



Evaluation of Drug Utilization of Parenteral And Inhaled Corticosteroids

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ABSTRACT

Selection of glucocorticoids along with its dose and duration are the important aspects which should be considered while prescribing to the critically ill hospitalized patients. The purpose of this study was to assess the prescription pattern of glucocorticoids and promote appropriate use of it. A prospective observational study, conducted for a period of six months from September 2019 to February 2020 in Navodaya Medical College, Hospital & Research Centre (NMCH&RC) Raichur. Current study was performed in patients of age 18 or above and either sex who were prescribed with Glucocorticoid. All the new cases with drug prescription were included in the study. Patients who were below 18, ICU patient, lactating and pregnant women were excluded from the study. All the collected data were analyzed with the help of standard guidelines. In the present study, the prescribing of glucocorticoids is found to be appropriate about 84.40 %. However, to ensure safe, effective and well-balanced therapeutic management with glucocorticoids, both patients and prescribers should be more aware of the appropriate dose, dosage regimen, route of administration, duration of therapy and overall guidelines for glucocorticoids prescribing. Hence the involvement of clinical pharmacists in clinical practice helps to increase proper usage of glucocorticoids and optimum outcome. Our study concludes that standard treatment guidelines should be developed at hospital for prescribing of glucocorticoids taking into consideration the patient specific parameters which will improve therapeutic outcomes.

Keywords: Prescribing pattern, glucocorticoids, corticosteroids, appropriateness, inappropriateness.

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INTRODUCTION

Drug use is a complex process and thus drug utilization research is an essential part of pharmacoepidemiology as it describes the extent, nature and determinants of drug exposure. DUE can be applied to a drug, therapeutic class, disease state or a condition, a drug use process or specific outcome. DUE helps in identifying the problems in drug use, reduces adverse drug reactions, optimizing the drug therapy. DUE allows the pharmacist to document and substantiate the benefit of pharmacy intervention in improving therapeutic and economic outcomes.¹

The mission of the pharmacy profession is to improve public health through ensuring safe, effective, and appropriate use of medications.² 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.³

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.

Drug utilization research can also be used as follows.

- It can be used to estimate the numbers of patients exposed to specified drugs within a given time period. Such estimates may either refer to all drug users, regardless of when they started to use the drug, or focus on patients who started to use the drug within the selected period.
- It can describe the extent of use at a certain moment and/or in a certain area. Such descriptions are most meaningful when they form part of a continuous evaluation system, i.e. when the patterns are followed over time and trends in drug use can be discerned.
- Researchers can estimate to what extent drugs are properly used, overused or underused. It can determine the pattern or profile of drug use and the extent to which alternative drugs are being used to treat particular conditions.⁴

Corticosteroids are of great value in treating a wide spectrum of inflammatory conditions as they provide rapid symptomatic relief, especially in the short term. These highly efficacious drugs are mostly used for the treatment of various autoimmune, respiratory and dermatological conditions.⁵

It can be administered systemically or by local injection in the surgical area. Corticosteroids are classified according to their potency, duration of action, relative mineral corticosteroid and plasma half-life.⁶

Inhaled corticosteroids are the most effective controllers used in the treatment of asthma and the only drugs that can effectively suppress the characteristic inflammation in asthmatic airways, even

in very low doses. They suppress inflammation mainly by switching off multiple activated inflammatory genes through reversing histone acetylation via the recruitment of histone deacetylase 2 (HDAC2).⁷

Long-lasting, crystalline suspensions of parenteral corticosteroids have been used to treat joint and soft-tissue disorders for many years; they decrease inflammation by reducing local infiltration of inflammatory cells and mediators. First used for arthritic joints more than 50 years ago, parenteral corticosteroids remain a mainstay of treatment of many causes of acute joint or soft-tissue pain. The results of using injectable corticosteroids, however, have not been rigorously evaluated. Controlled trials with these agents have been few, and much of the evidence concerning both efficacy and safety remains unreliable. This may be because these drugs are indeed assumed to be effective as well as because of the difficulty in measuring subjective outcomes, such as pain or swelling.⁸

To achieve better patient care, there is a need to monitor, evaluate and therapeutically analyse the utilization pattern of corticosteroids. Such analysis will not only improve the standards of medical treatment at all levels in the 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.

MATERIALS AND METHOD

A prospective observational study was carried out for the duration of 6 months among the patients under inclusion criteria. All the Patients above 18 years of age of either sex and the patients admitted with the condition that requires inhaled and parenteral glucocorticoid therapy were included in the study.

For data collection and documentation Patient profile form was designed which includes information on demographics of patient (Patient's name, age, gender, height, weight, date of admission and date of discharge), presenting complaints, provisional/confirmed diagnosis, glucocorticoid therapy given (with name of glucocorticoid, dose, duration and route of therapy) and laboratory test reports.

During the study period, medical case records of patients were reviewed for the diagnosis, glucocorticoid therapy prescribed and pattern of glucocorticoid administration. The data obtained was analyzed to assess the appropriateness of glucocorticoid therapy with respect to selection, dose, duration and route of administration to that of the recommended treatment guidelines.

RESULTS AND DISCUSSION

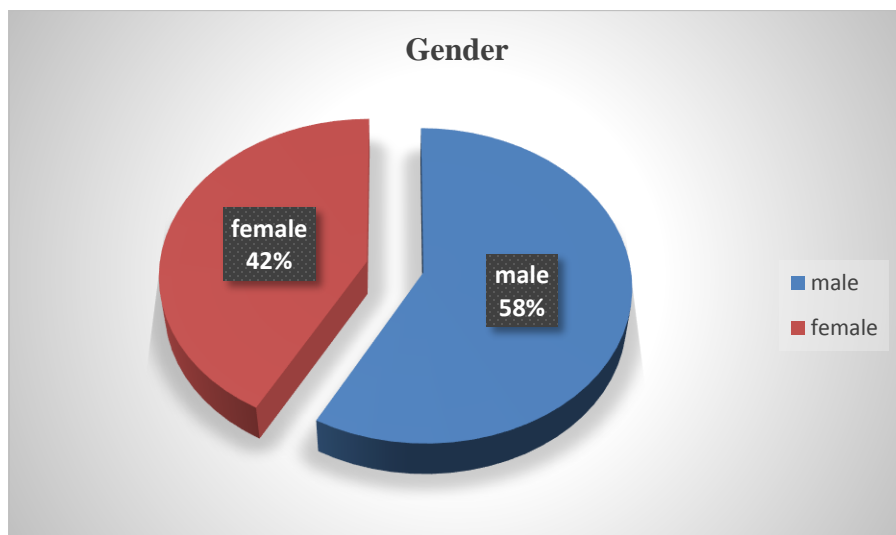


Figure 1: Gender Distribution of Study Participants (N=93)

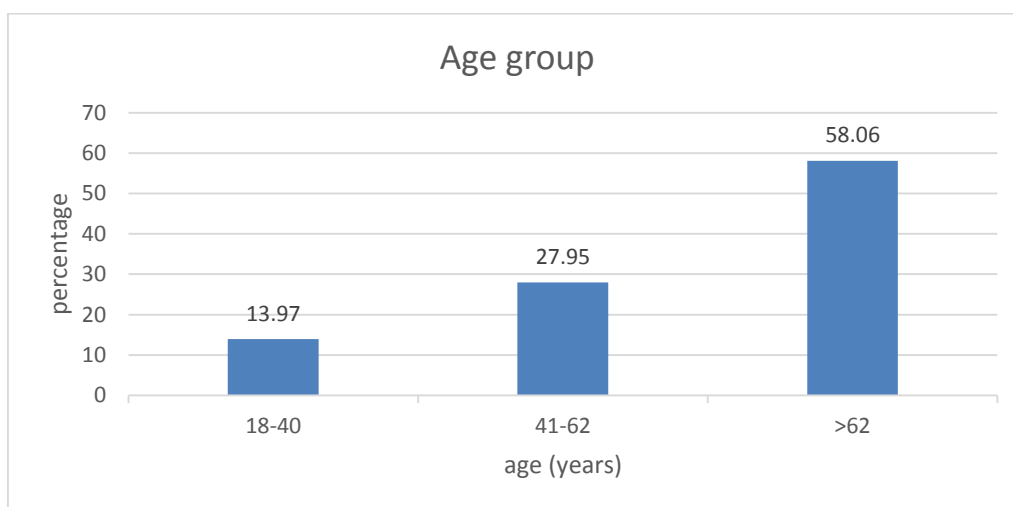


Figure 2: Age-Based Classification of Study Participants (N=93)

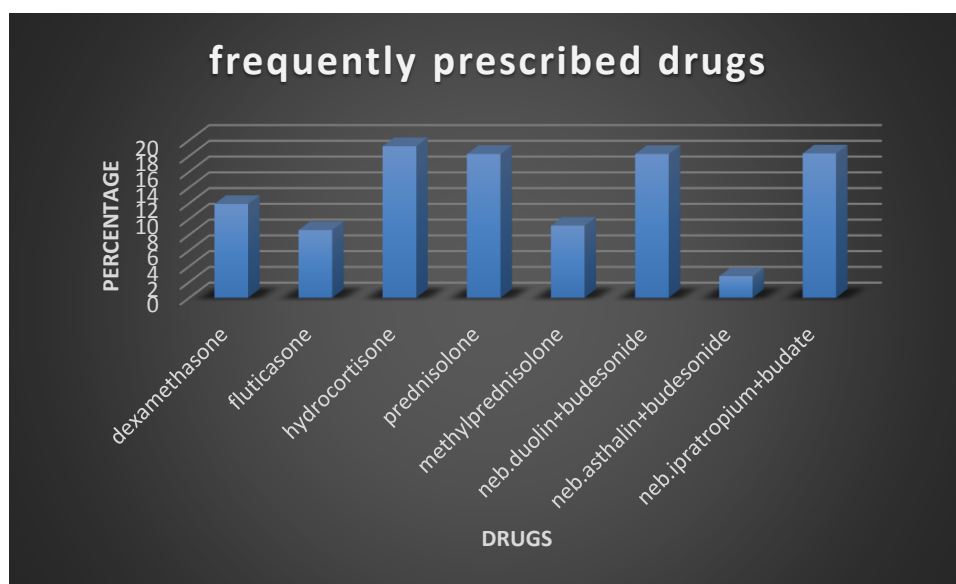


Figure 3: Frequently Prescribed Glucocorticoid Drugs in Study Participants (N=93)

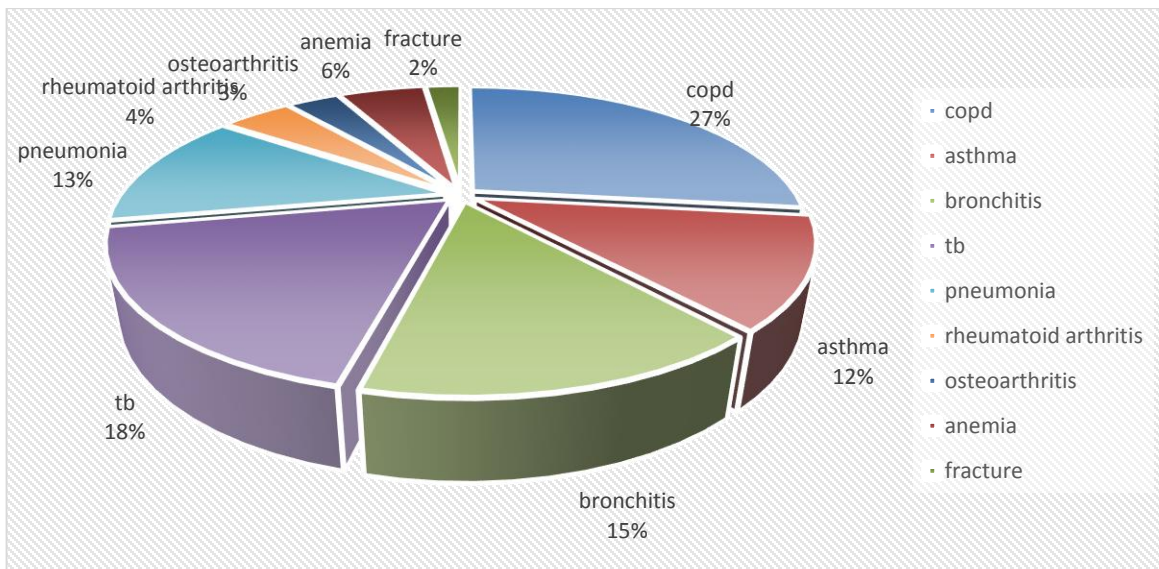


Figure 4: Disease Pattern Wise Distribution of Study Population (N =93)

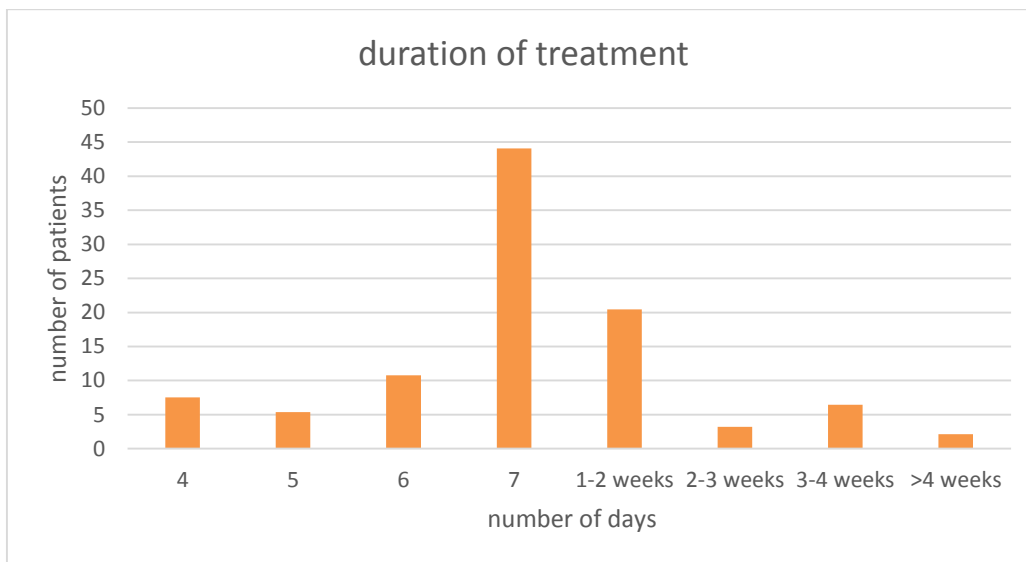


Figure 5: Duration of Treatment with Glucocorticoids in Study Population (N=93)

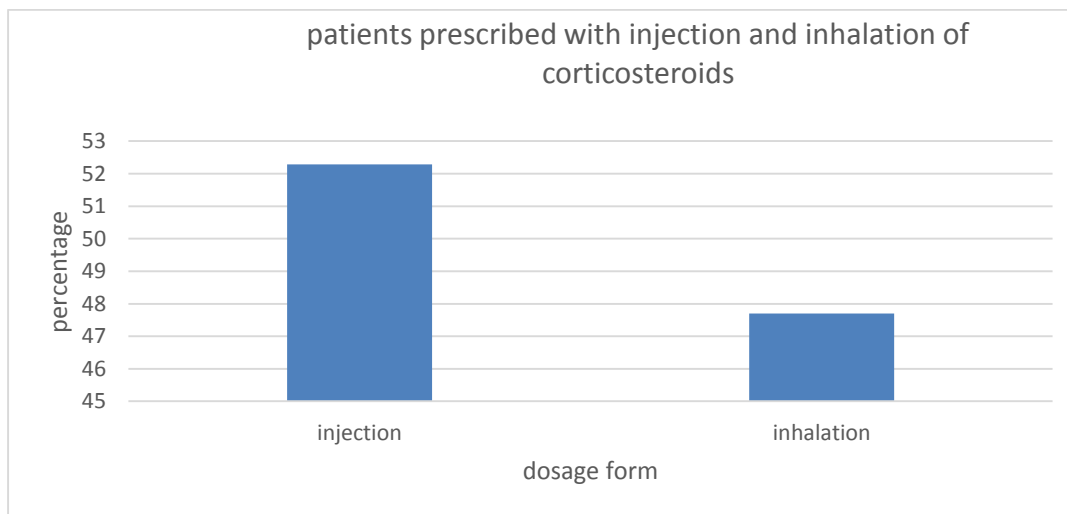


Figure 6: Dosage Form Classification of Glucocorticoids in Study Participants (N=109)

Table 1: Assessment of Selection Of Glucocorticoid Therapy According To Dose, Duration of Therapy and ROA (N=109)

Drugs	Dose	No. of prescriptions	of Appropriate	Not Appropriate
Dexamethasone	8 mg	1	10	3
	4 mg	12		
fluticasone	88 mcg	3	6	2
	200 mcg	5		
hydrocortisone	2.5 %	21	17	4
prednisolone	0.5-1.5 mg/kg	10	12	5
	1%	7		
methylprednisolone	1%	10	7	3
Neb.duolin +budesonide	0.5mg+500mcg+1.25	17	17	0
Neb.asthalin+budesonide	2.5 mg+0.5 mg	3	3	0
Neb.ipratropium+budate	500 mcg +0.5 mg	20	20	0
Total		109	92	17
Percentage			84.40%	15.59%
Drugs	Dose	No. of prescriptions	of Appropriate	Not Appropriate
Dexamethasone	8 mg	1	32	5
	4 mg	36		
Hydrocortisone	5 mg	13	12	7
	20 mg	6		
Prednisolone	7.5 mg	12	46	14
	30 mg	9		
	40 mg	39		
Methylprednisolone	16 mg	3	10	3
	32 mg	10		
Deflazacort	6 mg	6	6	0
Total		135	106	29
Percentage			78.52%	21.48%

A total of 93 patients with indications for parenteral and inhaled glucocorticoids were admitted to hospital during last six months. Among 93 patients included in the study comprise of 54 male and 39 female patients (Figure 1). Most of patients were of age group above 62 (58%), then followed by age group 41-62 (27%), 18-40 (13%) (Figure 2). Maximum number of patients were admitted in the pulmonary ward (56%), general medicine (25%), and ortho ward (17%). Among all the glucocorticoids, Hydrocortisone was prescribed in maximum number of cases (19%) as parenteral glucocorticoid. Prednisolone was second most prescribed (18%) followed by Dexamethasone (11%). In case of inhaled glucocorticoids, Neb. ipratropium+budate was prescribed most (18%). Neb.duolin+budate was the second most prescribed inhaled glucocorticoid followed by Neb. Asthalin+budesonide (Figure 3). Among all the clinical complaints, the patients were more presented with COPD 25 (26.8%), followed by TB 17 (18.27%), Bronchitis 14 (15.05%),

Pneumonia 12 (12.9%), Asthma 11 (11.8%), Anemia 5 (5.37%), Rheumatoid arthritis 4 (4.3%), Osteoarthritis 3 (3.2%), and Fracture 2 (2.15%) (Figure 4). The duration of treatment with glucocorticoids was mainly found to be seven days in 41 (44.08%) patients, followed by 1-2 weeks in 19 (20.43%) patients, six days in 10 (10.75%) patients, four days in 7 (7.52%) patients, 3-4 weeks in 6 (6.45%) patients, 5 days in 5 (5.37%) patients, 2-3 weeks in 3 (3.22%) patients and greater than or equal to 4 weeks in 2 (2.15%) patients (Figure 5). In the study we found that 52.29% of glucocorticoids were in the form of injection and 47.70% were inhaled form which is shown in figure 6. In our study we found that 84.40% of glucocorticoids were prescribed appropriately while 15.59% of glucocorticoids were prescribed inappropriately which are totally not recommended for the specific disease conditions as per the recommended guidelines. Which is shown in Table 1.

In the present study, 93 prescriptions were analyzed for assessing the selection of glucocorticoids according to dose, duration of therapy and ROA with respect to disease condition. In our study, we found that 84.40% of glucocorticoids were prescribed appropriately while 15.59% of glucocorticoids were prescribed inappropriately which are totally not recommended for the specific disease conditions as per the recommended guidelines. The same is shown in Table 1. Results showed inappropriate prescribing of Hydrocortisone in 4 prescriptions in cases of asthma and COPD. In few patients with COPD, hydrocortisone was prescribed inappropriately with respect to ROA. Hydrocortisone must be given systemically for increasing efficacy of treating the conditions like asthma and COPD. In some cases of TB and anemia prednisolone was inappropriately prescribed in 5 prescriptions. In few patients with TB prednisolone was prescribed which interacts with anti-tubercular drugs mainly rifampicin and this interaction results in reduced effectiveness of prednisolone. So, it is recommended to avoid prednisolone prescribing in TB cases and prescribe a glucocorticoid which does not interact with anti-tubercular drugs. In few anemic cases prednisolone was prescribed for reducing hemolysis of anemia but duration of therapy was only for 1-2 weeks and after that drug was immediately stopped. It is not advisable to stop prednisolone at once instead the prednisolone dose should be gradually and slowly tapered off for avoiding withdrawal effects.

However, to ensure safe, effective and well-balanced therapeutic management with glucocorticoids, both patients and prescribers should be more aware of the appropriate dose, dosage regimen, route of administration, duration of therapy and overall guidelines for glucocorticoids prescribing. Hence the involvement of clinical pharmacists in clinical practice helps to increase proper usage of glucocorticoids and optimum outcome. Standard treatment

guideline should be developed at all hospitals for prescribing of glucocorticoids taking into consideration the patient specific parameters which will improve therapeutic outcomes.

CONCLUSION

GCs however they are life-saving medications, produce unfavourable responses which might be gentle or dangerous. Impressive consideration has to be given to relative dangers and advantages, benefits unquestionably exceeding the dangers and individualization of treatment is essential. The choice to utilize Glucocorticoids should be made when a hypothetical conclusion has been made and when accessible data recommends a sensible chance of advantage. Measures to utilize has to be unmistakably distinguished and should be even-handed or quantifiable. To accomplish better patient consideration, there is need to screen, assess and remedially break down the use of glucocorticoids. Such examination won't just improve the principles of clinical treatment at all levels in wellbeing framework, yet will likewise help in the recognizable proof of issues identified with drug utilize like polypharmacy, drug-drug interactions and unfavourable medication responses. Standard treatment rule ought to be created at all emergency clinics for recommending of glucocorticoids mulling over the patient explicit boundaries which will improve helpful results.

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