

## Use of corticosteroids in medical practice: Pattern of prescription, adverse effects and pre-prescription counselling practices.

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*Received 20 July 2022; Accepted 02 August 2022*

### **Abstract**

#### **Background**

Corticosteroids are a group of medications that are structurally and pharmacologically similar to the endogenous hormone cortisol. The mechanisms of action for the therapeutic effects and clinical improvement associated with corticosteroids are also responsible for most of the adverse effects associated with its chronic use or its use in high doses. Prescription of corticosteroids is on the increase among patients seen in our clinical practice. The increase in steroid prescription is associated with increasing frequency of complications associated with its chronic use. The main objective of this study is to review the prescription pattern of steroids in our practice and to also assess how patients are counselled before they are started on these agents.

#### **Methods**

The study design was a mix of focused group discussions and cross-sectional survey with the use of a questionnaire. The focus group discussion was with three physicians, one each from the units that prescribe steroid frequently. The units are rheumatology, dermatology and nephrology. The cross sectional survey was among patients that have been on prescribed steroids for at least 3 weeks.

#### **Results**

A total of 150 patients participated in the cross-section survey, 52 (34.7%) males and 98 (65.3%) females. This study showed that prednisolone is the most commonly prescribed corticosteroid among the study participants and that more than a third of participants on steroids did not receive any form of counselling before they were started on longer-term corticosteroid use.

#### **Conclusion**

This study showed that many patients on long-term steroid therapy do not receive any form of counselling before they are started on this agent. Adverse effects from long-term use of steroids are common and must be actively looked for in patients during their follow-up clinic visits.

**Keywords: Corticosteroids, counselling, prescription, adverse effects, Lagos.**

## **I. INTRODUCTION**

Corticosteroids are a group of medications that are structurally and pharmacologically similar to the endogenous hormone cortisol.<sup>1</sup> They are used in clinical practice because of their diverse therapeutic actions, that include; anti-inflammatory, immune-suppressive, anti-proliferative, and vaso-constrictive effects.<sup>1,2,3,4</sup> Endogenous cortisone was first isolated in 1935 and synthesized in 1944.<sup>1</sup> Corticosteroids are used in about 1% of the general population at any point in time for various clinical indications, this point the prevalence of its use increases with increasing age of the population.<sup>5,6</sup>

The mechanisms of action for the therapeutic effects and clinical improvement associated with corticosteroids are also responsible for most of the adverse effects associated with chronic use or when used in high doses.<sup>7</sup> Use of corticosteroids for more than three weeks is considered as chronic and is associated with

complications.<sup>7</sup> Chronic use of steroids also leads to suppression of actions of the adrenal gland.<sup>7</sup> This suppression may affect the secretion of cortisol, an endogenous steroid that is required in times of stress.<sup>8</sup>

Use of prescribed corticosteroids is on the increase among patients seen in our daily clinical practices. This increase associated with increasing frequency of complications associated with its chronic use. The aim of this study is to review the prescription pattern of steroids in our practice and to also assess how patients are counselled before they are started on these agents. The objective of the focused group discussion was to determine if patients are routinely counselled before they are started on steroids, evaluate the content of information given to patients during pre-prescription counselling, and to determine the designated personnel that counsel patients. The objective of the patients' survey was to assess demographic profile, determine pattern of prescription of corticosteroids, determine the timing of administration of these agents, and document the common adverse effects associated with steroids.

## **II. METHODOLOGY**

The study was conducted among patients using corticosteroids prescribed at one of the following clinics; rheumatology, dermatology, or nephrology clinic of Lagos State University Teaching Hospital (LASUTH), Ikeja. Study data were collected over 6-months from consecutive patients who met the inclusion criteria for the study. To be included in the study, participants must have been using corticosteroids prescribed by a doctor in any of the clinics for a minimum of 3-weeks' duration. Participants must also consent and be willing to participate in the survey.

The study design was a mix of focused group discussion with one consultant physician from each of the participating units from the department of medicine of the hospital and a cross-sectional survey of patients on prescribed steroids with a structured questionnaire designed to collect necessary information from participants. The questionnaires were administered to participants during follow-up clinic visits by doctors who attended to them. The focused group discussion was conducted by a consultant physician who was not involved with the patients' management. The focused group discussion was used to evaluate whether treatment protocols were used to guide the prescription of steroids, by evaluating information given to participants during the pre-prescription counselling sessions. Physicians use of routine use of adjuvant therapy of steroids, such as steroids, sparing agents, and use of prophylaxis to prevent adverse and routine investigations requested from patients with long-term steroid use were also assessed. The cross-sectional survey was used to collect relevant information from patients and their medical records. Patients were asked about the indications for using steroids, drug history, including history of adverse reactions to the current steroids they are using. They were also asked if they received any form of counselling before they were commenced on steroids.

The minimum sample size was calculated using a point prevalence of 1% steroid prescription among the general population.<sup>6</sup>

## **III. RESULTS**

A total of 150 participants were recruited in the patient survey, 52 (34.7%) were males and 98 (65.3%) were females. The mean age of the participants was 39 years with the range of 13 to 73 years.

The three consultants from each of the participating units that took part in the focus group discussion agreed that patients were routinely counselled before they were started on long-term steroid therapy. They were also in agreement that patients could be started on long-term steroid therapy by either a consultant or a senior registrar in the unit. The Rheumatology consultant said that the unit uses a guideline for steroid therapy written by their professional association and that the unit ensures that new residents to the unit are made aware of this guideline when they join the unit. All three consultants said that they routinely monitor patients for treatment, emerging signs, and symptoms of an adverse drug reaction to steroids during follow-up clinic visits. The Dermatologist said they routinely give anti-helminthic medication to patients on oral corticosteroids, this is the only unit that does so. The Rheumatologist said that patients on steroids receive steroid-sparing medications to allow for reduction of steroid doses and prevention of adverse drug reactions due to chronic steroid use.

A review of prescription patterns of steroids among participating patients showed that prednisolone is the commonest prescribed agent, 68% (102) of participants were on prednisolone. The commonest observed adverse effect of steroids was weight gain; this was reported in 38.7% (58) of responders. See Table 2 for details.

The study revealed that the use of steroid-sparing agents and prophylactic drugs to reduce the incidences of adverse effects of steroids was not a routine practice among our physicians. Physicians from the rheumatology unit use steroid-sparing agents more commonly compared to physicians from other units, the most frequently prescribed steroid-sparing agents by doctors attending to the participants were azathioprine and methotrexate. Only a tenth of the participants, 16 were on either azathioprine or methotrexate. See Table 3 for details.

**Table 1: Details of the demographic profile of the study participants**

Variable	Output	
	Number	Percentage
<b>Sex</b>		
Male	52	34.7
Female	98	65.3
<b>Age (years)</b>		
Mean $\pm$ SD	39 $\pm$ 16.2	
Range	13-73	
<b>Age group</b>		
Less than 18	11	7.3
18 to 39	71	47.3
40-59	48	32.0
60 and above	20	13.3
<b>Units</b>		
Rheumatology	62	41.3
Dermatology	70	46.7
Nephrology	18	12.0
<b>Counseling</b>		
Yes	92	61.3
No	58	38.7

**Table 2: Details of information about the steroids used and adverse drug reactions associated with their use.**

Variable	Frequency	Percentage
<b>Type of steroid</b>		
Prednisolone	102	68.0
Methylprednisolone	18	12.0
Triamcinolone	14	9.3
Clobetasol	8	5.3
Hydrocortisone	4	2.7
Betamethasone	2	1.3
<b>Timing of dose</b>		
AM	94	62.7
PM	2	1.3
Twice daily	36	24.0
<b>Route</b>		
Oral	104	69.3
Topical	28	18.7
Intra-lesional	14	9.7
Parenteral	4	2.7
<b>Adverse effects of steroid</b>		
Weight gain	58	38.7
Hyperglycaemia	28	18.7
Peptic ulcer disease	26	17.3

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Skin lightening	18	12.0
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**Table 3: Details of adjuvant agents co-administered with steroid medicine in study participants.**

Variable Co-medication	Unit		
	Dermatology	Rheumatology	Nephrology
Hydroxychloroquine	8	25	0
Azathioprine	0	8	0
Methotrexate	0	8	0
Mycophenolatemofetil	0	6	7
Omeprazole	6	14	0
Albendazole	6	0	0

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#### IV. DISCUSSION

This study showed that prednisolone is the most commonly prescribed corticosteroid among the study participants and that more than a third of participants on steroids did not receive any form of counselling before they were started on longer-term corticosteroid use.

The finding that prednisolone is the most commonly prescribed corticosteroid in this study is in keeping with reports from previous studies<sup>2,9</sup>, however, a study in which patients with respiratory disorders were in the majority of the study population reported dexamethasone as the more commonly prescribed.<sup>10</sup>

The choice of which corticosteroid to use is determined by the clinical indication, pharmacokinetic properties, duration of use, and adverse effect profile of the agent.<sup>2</sup> Methylprednisolone, which is similar to prednisone and prednisolone, has less mineralocorticoid activity and is thus preferred when mineralocorticoid effects are undesirable. Dexamethasone has minimal mineralocorticoid activity, but is more potent and has a longer duration of action than prednisolone. However long-term treatment with dexamethasone is associated with severe hypothalamic-pituitary-adrenal axis suppression.<sup>2,11</sup> The agent is commonly used for a short-term period and for very severe, acute conditions. The long duration of action of dexamethasone makes it unsuitable for alternate-day therapy.<sup>2,11</sup>

This study showed that the use of steroid-sparing agents for patients on long-term steroids is not a common practice among our physicians. Rheumatologists from this survey use steroid-sparing agents compared to their colleagues in nephrology and dermatology. This is because patients seen in rheumatology clinics tend to use higher doses of steroids and for a longer period compared to patients seen in other clinics in this study. The route of administration of steroids in patients attending dermatology clinics is mainly topical and intra-lesional. This route of administration allows for the use of smaller doses and is associated with fewer systemic adverse effects. Steroid sparing agents are indicated in patients in whom systemic steroids are ineffective or are contraindicated. They are also used when patients have to stop steroids because of adverse effects. Steroid sparing agents are also used as an adjuvant to corticosteroids or as monotherapy in place of steroids.<sup>12</sup> The use of steroid-sparing agents allows for partial withdrawal or reduction of doses of steroids.<sup>2</sup> This helps in reducing the incidence of adverse effects that are associated with these agents.<sup>2</sup> Steroid sparing agents are usually non-glucocorticoid immunosuppressive medicines. The commonest steroid-sparing agents prescribed for participants in this study were hydroxychloroquine and mycophenolatemofetil (MMF).

The most common adverse effects associated with chronic use of steroids are osteoporosis and fractures, cushingoid appearance and weight gain, and hyperglycemia.<sup>2</sup> In this survey, the commonest recorded adverse effect was weight gain, followed by hyperglycaemia. This adverse effect profile is in keeping with previous findings, however, because dual-energy x-ray absorptiometry (DEXA) scanning is not routinely done in our facility, the diagnosis of osteoporosis as an adverse effect is difficult.<sup>5</sup> Patients are advised to take steroids in the morning, this helps to reduce adrenal suppression and prevent sleep disturbance associated with taking the agents in the evening.<sup>5,13</sup> Most of the participants in the survey were on a single morning dose of steroids. Some of the physicians interviewed said that some of their patients were on twice-daily doses due to the high pill burden in those using very high doses of steroids.

It is recommended that patients to be placed on long-term steroid use should be counselled before treatment with these agents is started.<sup>2,10</sup> Patients should also be encouraged to read the information leaflet provided by the pharmaceuticals companies enclosed in the drug pack.<sup>2,10</sup> The units in the medicine department included in this study in the focus group discussion said that they routinely provide patients with counselling before starting them on steroids. The response from the participants showed that two-thirds of them recalled being given some form of counselling before they were started on the agents. This can be explained by the fact that none of the units has a written protocol for counselling patients, although they follow guidelines written by professional organizations for steroid use. Commencement of steroid use is not restricted to consultants in the

unit, resident doctors sometimes commence patients on steroids. Some of these residents are not aware of the standard practice in their units and they have moved around to other units frequently. In addition, the content of the counselling is not uniform across the different units. A previous study had shown that one in seven patients on steroids were unable to recall the indication for treatment, and only half could recall their doctor's advice on the likely side effects.<sup>14</sup>

## V. Conclusion

This study showed that some patients on long-term steroid therapy do not receive any form of counselling before they are started on this agent. Adverse effects from long-term use of steroids are common and must be actively looked for in patients during their follow-up clinic visits. When starting a patient on steroids, the physician must provide information on the intended benefits, dose, and the length of the course. Patients must also be told when and how they should stop taking steroids.

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Ogundele SO, et. al. "Use of corticosteroids in medical practice: Pattern of prescription, adverse effects and pre-prescription counselling practices." *IOSR Journal of Pharmacy (IOSRPHR)*, 12(7), 2022, pp. 12-16.