



## A Prospective Study on Drug Utilization Evaluation of Corticosteroids among Out-Patients of Teaching Hospital

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### Research Article

Please cite this paper as Pradeep Kumar Thakur<sup>1\*</sup>, Ayesha Majid<sup>1</sup>, M. Shramik<sup>1</sup> and Shiv Kumar<sup>2</sup>. A Prospective Study on Drug Utilization Evaluation of Corticosteroids among Out-Patients of Teaching Hospital Project. IJPTP, 2015, 6(4), 2630-2634.

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### Abstract

**Background:** Corticosteroids being widely used powerful anti-inflammatory & immunosuppressive agents and have become cornerstone of therapy in acute and chronic inflammatory diseases. Corticosteroids though they are life-saving drugs, produce adverse reactions which may be mild or life threatening. Considerable attention should be given to relative risks & benefits, benefits definitely outweighing the risks & individualization of treatment is necessary.

**Objective:** This study was aimed to evaluate the utilization of corticosteroids in OPD patients with the secondary objective to assess co-prescription with corticosteroids, the nature and severity of drug-drug interactions, with an intention to prevent the inappropriate use of corticosteroids.

**Methods:** A prospective observational study was carried out in 109 Out-patients from various departments of the hospital during 6 months period and subjected to statistical analysis.

**Results:** Out of total 109 prescription scrutinized, both male and female were almost equally prescribed and maximum were from mid aged group. Most of patients were from dermatology ward (60.5%) and were prescribed of corticosteroids with monotherapy (90.8%). The total number of drug prescribed was 3 to 4 in most of the patients and the average number was 3.67. Most of the patients were prescribed corticosteroids for not more than 1-2 weeks. The clobetasone was found to be most widely prescribed through the topical route. The drug interaction

was found to be considerably low and most concurrent drug administered was antibiotics.

**Conclusion:** We found all the prescriptions were rational. Most of all patients were diagnosed well and were prescribed corticosteroids by maintaining pharmacokinetic and pharmacodynamic parameters. Educational interventions among physician, patients as well as students should be carried out in order to further enhance rational drug use.

**Keywords:** Corticosteroids, Drug Utilization, Drug-Drug Interactions, Out-patient

### Introduction

The World Health Organization (WHO) in 1997 defined drug utilization as the marketing, distribution, prescription and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences. Drug utilization research is an essential part of pharmacoepidemiology as it describes the extent, nature and determinants of drug exposure<sup>[1, 2]</sup>. DUE allows the pharmacist to document and substantiate the benefit of pharmacy intervention in improving therapeutic and economic outcomes.

It involves a comprehensive review of patient's prescription and medication data before, during, and after dispensing in order to assure appropriate therapeutic decision making and positive patient outcomes. Pharmacists participating in DUE programs can directly improve the quality of care for patients, individually and as populations, by preventing the use of unnecessary or inappropriate drug therapy and by preventing adverse drug reactions<sup>[1, 3]</sup>.

Pharmacy profession has been changed in terms of its dynamic services in recent



years<sup>[4]</sup>. The mission of the profession of pharmacy is to improve public health through ensuring safe, effective, and appropriate use of medications. Contemporary pharmacy practice reflects an evolving paradigm from one in which the pharmacist primarily supervises medication distribution and counsels patients, to a more expanded and team-based clinical role providing patient-centered medication therapy management, health improvement, and disease prevention services<sup>[5]</sup>. In addition, checking drug-drug/drug-food interaction, adverse drug reaction and rationality are the modern scope of pharmacy practice.

Corticosteroids being widely used powerful anti-inflammatory & immunosuppressive agents and have become cornerstone of therapy in acute and chronic inflammatory diseases. Corticosteroids though they are life-saving drugs, produce adverse reactions which may be mild or life threatening. Considerable attention should be given to relative risks & benefits, benefits definitely outweighing the risks & individualization of treatment is necessary. The decision to use Corticosteroids should be made when a presumptive diagnosis has been made & when available information suggests a reasonable possibility of benefit. Criteria to use should be clearly identified and should be objective or quantifiable<sup>[6]</sup>.

To achieve better patient care, there is need to monitor, evaluate and therapeutically analyze the utilization pattern of corticosteroids. Such analysis will not only improve the standards of medical treatment at all levels in health system, but will also help in the identification of problems related to drug use such as polypharmacy, Drug-Drug interactions and Adverse Drug Reactions<sup>[7]</sup>.

Keeping the above in mind, present study is taken up to generate valid data for evaluation of drug use in various pathological conditions for early detection of corticosteroids related problems and to minimize complications.

### Material and Method

A prospective study was carried out in departments of dermatology, orthopedics, ophthalmology and general medicine of Navodaya Medical College, Hospital and Research Centre, Raichur, Karnataka,

India after obtaining the ethical clearance. A structured data collection form was prepared which includes patient demographics and medication related information. 109 prescriptions were collected from November 2014 to April 2015. All necessary information for study was collected from Out-patient department cards, laboratory investigation, prescription and interview with patients. All the cases/prescriptions were reviewed prospectively and monitored extensively for utilization pattern of corticosteroids like their category, indication, rationality of the prescription (number of corticosteroids, appropriateness of dose, dosage form, and duration of therapy) and number of drugs in prescriptions. Drug-drug interactions were checked by using MICROMEDEX software, DRUG.COM and STOCKLEY's drug interaction book. Data was analyzed using descriptive statistics namely total numbers, percentage, mean and standard deviation wherever applicable and expressed in MS-Word & MS-Excel.

### Results and Discussion

The gender distribution of study population showed that among 109 Out-patients, 51.3 % were male and 48.7% were female. Highest number of patients belonged to middle age group i.e., 21-30 years (30.2%), 31-40 years (24.7%) and 41-50 years (19.3%). The mean age of out-patients was  $38.59 \pm 1.31$  and  $32.50 \pm 1.93$  years in males and females respectively. This data showed that mid aged group in both populations are almost equally prone to diseases, for which steroids are used.

#### (Table 1)

In this study, majority were from Dermatology department (60.5%) with the major complaints of various skin disorders like Herpes Zoster, Hensen's disease, pemphigus Vulgaris, Psoriasis and Dermatitis followed by General medicine (17.4%) for respiratory tract infection, Ophthalmology (16.6%) for inflammation as



well as operative condition and Orthopedics (5.5%) for arthritis condition.

Among various dosage forms of steroids use, the topical route of administration was

**Table 1: Age Wise Distribution of study population**

Age group (years)	Male	Percentage (%)	Female	Percentage (%)	Total	Percentage (%)
0-10	1	0.9	0	0	1	0.9
11-20	5	4.5	6	5.5	11	10.0
<b>21-30</b>	<b>14</b>	<b>12.8</b>	<b>19</b>	<b>17.4</b>	<b>33</b>	<b>30.2</b>
31-40	15	13.7	12	11.0	27	24.7
41-50	11	10.0	10	9.2	21	19.3
51-60	5	4.5	3	2.7	8	7.3
>60	8	7.3	0	0	8	7.3
<b>Total</b>	<b>59</b>	<b>51.3</b>	<b>50</b>	<b>48.7</b>	<b>109</b>	<b>100</b>

We found dermatology department was centre for more corticosteroids use. Most of out-patients were prescribed with potent class of corticosteroids (32.1%). The most widely prescribed corticosteroids were Clobetasone (22%), followed by betamethasone and dexamethasone (11% each). **(Table 2)** The duration of treatment with corticosteroids was found to be 1 to 2 weeks duration (44%) and less than 1 week (38.5%). The mean duration of corticosteroids use was  $1.43 \pm 0.40$  in weeks. **(Figure 1)**

**Table 2: Individual Corticosteroids Prescribed in study population**

Corticosteroids	No. of Patients	Percentages (%)
Clobetasone	24	22.0
Betamethasone	12	11.0
Dexamethasone	12	11.0
Hydrocortisone	10	9.1
Beclomethasone	10	9.1
Prednisolone	9	2.2
Clobetasol	7	6.4
Methyl Prednisolone	6	5.5
Deflazacort	6	5.5
Mometasone	5	4.5
Fluticasone	3	2.7
Budesonide	3	2.7
Halobetasone	2	1.8

**Table 3: Incidence of Polypharmacy**

No. of drug per prescription	No. of Patients	Percentages (%)
2	6	5.5
<b>3</b>	<b>46</b>	<b>42.2</b>
4	40	36.7
5	12	11.0
6	5	4.6
>6	0	0
Average number of drugs prescribed = 3.67		

widely used in the form of ointment, cream, gel and lotion (57.7%), followed by oral route in the form of tablets (26.7%), Eye drops (8.2%), injection (3.6%) and inhalation (3.6%). 99 patients (90.8%) were prescribed with single corticosteroids and remaining patients were given combination of corticosteroids through same or different route. The most widely used combination was prednisolone + clobetasone and Budesonide + Deflazacort (1.8% of each). 42.2% of patients were prescribed with 3 drugs, 36.7% with 4 drugs and 11% with 5 drugs. The average number of drugs prescribed for out-patients was 3.67. **(Table 3)**

**Table 4: Con-current Drugs Prescribed with Corticosteroids**

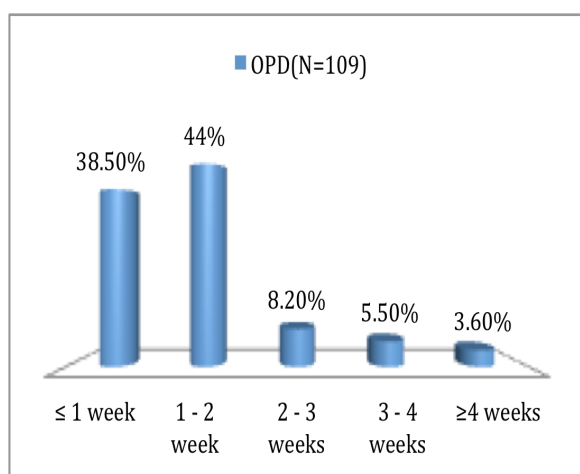
Drug category	No. of Patients	Percentages (%)
Antibiotics	52	17.2
Anti-allergics	44	14.6
Multivitamins	38	12.6
NSAIDs	24	7.9
Emollients	23	7.6
Anti-pruritics	23	7.6
Acid suppressants	21	6.9
Anti-pyretics	21	6.9
Anti-virals	12	3.9
Bronchodilators	12	3.9
Expectorants	5	1.6
Anti-tubercular	5	1.6
Anti-fungal	5	1.6
Anti-hypertensives	3	0.9
Miscellaneous	13	4.3



**Table 5: Drug-Drug Interaction Observed in study population**

Ward	No. of Patients	No. of prescription with interaction, (%)	No. of total interaction with corticosteroids	No. Moderate Interaction	No. of major interaction
Dermatology	66	8(7.4%)	6	6	0
General medicine	19	7(3.3%)	8	8	0
Ophthalmology	18	5(4.6%)	2	1	1
Orthopaedics	6	4(3.7%)	4	4	0
<b>Total</b>	<b>109</b>	<b>24(22.0%)</b>	<b>20</b>	<b>19</b>	<b>1</b>

**Figure 1: Duration of Treatment with Corticosteroids in study population**



Concurrent drugs association shows that, antibiotics (17.2%) were commonly administered followed by anti-allergics (14.6%) and multi vitamins (12.6%). Antibiotics and anti-allergics were most commonly prescribed because of majority of complaints on skin inflammatory disorders, followed by multi vitamins, which are usually recommended along with antibiotics to prevent vitamin deficiency associated with death of normal micro flora as well as in recovery of skin scars. **(Table 4)**

The incidence of drug-drug interactions was considerably low in Out-patient i.e., 24 prescriptions (22%). Among these 24 prescriptions, the total number of drug-drug interactions with corticosteroids was found to be 20, of which 19 are moderate and 1 major interactions. **(Table 5)**

### Conclusion

We found all the prescriptions were rational and comply with standard guidelines of corticosteroids

use at NMCH & RC, Raichur. Most of all patients were diagnosed well and were

prescribed corticosteroids by maintaining pharmacokinetic and pharmacodynamic parameters. There was also a reduced prescription cost and polypharmacy observed. However dosing regimen for inhalation, topical and ocular dosage form remain uncertain and found different pattern of corticosteroids use by patient to patient. Hence clinical pharmacy profession play critical role in Counseling and ensuring medication adherence especially for special and newer dosage forms. Educational interventions among physician, patients as well as students should be carried out in order to promote rational drug use.

### Acknowledgement

The authors wish to acknowledge Navodaya Medical College and Research Centre and the Principal, NET Pharmacy College, Raichur for permitting this work.

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#### **AUTHORS' CONTRIBUTIONS**

Authors contributed equally to all aspects of the study.

#### **PEER REVIEW**

Not commissioned; externally peer reviewed.

#### **CONFLICTS OF INTEREST**

The authors declare that they have no competing interests.