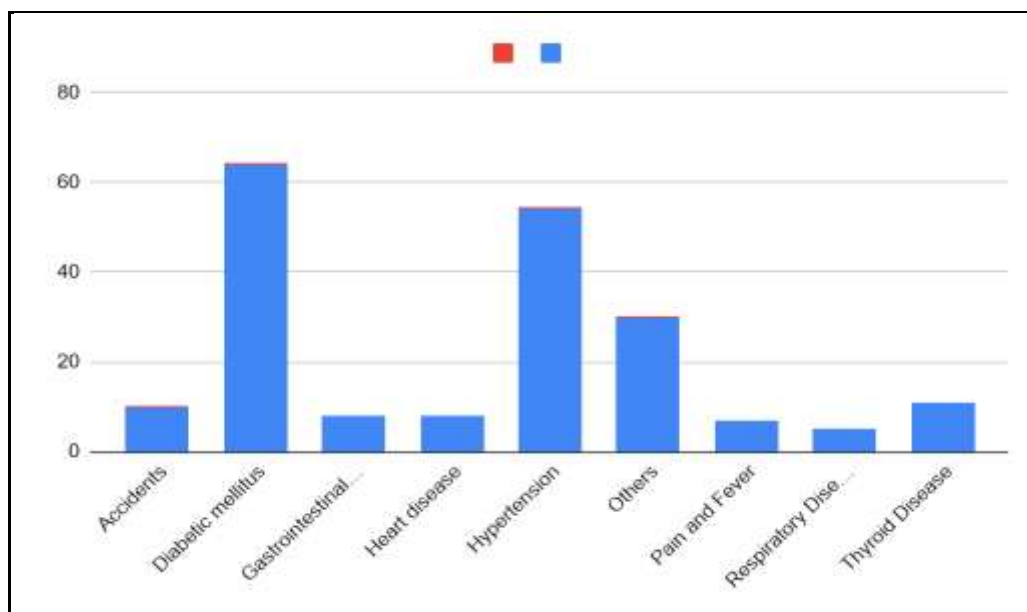


TABLE 8 : Patient Demography based on Diagnosis

From 140 patients under corticosteroids patients are registered to the hospital with found diagnosis (Table 8) such as respiratory disease (65%), heart and vascular disease (20%), brain disorders (5.71%), fever and pain (12.85%) ,

allergic reactions (2.14%), infection disease(45%), gastrointestinal disease (8.57%) and bone damage (5%). Mostly patients are diagnosed with infectious diseases and after that respiratory disease in the hospital (Fig 4).

Patient demography (Past disease)	No. of the participants	Percentage (%)
Respiratory Diseases	91	65%

Heart and vascular disease	28	20 %
Brain disorders	8	5.71%
Fever and pain	18	12.85%
Allergic reactions	3	2.14%
Infectious disease	63	45 %
Gastrointestinal disease	12	8.57 %
Bone damage	7	5%

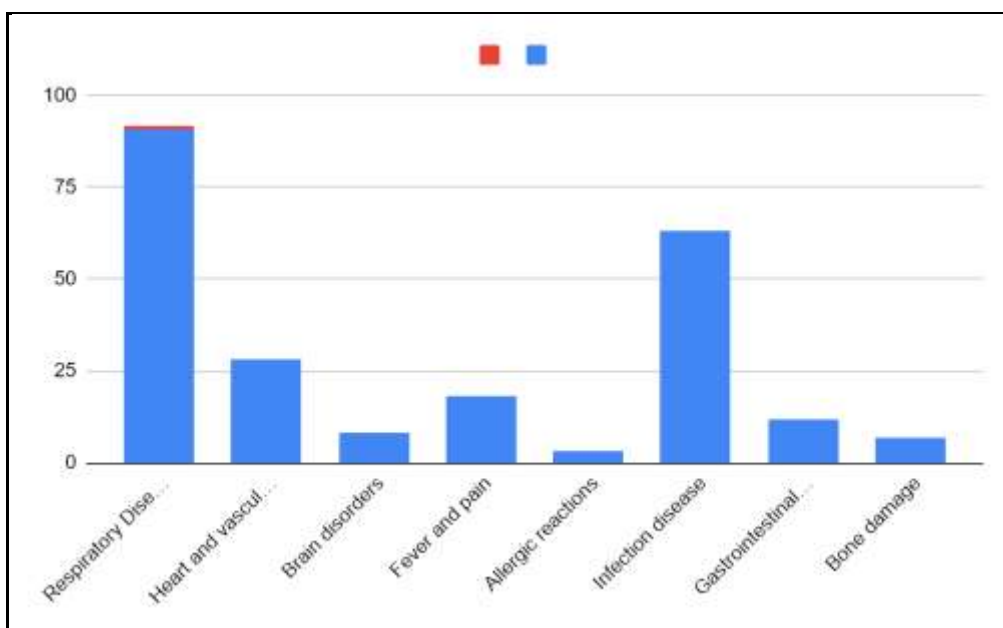


TABLE 9 : Categories of Corticosteroid use in different area / ward.

Patients are found in this study are recorded randomly in wards (Table 9) (Fig 5) As Intensive care unit (ICU) 37 patient (26.42%), intensive cardiac care unit (ICCU) 3 patients

(2.14%). High Intensive care unit (HICU) 42 patients (30%), Medicine wards 58 patients (41.42%)

Corticosteroids use in wards	No. of the participants	Percentage (%)
High intensive care unit (HICU)	42	30%



Intensive care unit (ICU)	37	26.42%
Medicine wards	58	41.42%
Intensive Cardiac care unit (ICCU)	3	2.14%

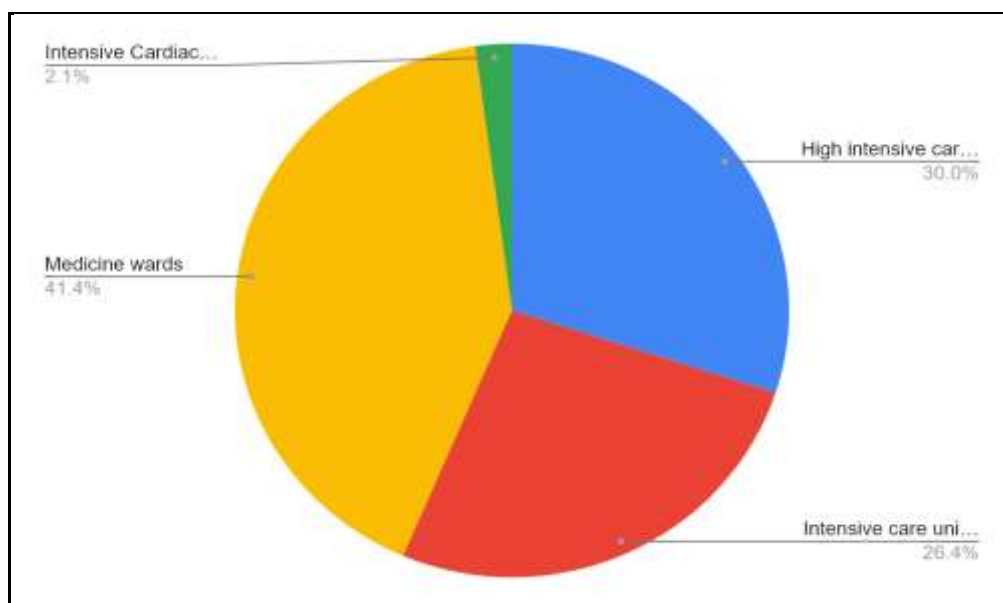


TABLE 10 : Patient identifications based on Corticosteroid Use

From 140 patients 7 patients are found that they used Steroid currently (5%) (Fig 6), 133 patients are found that they didn't have history use of corticosteroids (95%). Also we conducted that

(42 (30%)) number of patients were under polytherapy and 98 (70%) patients under monotherapy of corticosteroids (Table 10) (fig 7).

Patient demography	No. of the participants	Percentage (%)
Total patients under Corticosteroid use	140	100%
Total Steroid used currently	7	5 %
Total Steroid not used currently	133	95 %

No.of patients under polytherapy	42	30 %
No.of patients under monotherapy	98	70 %

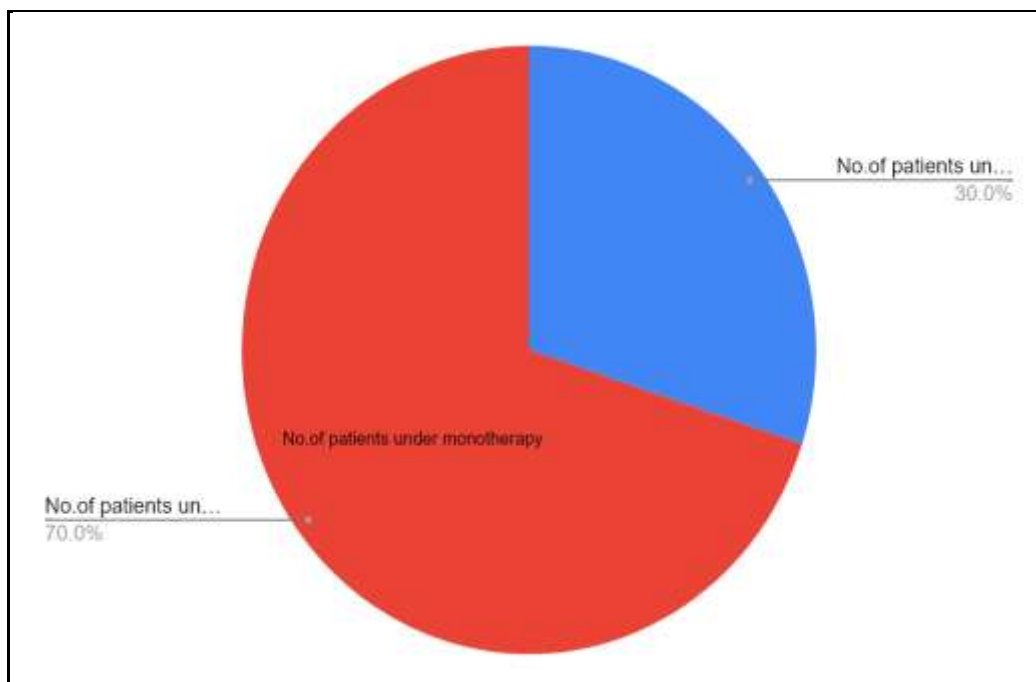
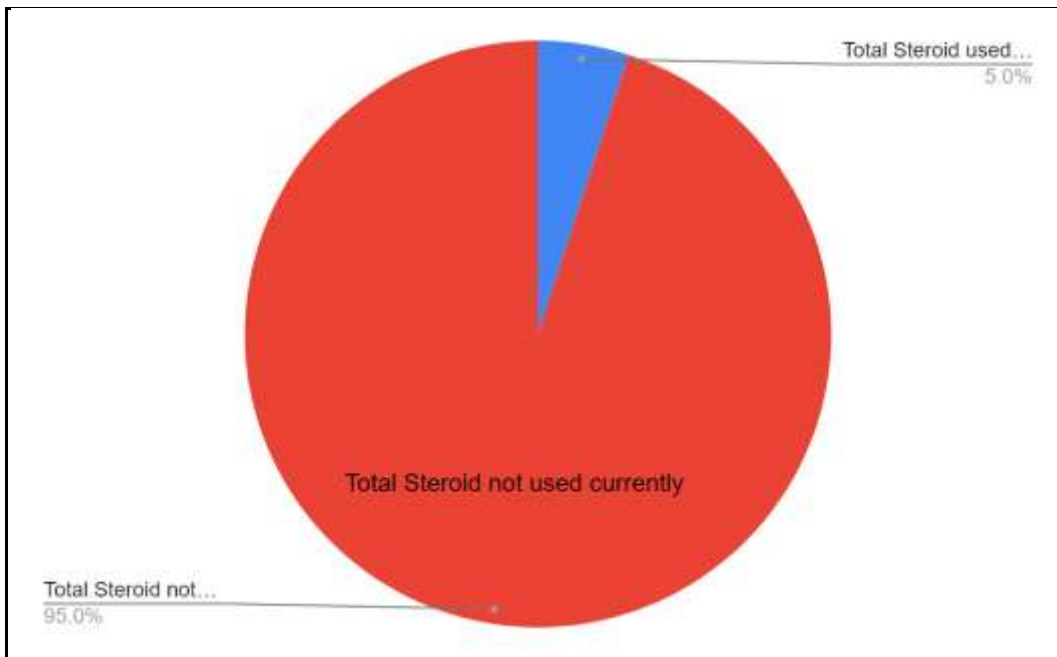


TABLE 11 : Corticosteroid drug classification

Total number of patients are 140 and around 160 drugs are used (Table 1), Hydrocortisone was given to 27 patients (19.42%) and they are given totally in injection dosage form, Budesonide was given to 98 patients (70%) than they are given as nebulization form, Prednisolone was given to 6 patients (4.31%) and they are given

orally (5(3.59%)) and injection ( 1(0.71%)) in dosage form, Dexamethasone is given to 6 patients (4.31%) that they are given orally (4(2.87%)) and injection ( 2(1.43%)) form Fludrocortisone is given to 3 patients (2.15%) and they are given orally ( 2(1.43%)) and injection form (1(0.71%)) (Fig 8 and Fig 9).

Drug Name	No. of the participants (%)	Oral usage (%)	Nebulization Use (%)	Injection Use (%)
Hydrocortisone	27 (19.42%)	0	0	27 ( 19.42%)
Budesonide	98 (70%)	0	97 (70%)	0
Prednisolone	6 (4.31 %)	5 (3.59%)	0	1 (0.71%)
Dexamethasone	6 (4.31 %)	4 (2.87%)	0	2 (1.43%)
Fludrocortisone	3 (2.15%)	2 (1.43%)	0	1( 0.71%)
<b>TOTAL</b>	<b>140 (100%)</b>	<b>11 (9.81%)</b>	<b>98 (70%)</b>	<b>31 (22.30%)</b>

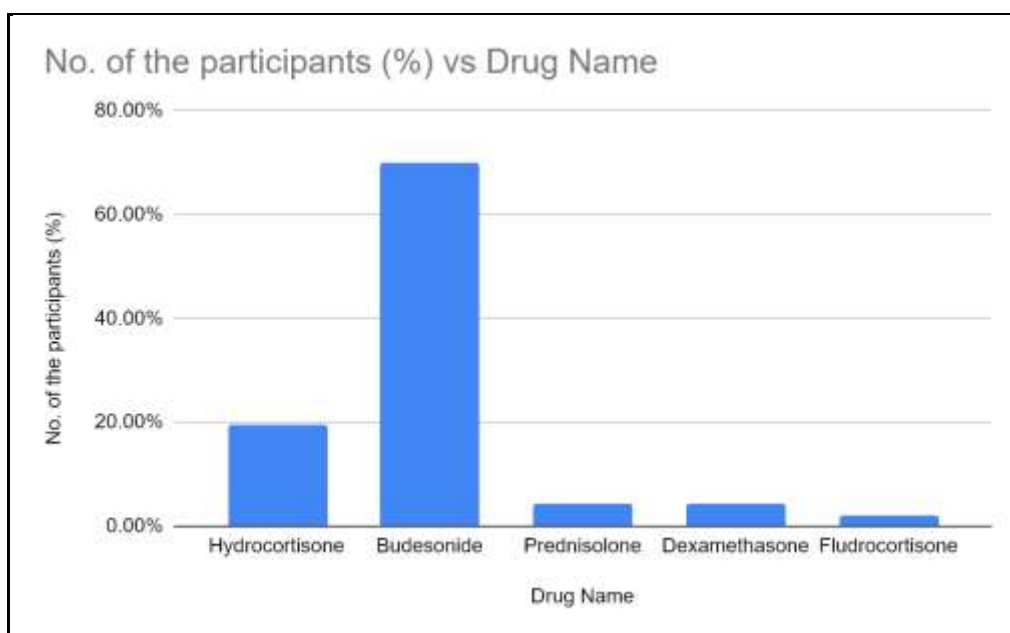


TABLE 12 : Indication for Corticosteroid Use

Most indications (Table 12) (Fig 10) that are used for purpose of use of corticosteroids were conducted where 6 patients for Allergic disease indication (4.28%), 18 patients for Anti-inflammatory indication (12.85%), 19 patients

Anti-pain use (13.57%), 86 patients for Bronchitis indication (60.71%), 11 patients for Other rare indications (7.85%). The use of corticosteroid was mostly indicated for bronchitis (60.71%).

Indication for steroid use	No. of the participants	Percentage
Allergic Disease	6	4.28%
Anti- inflammatory	18	12.85%
Analgesic	19	13.57%
Bronchitis	86	60.71%
Other	11	7.85%

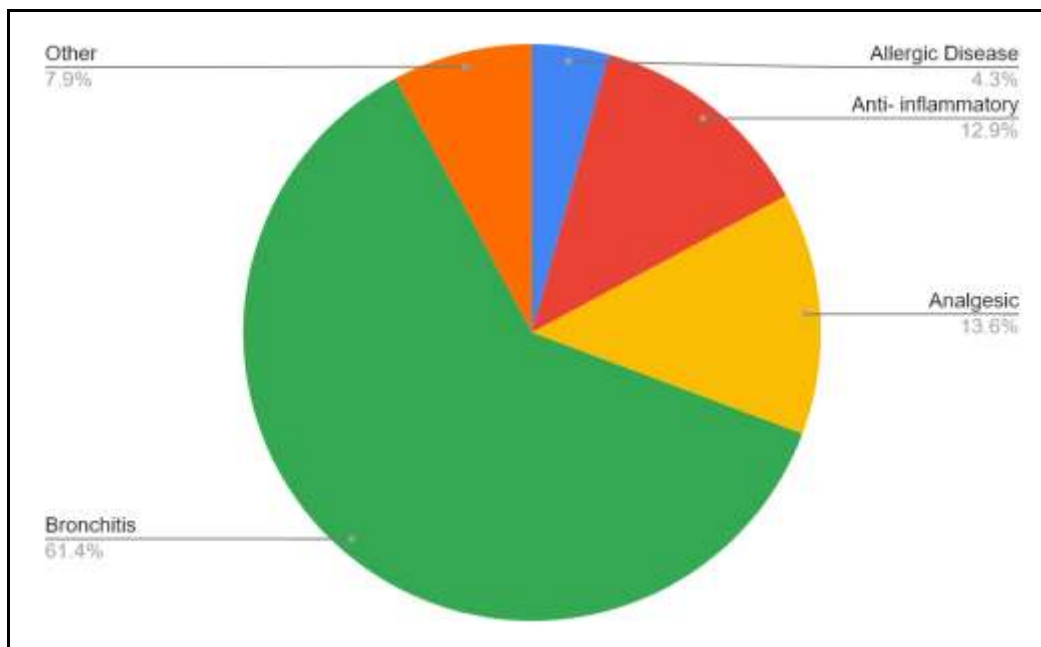


TABLE 13 : Prescribed frequency for corticosteroid use

Frequency of the corticosteroids (Table 13) are given as mostly in three in a day (79 patients (49.37%)), twice in a day (72 patients (45%)) and once in day (9 patients (5.62%)) in rare

cases. Than the three in a day that are the usually the most frequency for corticosteroids in prescriptions (Fig 11).

Frequency Available	No. of drugs	Percentage
Once in a day	9	5.62%
Twice in a day	72	45.00%
Thrice in a day	79	49.37%

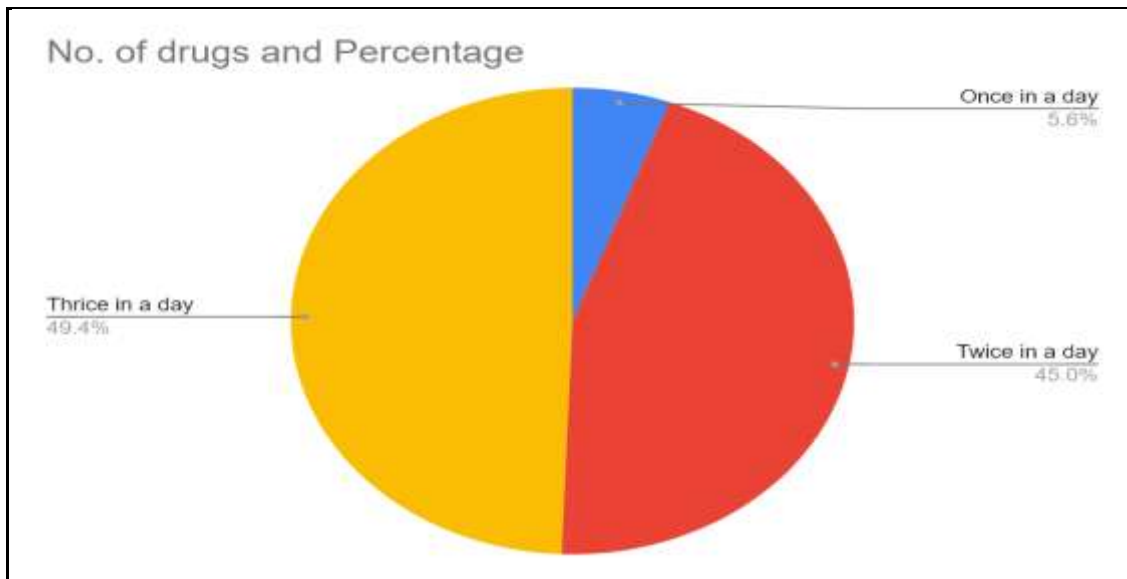
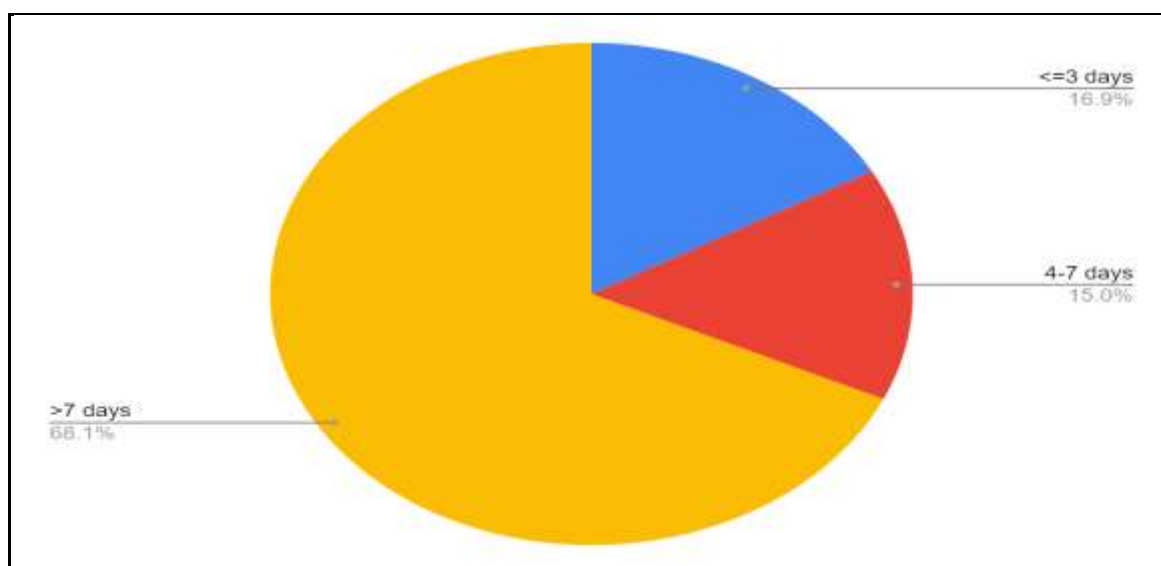


TABLE 14 : Prescribed duration of Corticosteroid therapy

In the hospital most of corticosteroids are prescribed for duration of more than 7 days (109 cases (68.125%)) and then after that days between

4 to 7 days (24cases (15%)) and minimum 3 days (27cases (16.875%)).

Days of treatment	<=3 days	4-7 days	>7 days
No. of drugs	27	24	109
Percentage	16.88%	15.00%	68%



## V. DISCUSSION

Total 140 patients are considered in this study during six month of study on the corticosteroids pattern in a tertiary care hospital. 81(57.85%) patients are male and 59 (42.14%) female are found in this study in this study base on gender. From this amount patients are classified in to three classes of ages as Age less than 20, Age between 21 to 5, Age more than 51, Class one were found for 4(2.85%) patients, class two were 10(7.14%) patients and class three were 126(90%) patients, this statistics are shows that the corticosteroids are used mostly in age of more than 51 years old than younger ages. Patients are presented to hospital and prescribed the use of corticosteroids with past history of the Respiratory diseases (3.57%) Diabetic mellitus (45.71%), Hypertension (38.57%), Thyroid disease(7.85%), Pain and fever (5%), Accidents or any bone damages (7.14%), Heart diseases(5.71%), gastrointestinal disease (5.71%), other conditions (21.42%); therefore diabetic mellitus and hypertension are the most past history that are found out in patients with corticosteroids treatment. From 140 patients under corticosteroids patients are registered to the hospital with found diagnoses such as respiratory disease (65%), heart and vascular disease (20%), brain disorders (5.71%), fever and pain (12.85%) , allergic reactions (2.14%), infection disease(45%), gastrointestinal disease (8.57%) and bone damage (5%). Mostly patients are diagnosed with respiratory disease. Patients are found in this study are recorded randomly in wards as High intensive care unit (HICU) 42 patients (30%), Intensive care unit (ICU) 37 patient (26.42%), Medicine wards 58 patients (41.42%) and Intensive cardiac care unit (ICCU) 3 patients (2.14%). Patients 7 patients are found that they used Steroid currently (5%), 133 patients are found that they didn't have history use of corticosteroids (95%). Also we conducted that (42 (30%)) number of patients were under polytherapy and 98 (70%) patients under monotherapy of corticosteroids. Around 160 drugs are used, Hydrocortisone was given to 27 patients (19.42%) and they are given totally in injection dosage form, Budesonide was given to 98 patients (70%) than they are given as nebulization form, Prednisolone was given to 6 patients (4.31%) and they are given orally (5(3.59%)) and injection (1(0.71%)) in dosage form, Dexamethasone is given to 6 patients (4.31%) that they are given Fludrocortisone is given to 3 orally (4(2.87%)) and injection (2(1.43%)) form patients (2.15%) and

they are given orally (2(1.43%)) and injection form (1 (0.71%)) are conducted as 6 patients. Most indications that corticosteroids were used for was for the following: 6 patients for Allergic disease indication (4.28%), 18 patients for Anti-inflammatory indication (12.85%), 19 patients Anti-pain use (13.57%), 86 patients for Bronchitis indication (60.71%), 11 patients for Other rare indications (7.85%). The use of corticosteroid was mostly indicated for bronchitis (60.71%).

## VI. CONCLUSION

This study can form the basis for future studies with larger number of patients followed up for a longer duration of time and which will be reflective of a full population. Corticosteroids will continue to be first line therapy for various diseases and appropriate use of these medications with narrow therapeutic index will be imperative to the minimization of cost and improve the patient according to standard guidelines without any therapeutic inappropriateness by the healthcare professionals. Corticosteroids owing to their narrow therapeutic index tend to show more adverse drug reactions if abused or misused by the patient and prescribed by the healthcare practitioners.

## REFERENCES

- [1]. Robert S. Stem, MD Boston, Massachusetts The pattern of topical corticosteroid prescribing in the United States, 1989-1991
- [2]. Saravanakumar RT\*, Prasad GS Study of prescribing pattern of topical corticosteroids in the department of dermatology of a multispecialty tertiary care teaching hospital in south India, 11-10-2012.
- [3]. Alex POLYAKOV, Saul COHEN, Patterns of antenatal corticosteroid prescribing 1998-2004
- [4]. W.M. Sweileh; Audit of prescribing practices of topical corticosteroids in outpatient dermatology clinics in north Palestine; 12/10/04
- [5]. Sanoj Varkey 1, Suchandra Sen; Prescribing Patterns of Corticosteroids in Pulmonology Department; 2012
- [6]. Kimberly G. Harmon, MD; Physician Prescribing Patterns of Oral Corticosteroids for Musculoskeletal Injuries; 18 March 2002.



- 
- [7]. Chetan Javsén. Rajesh kumar Suman; To Study Prescription Pattern of Corticosteroids in Skin OPD in Tertiary Care Teaching Hospital; 25-08-2014
- [8]. Sarkar C, Das B, Sripathi H; drug prescribing pattern in dermatology in a teaching hospital in western Nepal; March, 2002
- [9]. Bhuvana Kolar Bylappa: Drug prescribing pattern of topical corticosteroids in dermatology unit of a tertiary-care hospital; May 31, 2015
- [10]. Francine M ducharme; Clinical effectiveness of inhaled corticosteroids versus montelukast in children with asthma: prescription patterns and patient adherence as key factors.