Original Research Article

Prescription pattern of corticosteroid among patients presented at community pharmacies in Lahore, Pakistan

ABSTRACT

Background

Corticosteroids are a class of steroid hormones produced by the adrenal gland and are used to treat many diseases, including autoimmune diseases and inflammatory diseases. Besides their role in many diseases, long-term use, misuse, and overuse cause side effects including hypertension, diabetes mellitus, and osteoporosis.

Objective

The aim of current study is to evaluate the prescription pattern of corticosteroids in different community pharmacies, among patients, in Lahore.

Method

The cross-sectional stratified convenient study performed using a validated questionnaire to analyse the prescription pattern of corticosteroids in patients at different community pharmacies in Lahore. Total 92 patients are participating in this study.

Result

A total of 92 patients take part in the study. In this research 67.4% females are participated. The average age of patients is above 30 years. Asthma is the most common reason for corticosteroids administration (19.6%) followed by rheumatoid arthritis (12.0%) whereas in inflammatory bowel disease they are least prescribed (1.1%). Prednisolone is the most prescribed drug (33.7%) and Oral route is the frequently given route.

Conclusion

Our data shows that the prescription pattern of corticosteroid must be improved. Health care providers should pay attention to counseling of patients and guide them about dose tapering to avoid adverse effects.

INTRODUCTION:

A class of compounds comprises both naturally occurring hormones and synthetic molecules known as corticosteroids [1]. In 1930, there was the first clinical proof that an extract of adrenocorticoid tissue from an animal could avoid adrenal failure in humans [2]. In 1940, they were classified into two categories: one that causes salt and fluid retention (mineralocorticoids) and the other that reduces inflammation and shock (glucocorticoids) [3]. In 1948, extractive chemistry (T. Reichstein), synthesis of chemicals (E.C. Kendall), and clinical research (P. Hench) came together, which led to the discovery of cortisone, leading to a long series of derivatives [4].

Corticosteroids are commonly used for the treatment of many immune and inflammatory diseases [5]. Nowadays glucocorticoids are used as standard treatment in asthma for immune activation, reducing inflammation, and allergic reactions [6]. Corticosteroids are also used in autoimmune diseases such as dermatological, rheumatoid, inflammatory bowel, vascular, and other systemic disorders, and mainly in allotransplantation [7]. Many inhaled and oral corticosteroids are used for the effective treatment of respiratory disorders like Bronchopneumonia, asthma, COPD, tuberculosis, and respiratory distress syndrome [8]. Consultants widely prescribe steroids due to their potent immunosuppressive and anti-inflammatory properties, and this approach often results in over-prescription of these medications [9].

Corticosteroid-related adverse effects are due to impaired immunity, cardiovascular homeostasis, calcium metabolism, fluid retention, and different endocrine effects [10]. Respiratory specialists worldwide have called a structured "OCS-stewardship" method to save patients from improper usage of OCS and its impacts [11]. Improvement in the use of dose tapering has been done by the accessibility of OCS-sparing therapies with caution to avoid reoccurrence [12]. This evaluation of corticosteroids is required for several reasons including adverse responses and drug interactions [13].

Inappropriate use of corticosteroids due to misuse, self-medication, and lack of proper medical guidance has caused adverse health effects [14]. Misuse of steroids results in immunosuppression and a high risk of infections, osteoporosis, diabetes mellitus, and cardiovascular diseases [15]. As a result, the healthcare costs and mortality rates due to

complications from long-term usage are increased [16]. A prescribing regimen is crucial in encouraging the rational use of medications [17]. The prescribing pattern of corticosteroids is important in reducing the risk of systemic and local negative effects [18].

Drug usage evaluation can identify illogical drug use and promote the responsible use of medications in communities [19]. This research on prescribing patterns aims to monitor, access, and make any changes to prescriber's practices to provide reasonable and economical medical care [20]. In rational prescribing, clinicians should prioritize clinical effectiveness, reduce adverse effects, conserve healthcare resources, and respect patient preferences [21]. Strategies for rational prescribing include education, management, and regulation [22]. This approach leads to economic benefits, easy identification of drug use problems, and benefits like polypharmacy, drug interactions, and adverse reactions [23].

The current study aims to analyse corticosteroid prescription patterns among patients presented at several community pharmacies in Lahore, Pakistan. The misuse of corticosteroids is increasing day by day; to promote the rational prescribing of corticosteroids, the role of a healthcare provider is significant.

MATERIAL AND METHOD

The cross-sectional observational study was conducted at several community pharmacies in Lahore. The purpose of the study is to assess the prescription pattern of corticosteroids among patients at different community pharmacies in Lahore, Pakistan. The data collection was conducted in a community pharmacy within the period of 20 August 2024 to 31 August. The study had an intended sample size of 101; however, 9 were excluded due to certain criteria.

Inclusion criteria:

The study participants are those who approached the community pharmacy to purchase corticosteroids and met the required criteria. Data collection was gathered from participants whose consent form was obtained before engaging in the study.

Exclusion criteria:

All patients under the age of 18 years are excluded from the study.

After inclusion and exclusion criteria 92 patients were enrolled in the study out of 101 patients. A validated questionnaire form was employed in the community pharmacy to assess the perception and feedback of the patients. Each questionnaire was administered within 5 to 8 minutes, and all participants received a clear explanation of each query. A pharmacy student

from a private medical college collected data. Data was collected from 12 different community pharmacies in Lahore, Pakistan. After explaining the aim and objective of the study, informed consent was obtained from the participants. Subsequently during the interview, the participant's information was entered into a questionnaire form.

Patients' information was collected using a detailed form, which consists of seven sections. The first page of the questionnaire contains a consent form which includes the purpose of the study along with the procedure and confidentiality sections A and B contain the patient's socio-demographic factors such as gender, age, weight, height, height and diagnosis of patient, educational level, employment status, marital status, monthly income, smoking, and exercise habit. Section C includes yes/no questions to evaluate the patient's medical history and comorbidity. Section D contains the class of corticosteroids used to treat the disease, the frequency of the drug, and the number of corticosteroids prescribed. The drug information included in Section E includes the route of drug administration, duration of therapy, dose tapering, number of drugs per prescription, supply, and OTC drugs. while sections F and G contain yes/no questions to assess the monitoring parameters (blood pressure, complete blood count) and compliance with therapy.

STATISTICAL ANALYSIS

By using SPSS version 26, the obtained data was analyzed. To summarize the data, standard deviation and mean are used. The data follows normal distribution or not to determine this skewness and kurtosis applied. For categorical data evaluation, the Fisher exact test and Chi-square test are used.

RESULT

Total 92 respondents participate in current study. About 32.6% males participates in this study which are less than the female (67.4%). Further information of participants demographic is given in Table 1.

Table 1: Represent Patient’s Demographics and Social Characteristics (N=92)

Variable	N (%)
Gender	
Male	30 (32.6)
Female	62 (67.4)
Age	
18-30	33 (35.9)
Above 30	59 (64.1)
Weight	
<40kg	2 (2.2)
40-80kg	75 (81.5)
>80kg	15 (16.3)
Height	
Below 5 ft	5 (5.4)
5 ft	18 (19.6)
Above 5 ft	69 (75.0)
Respiratory Diagnosis	
COPD	4 (4.3)
Tuberculosis	3 (3.3)
Asthma	18 (19.6)
None	67 (72.8)
Dermatological Diagnosis	
Dermatitis/Eczema	10 (10.9)
Psoriasis	2 (2.2)
Scabies	4 (4.3)
Fungal infection	5 (5.4)
None	71 (77.2)
Inflammatory Diagnosis	
Rheumatoid Arthritis	11 (12.0)
Osteoarthritis	7 (7.6)
Gout	2 (2.2)
IBD	1 (1.1)
None	71 (77.2)
Allergic Diagnosis	

Yes	13 (14.1)
No	79 (85.9)
Infectious Diagnosis	
Eye infection	2 (2.2)
None	90 (97.8)
Other Diagnosis	
Yes	16 (17.4)
No	75 (81.5)
Education level	
No formal education	12 (13.0)
Primary education	5 (5.4)
Secondary education	18 (19.6)
College	26 (28.3)
University	31 (33.7)
Employment status	
Not employed	64 (69.6)
Employed	28 (30.4)
Marital status	
Married	49 (53.3)
Not married	35 (38.0)
Divorced	1 (1.1)
Widow	7 (7.6)
Monthly income	
Rs 20k-30k	13 (14.1)
Rs 40k-50k	8 (8.7)
Rs 60k-80k	9 (9.8)
More than 80k	12 (13.0)
None	50 (54.3)
Smoking	
Yes	7 (7.6)
No	85 (92.4)
Exercise	
Yes	15 (16.3)

No	77 (83.7)

About 12.0% participants are having diabetes mellitus. In this study 18.5% respondents are having obesity. Approximately 29.3% participants are having hypertension. Further information regarding participants medical history is given in Table 2.

Table 2 Medical history and comorbidity

Variable	**N (%)**
Hypertension	
Yes	27 (29.3)
No	65 (70.7)
Metabolic syndrome	
Yes	6 (6.5)
No	86 (93.5)
Renal disease	
Yes	5 (5.4)
No	87 (94.6)
Congestive Cardiac Failure	
Yes	0 (0.0)
No	92 (100.0)
Nephrolithiasis	
Yes	1 (1.1)
No	91 (98.9)
Liver Disease	
Yes	7 (7.6)
No	85 (92.4)
Diabetes Mellitus	
Yes	11 (12.0)
No	81 (88.0)
Myocardial infarction	
Yes	2 (2.2)
No	90 (97.8)
Hypothyroidism	

Yes	2 (2.2)
No	90 (97.8)
Hyperlipidemia	
Yes	6 (6.5)
No	86 (93.5)
Anemia	
Yes	10 (10.9)
No	82 (89.1)
Mental health issue	
Yes	1 (1.1)
No	91 (98.9)
Obesity	
Yes	17 (18.5)
No	75 (81.5)
Hospitalized	
Yes	8 (8.7)
No	84 (91.3)
Others	
Yes	12 (13.0)
No	80 (87.0)

In current research the participants are using prednisolone (33.7%) monotherapy. About 42.4% monotherapy glucocorticoids are prescribe in once daily dosing. Further information on corticosteroids monotherapy is given in Table 3.

Table 3 Represent Monotherapy used

Variable	**N (%)**
Glucocorticoid	
Hydrocortisone	8 (8.7)
Prednisolone	31 (33.7)
Triamcinolone	2 (2.2)
Dexamethasone	14 (15.2)
Betamethasone	12 (13.0)

Budesonide	4 (4.3)
None	14 (15.2)
Prednisolone + Dexamethasone	2 (2.2)
Dexamethasone + Betamethasone	1 (1.1)
Hydrocortisone + Dexamethasone	1 (1.1)
Hydrocortisone + Betamethasone	1 (1.1)
Prednisolone + Methyl Prednisolone	1 (1.1)
Betamethasone + Budesonide	1 (1.1)
Dose	
Once a day	39 (42.4)
Twice a day	31 (33.7)
Thrice a day	9 (9.8)
None	13 (14.1)
Mineralocorticoids	
Fludrocortisone	1 (1.1)
Aldosterone	1 (1.1)
None	90 (97.8)
Dose	
Once a day	1 (1.1)
Twice a day	1 (1.1)
None	90 (97.8)
Other Steroids	
Beclomethasone	6 (6.5)
Clobetasol	5 (5.4)
Mometasone	2 (2.2)
Fluticasone	2 (2.2)
Fluocortolone	1 (1.1)
Flucinolone	1 (1.1)
None	75 (81.5)
Dose	
Once a day	11 (12.0)
Twice a day	4 (4.3)
Thrice a day	2 (2.2)

None	75 (81.5)
Number of steroids	
1 only	79 (85.9)
2 drugs	13 (14.1)

The participants mostly check blood pressure and performed CBC (complete blood count) test. Less number of participants analyze their bone density by using bone density test. Further information regarding patient's laboratory test analysis is given in Figure 1.

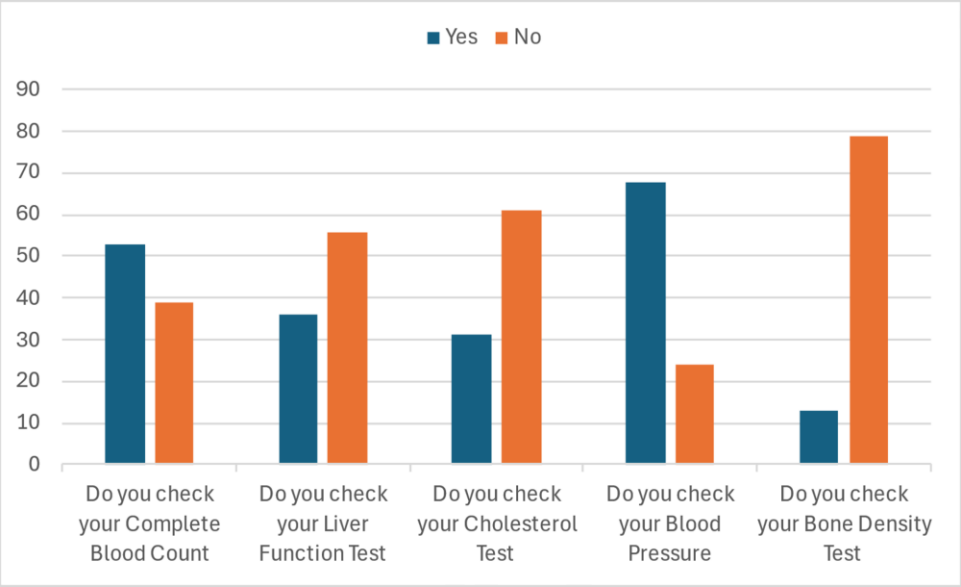

Figure 1: Laboratory test analysis

Most of the participants followed the instruction of prescriber and show maximum compliance towards therapy. Further information towards compliance of patients is given in Figure 2.

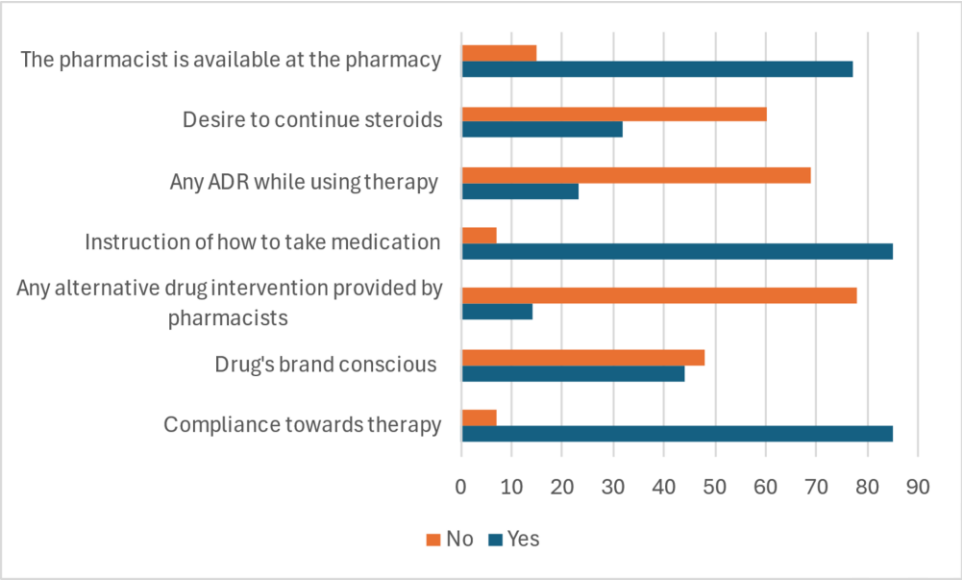

Figure 2: Compliance of patients toward therapy

Mostly corticosteroids prescribe to patients by Registered medical practitioner with a percentage of 88.0% followed by pharmacist 7.6%. Further information regarding prescribing is given in Figure 3.

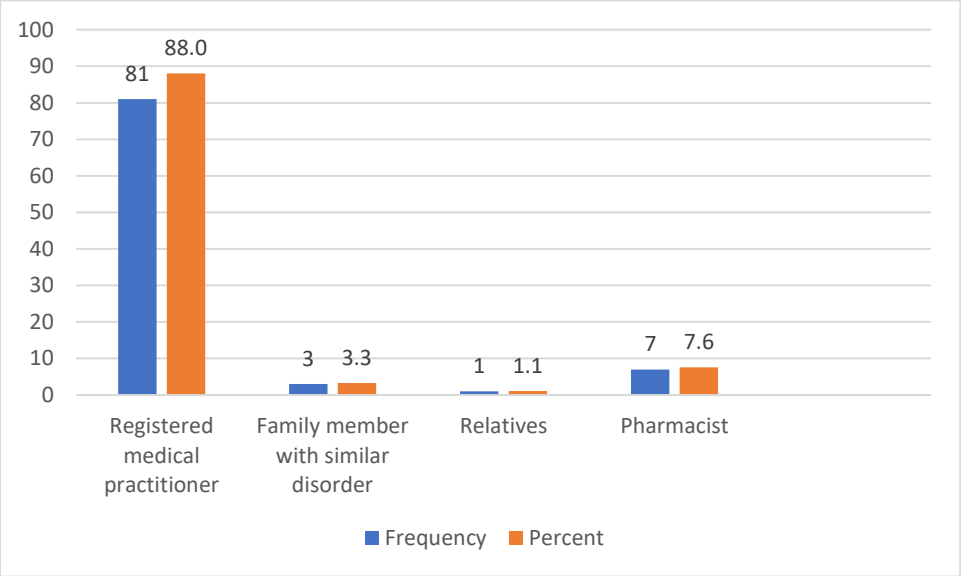

Figure 3: Prescribe by whom

DISCUSSION

The study highlighted the significant presence of comorbid conditions. These comorbidities are of concern in corticosteroid administration because these drugs have considerable side

effects, mainly when used for chronic diseases. The analysis shows that 29.3% of the patients had hypertension, and 12.0% of patients had diabetes mellitus, which suggests that clinicians must take precautions when prescribing corticosteroids as they interfere with the regulation of blood pressure and glucose levels. It aligns with the previous study that highlighted corticosteroids as a risk factor in patients with hypertension and diabetes [24][25].

Liver diseases (7.6% of patients) and renal diseases (5.4% of patients) also complicate the condition. Corticosteroids are metabolized by the liver and excreted through the kidneys. That is why the presence of liver disease or kidney disease increases the likelihood of drug accumulation and toxicity. Previous research shows that patients with liver disease may have worsened side effects because of the inadequate metabolism of the drug [26].The study found that 18.5% of individuals were obese, demonstrating the potential for corticosteroids to contribute to obesity by changing fat distribution and increasing appetite [27]. Obesity should consider while taking corticosteroids since it raises the risk of problems such as insulin resistance, hyperglycaemia, and cardiovascular disease [28].

Although only 2.2% of patients had a myocardial infarction history, corticosteroid use can worsen the condition due to fluid retention and hypertension. A case-control retrospective study demonstrated that the current glucocorticoid use is related to a substantially elevated risk of heart failure [29].10% of patients had anaemia, 6% had metabolic syndrome, 2% had hypothyroidism, 6% had hyperlipidaemia, 1% showed mental health issues and 12% had other unspecified conditions. These medical conditions and comorbidities are necessary for evaluating the proper use of corticosteroids because this medicine can have adverse effects.

The study shows that the most frequently prescribed corticosteroid from glucocorticoids is prednisolone 33.7%, dexamethasone 15.2% and betamethasone is 13.0%. The frequent use of prednisolone is because asthma and rheumatoid arthritis patient percentage is high. These medicines mostly given once daily 42.4%. A similar study conducted in Ethiopia in 2019 is align with our current findings [30].

Mineralocorticoid is not used commonly; the percentage of fludrocortisone and aldosterone prescribing in patients is 1.1%. About 97.8% patients do not used this class of corticosteroids. These findings are in contrast with the study conducted in India in 2019 [31].

From other class of steroid beclomethasone 6.5% and clobetasol 5.4% is mostly used. The current study not align with study held in Ikeja in 2022 [32].

This study showed corticosteroids that are prescribed by a registered medical practitioner have the highest percentage (N=81, 88%) as corticosteroids are prescription drugs that must prescribed by a healthcare provider, and corticosteroids that are recommended by a family member with the same disorder (N=3, 3.3%) which is in contrast with the study conducted in Iraq in 2018 which reported opposite results regarding the use and abuse of corticosteroids [33].

The study represents that the most tested lab monitoring parameter in patients taking corticosteroids is blood pressure monitoring, as the oral corticosteroids are related to the high possibility of hypertension and the lowest percentage of lab monitoring parameters is the bone density test; although it is the major side effect of corticosteroids, it is not monitored properly and appropriately as reported by previous studies conducted in England in 2017 [34].

CONCLUSION

Our data confined that the prescription pattern of corticosteroid must be improved for rational use. Researchers can use this data to enhance prescribing patterns. Some participants use corticosteroids without prescription, and they are unaware of their potential adverse effects. The health care provider should counsel the patients about the use and side effects of corticosteroids. The health care providers must pay attention to the rational use of corticosteroids and prescribe medications according to standard guidelines.

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