SJ Ophthalmology Africa
Vol. 3 No. 1 (2026): January 2026 Issue
https://doi.org/10.51168/2fdpw983
Original Article

A cross-sectional study on the adverse effects of Prolonged use of ocular corticosteroids among patients receiving eye care services at Jinja Regional Referral Hospital.

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Abstract

Background
Corticosteroids remain the mainstay of treatment for various ocular conditions affecting the ocular surfaces, anterior and posterior segments of the eye. This study assessed the adverse Effects of Prolonged use of ocular corticosteroids among patients receiving eye care services at Jinja Regional Referral Hospital.

Methodology
A descriptive cross-sectional study was employed, in which quantitative methods were used to collect data. A purposive method was used to choose the participants, a questionnaire method was used to collect data, and the Data was analyzed using Microsoft Excel. The data was presented in the form of tables, charts, and percentages.

Results
The majority, 28(70%) of the study participants were females, 25(62.5%) were aged 25years. The study revealed that prednisolone 20(50%), dexamethasone 10(25%), hydrocortisone 5(12.5%) and triamcinolone 5(12.5%) were the commonly used ocular corticosteroids, glaucoma 20(50%), cataract 10(25%), delayed wound healing 3(7.5%), corneal thinning 3(7.5%) and activation of infection 4(10%) were the common adverse effects of prolonged use of ocular corticosteroids.

Conclusion
The adverse effects of prolonged use of ocular corticosteroids among patients receiving eye care services included glaucoma, cataract, activation of infection, delayed wound healing, and, lastly, corneal thinning.

Recommendations.
Eye specialists should educate patients and other health workers about the adverse effects of prolonged use of ocular corticosteroids and should also carry out more research on their adverse effects.

Keywords: *Adverse effects, Ocular corticosteroids, Eye care services, Jinja Regional Referral Hospital, Uganda.*
Submitted: *October 20, 2024* ***Accepted:*** *December 03, 2025* ***Published:*** *January 01, 2026*

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Background.
Steroids are organic compounds with 17 core carbon atoms bonded in three fused cyclohexane and one fused cyclopentane ring (Fung et al., 2020). Corticosteroids remain the mainstay of treatment for various ocular conditions affecting the ocular surfaces, anterior and posterior segments of the eye, due to their anti-inflammatory, anti-edematous, and anti-neovascularization properties (Gaballa et al., 2021). Globally, according to a review article on Local delivery of ocular corticosteroids in clinical ophthalmology, locally administered steroids have a long history in ophthalmology for the treatment of inflammatory conditions. Anterior segment conditions are typically treated with topical steroids, whereas posterior segment conditions generally require periocular, intravitreal, or systemic administration to achieve adequate penetration. Locally administered steroids continue to retain a fundamental role in managing many ocular conditions (Fung et al., 2020).

In addition, in Africa, a case report of a rare case of bilateral post-intravitreal Avastin endophthalmitis with a good visual outcome was carried out in Lusaka, Zambia. Corticosteroids are anti-inflammatory drugs with immunosuppressive properties and were introduced for use in ophthalmology around the 1950s. However, the use in ocular infections has been associated with multiple systemic and local side effects that include ulcerative keratitis, glaucoma, cataracts, as well as delayed wound healing (Nyalazi et al., 2022). Furthermore, in East Africa, according to a prospective cohort study on the side effects of local corticosteroid therapy (maxidrol and chibrocadron eye drops) among patients with allergic conjunctivitis at KUTH, Kigali

Rwanda, it revealed prolonged use of these topical agents can be associated with certain local and serious side effects, including increase in intraocular pressure (IOP), glaucoma, cataract, delayed wound healing, exacerbations of viral infections of the conjunctiva and susceptibility to secondary infection as well (Saiba et al., 2017).

In conclusion, the study aims to identify the commonly used ocular corticosteroids, their adverse effects, and the prevalence of the adverse effects among patients receiving eye care services at Jinja Regional Referral Hospital.

Methodology.

Study design.

A descriptive cross-sectional study involving quantitative methods was used to identify the adverse effects of prolonged use of ocular corticosteroids among patients receiving eye care services at JRRH. This was because this study design was quicker and easier to use.

Study area.

The study was carried out in the eye department of Jinja Regional Referral Hospital in Jinja City, Central Division, near the source of the Nile in Eastern Uganda.

Study population.

The study was carried out among patients who received eye care services at JRRH and had been prescribed ocular corticosteroids.

Sample size determination.

The sample size was determined using Button's 1995 method below.

Sample size S=GR/O

Where S was the sample size.

G was the number of people interviewed per day.

R was the maximum number of days for data collection.

O was the maximum time an interviewer takes on each patient.

G=4 people, R=5days, O= (30/60) =0.5 hours

Therefore, S= (4x5)/0.5= 40 respondents

Sampling technique.

In this study, a purposive method was used to choose the participants, whereby only those patients who had been prescribed ocular corticosteroids for a long time at JRRH were involved. The purposive method was used because it was time-effective and cost-friendly.

Sampling procedure

Patients who attended eye care services at the eye clinic of JRRH were involved in the study, in which purposive sampling was used to select participants, based on the fact that they had used ocular corticosteroids for a long time. The purpose of the study was explained to them to ensure voluntary participation. After the consent, questionnaires were given to the selected group, and data were collected.

Data collection method

The questionnaire method to collect data was used, which involved asking the patients questions concerning the study.

Data collection tools

A structured questionnaire, which consisted of both open and closed-ended questions, written in simple and understandable language about the specific objectives, was used.

Data collection procedure

A letter from the research committee was sent to the management of JRRH and the Eye Department to allow the researcher to collect data from the patients. The researcher identified an assistant who was first trained and then helped him to fill out the questionnaires. Rapport was created with the respondents, and they were reassured about confidentiality. The questions were read and interpreted for the respondents to understand. Data was filled in English by the researcher and the research assistant.

Study Variables

The independent variable of this study was the prolonged use of ocular corticosteroids, and it was measured in weeks beyond eight weeks. The dependent variable was the adverse effects among the patients who received eye care at JRRH; the variable was measured according to the severity of the effect.

Quality control.

The questionnaire was pretested to identify any errors. Disinfection and gloving were done to adhere to the standard operating procedures.

Inclusion criteria

The study included only the patients who received eye care services from the eye clinic in JRRH and had used ocular corticosteroids for a long time, and only those who consented to take part in the study.

Exclusion criteria

Patients who received eye care services from the eye clinic in JRRH but were mentally disturbed, and those patients who were not willing to participate in the study.

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Data analysis and presentation
Data was analyzed using Microsoft Excel. The data was presented in the form of tables, charts, and percentages.

Ethical approval.
Ethical consideration
An introductory letter from the principal of Ophthalmic Clinical Officers Training School, Jinja, was presented to the hospital director of JRRH to give the researcher permission to carry out research at Jinja Regional Referral Hospital. The hospital director introduced the researcher to the head of the eye department.

Informed consent
Written consent was sought from the respondents after the explanation of the study topic. The respondents were assured of their right to consent or not to. Confidentiality was reassured to the respondents before the start of the process of data collection. Numbers were assigned to each respondent to avoid disclosure of their names.

Results.
Prevalence of the adverse effects of prolonged use of ocular corticosteroids

Table 1: Showing the demographic data of the respondents.

VARIBLES	CATEGORY	FREQUENCY(n=40)	PERCENTAGE (%)
Gender	Male	12	30
	Female	28	70
Age (years)	Below 25	25	62.5
	25-45	5	12.5
	Above 65	10	25
Tribe	Musoga	30	75
	Muganda	5	12.5
	Mugisu	5	12.5
Religion	Anglican	10	25
	Catholics	10	25
	Born again	12	30
	Moslems	8	20
Education level	Primary	15	37.5
	Secondary	10	25
	Tertiary	15	37.5
Are you employed	Yes	15	37.5
	No	25	62.5

Table 1 shows that out of the 40 respondents, by gender, most of the respondents were females, 28(70%), and the remaining 12(30%) were male. By age, 25(62.5%) respondents were below 25years, 5(12.5%) respondent were between the age of 25 years and 45years, 10(25%) respondents were above 45years.By tribe, 30 (70%) respondents were Basoga, 5(12.5%) respondents were Baganda, and 5(12.5%) respondents were Banyankole. By religion, 10 (25%) respondents were Anglicans, 1025% were Catholics, 12(30%) respondents were born again, and 8(20%) respondents were Muslims. By education level, 20(50%) respondents were of primary level, 15(37.5%) respondents were of secondary level, and 5(12.5%) respondents were of tertiary level. By employment, 15(37.5%) respondents were employed, 25(62.5%) respondents were unemployed.

Commonly used ocular corticosteroids.

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Figure 1: showing the ocular conditions the respondents had (n=40).

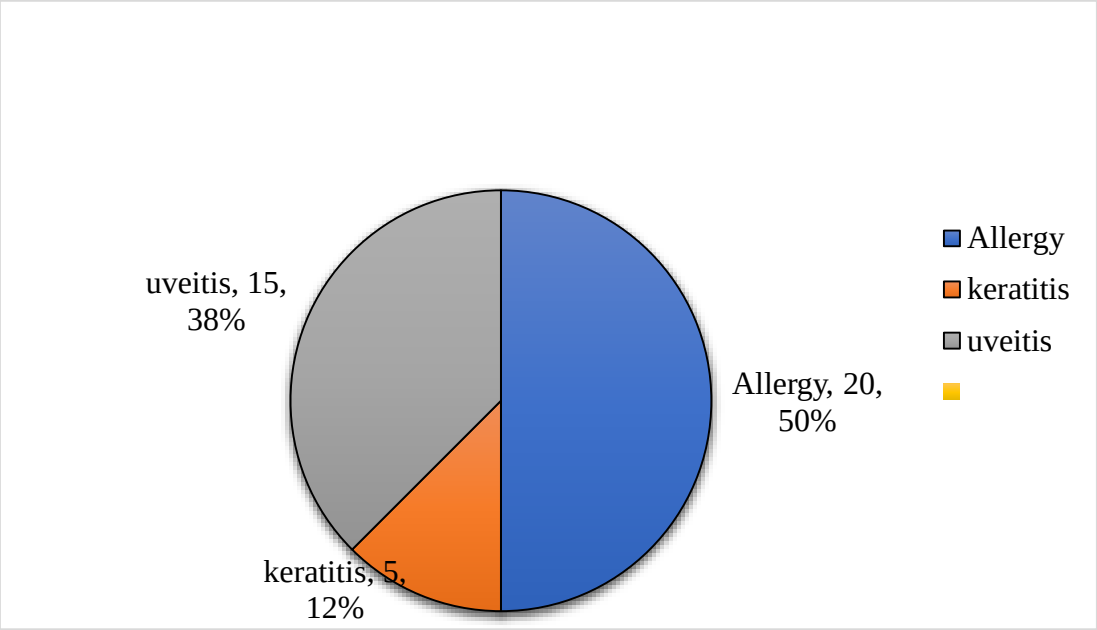

Figure1 showing that 20(50%) respondents had allergy, 15(38%) respondents had uveitis and 5(12%) respondents had keratitis.

Table 2: Showing how long the respondents had had the condition.

Variables	Frequency(f) (n=40)	Percentage (%)
From childhood	20	50
Less than a year	15	37.5
More than a year	5	12.5

Table 2 shows that 20(50%) respondents had the condition from childhood, 15(37.5%) respondents had the condition for less than a year, and 5(12.5%) respondents had the condition for more than a year.

Table 3: Showing whether the respondents used any ocular drug.

Variable	Frequency(f) (n=40)	Percentage (%)
Yes	40	100
No	0	0

Table 3 shows that 40(100%) respondents used ocular drugs.

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Figure 2: Showing the drugs the respondents used.

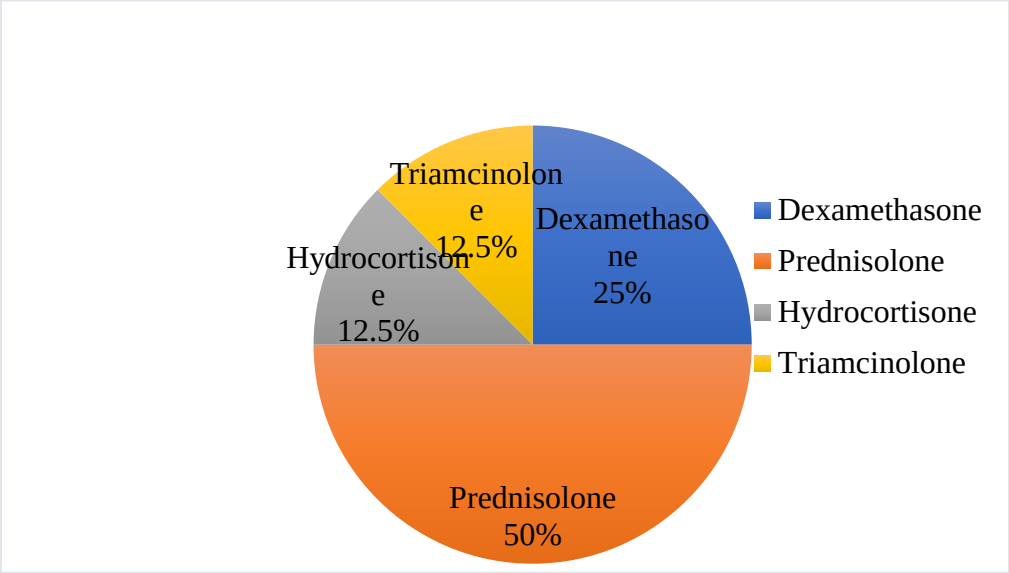

Figure 2 showing that 20(50%) respondents used prednisolone, 10(25%) respondents used dexamethasone, 5(12.5%) respondents used hydrocortisone and 5(12.5%) respondents used triamcinolone.

Table 4: Showing how long the respondents used the drug.

Time in weeks	Frequency(f) (n=40)	Percentage (%)
Less than 8 weeks	8	20
8 weeks	14	35
More than 8 weeks	18	45

Table 4 shows that most of the respondents, 18(45%), used the drug for more than 8 weeks, 14(35%) used the drug for 8 weeks, and finally 8(20%) used the drug for less than 8weeks.

Common adverse effects of prolonged use of ocular corticosteroids

Figure 3: Showing the different conditions the respondents had.

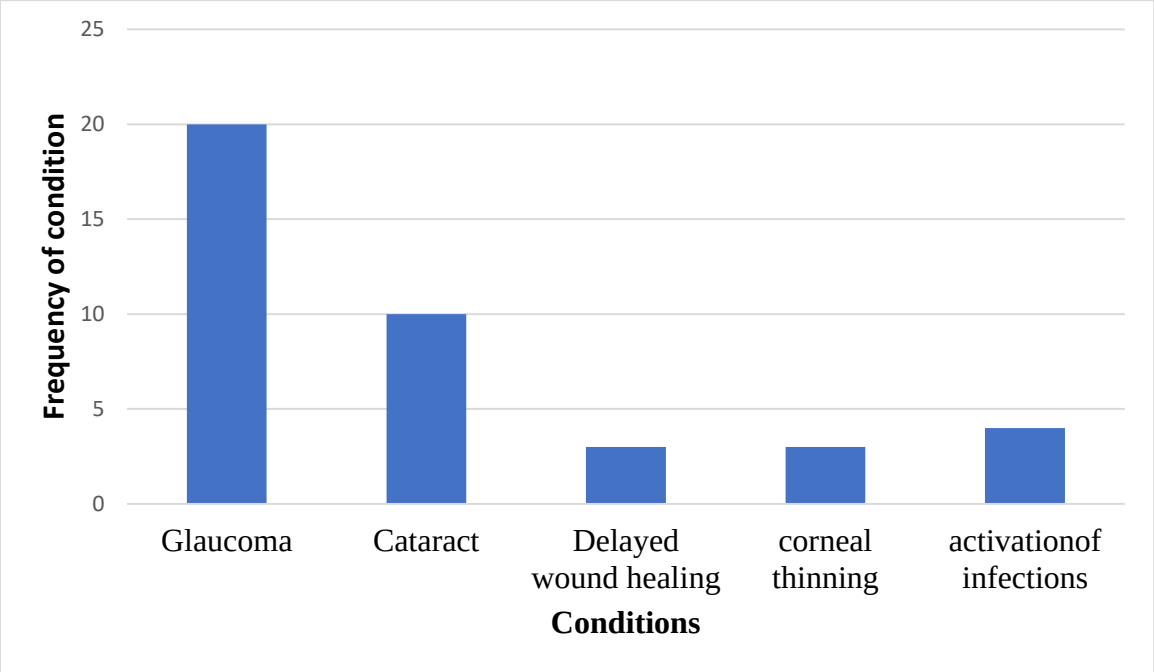

Figure 3 showing that out of 40 respondents, half 20(50%) had glaucoma, 10(25%) had cataract, 3(7.5%) had delayed wound healing, 3(7.5%) had corneal healing and 4(10%) had activation of infection.

Table 5: Showing when the condition started.

When the condition started	Frequency(f) (n=40)	Percentage (%)
Before using the drug	22	55
After using a drug	18	45

Table 5 shows that more than half of the respondents, 22(55%), had the condition before using the drug, while the rest 18(45%) got the condition after using the drug.

Table 6: Showing how long the respondents have had the condition.

How long the respondent had had the condition	Frequency(f)	Percentage (%)
Less than a year	22	55
More than a year	18	45

Table 6: showing that more than half of the respondents, 22(55%), had the condition for less than a year, and the rest 18(45%) had the condition for more than a year.

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Vol. 3 No. 1 (2026): January 2026 Issue
https://doi.org/10.51168/2fdpw983
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Figure 4: showing what the ophthalmologists said was the cause of the condition

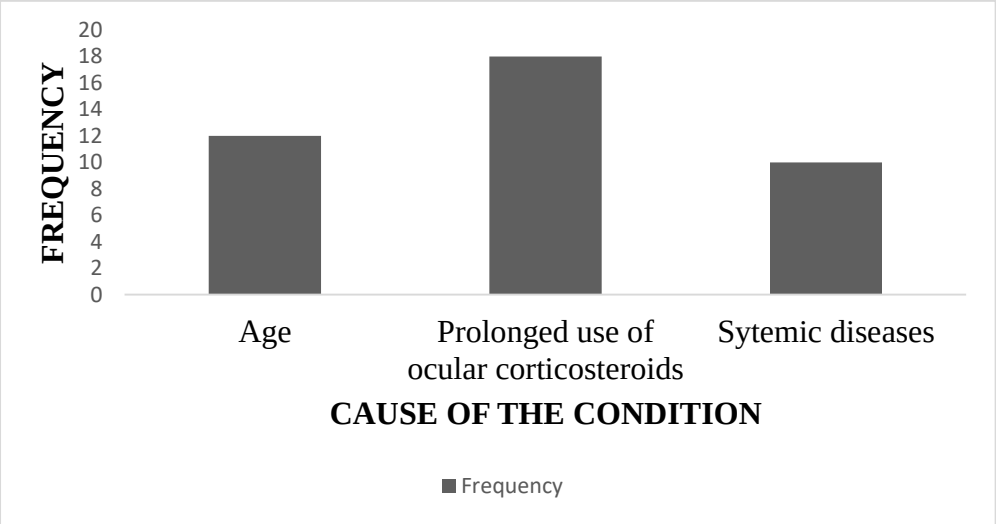

Figure 4 shows that out of the 40 respondents, 18(45%) had prolonged use of ocular corticosteroids as the main cause for the condition, 12(30%) had age as the cause of their condition, and 10(25%) had systemic diseases as the cause.

Discussion of results.

Prevalence of the adverse effects of prolonged use of ocular corticosteroids

After data analysis and interpretation, the study results revealed that prevalence of the adverse effects affected both genders but was more dominant among the females, that is 28(70%) females and 12(30%) males this is because of the large number of the females compared to the males countrywide and also better health seeking behavior of females compared to the males.

Furthermore, the study revealed that the prevalence of the adverse effects was highest in respondents below 25years 25(62.5%) and moderate in those above 45years 10(25%) and lowest in those between 25years and 45years 5(7.5%) because those below 25years and those above 45years their immunity was fragile and unstable therefore easily be affected compared to those between 25years and 45 years whose immunity was stable therefore not easily affected.

To add to that, the study revealed that the prevalence of the adverse effects was highest among the Basoga 30(75%) compared to other tribes. This was because the hospital was located in the Busoga region, with the majority of the population being Basoga.

In addition to that, the study revealed that the prevalence of the adverse effects mainly affected the Born Agains, Anglicans, and Catholics than the Muslims because of the Christians being more than the Muslims countrywide.

Furthermore, the study showed that the prevalence of the adverse effects was highest among those with a lower education level, 25(62.5%), compared to those with a higher education level, 15(37.5%), because those with a lower education level were ignorant, and others had little information on the adverse effects of the prolonged use of corticosteroids.

And lastly, the study revealed that the prevalence was higher in the unemployed 25(62.5%) compared to the employed (37.5%) because some unemployed were unable to buy the prescribed drugs and others were still under the care of others, having little say on what drugs they needed since the drugs were just bought for them by the care takers who bought what they could afford.

This study agrees with a prospective cohort study that was carried out on the side effects of local corticosteroid therapy (Maxitrol and Chibrocadron eye drops) among patients with allergic conjunctivitis at KUTH, Kigali, Rwanda. In which both sexes participated, with females 55% being dominant compared to males 45% because of their high number countrywide. Where the majority of the participants were between 21 and 25 years, and a minority between 51 and 55 years, and the educational levels were 14.4% no formal education, 24.4% primary education, 39.4% secondary education, 21.9% tertiary education (Saiba et al., 2017)

Commonly used ocular corticosteroids.

In order to find out the commonly used ocular corticosteroids, the study identified the conditions in which the corticosteroids are used, and it revealed that corticosteroids were mostly used in allergy 20(50%), followed by uveitis 15(37.5%), then keratitis 5(12.5%). This

was because allergy is an ocular condition that affects most of the population.

In addition to that, the study focused on how long the respondents had had the conditions in which ocular corticosteroids were used, and it revealed that most of the respondents had the condition from childhood, 20(50%), 15(37.5%) respondents had the condition for less than a year, and 5(12.5%) respondents more than a year. This was because some of the conditions were related to genes, others were seasonal, and others were recurrent.

Furthermore, the study revealed that all the respondents, 40(100%), had used ocular drugs. This was because the study was focused on respondents who had been prescribed and used ocular corticosteroids for a long time.

Most importantly, the study revealed that the commonly used corticosteroids were prednisolone 20(50%) being the most used, dexamethasone 10(25%) being the second most used, hydrocortisone 5(7.5%), and triamcinolone 5(7.5%) being the least used. This was because prednisolone is the most well-known and available brand on the market, the most prescribed and potent drug compared to the other drugs.

Finally, the study revealed that the commonly used corticosteroids are mostly used for more than 8weeks and least used for less than 8weeks. This was because the conditions in which they were used took a long time to resolve, and others were recurrent.

This study agrees with a review article on corticosteroids in ophthalmology that revealed that prednisolone, prednisolone acetate, dexamethasone, triamcinolone acetonide, fluocinolone acetonide, and loteprednol etabonate were the most widely used ophthalmic corticosteroids (Gaballa et al., 2021).

Common adverse effects of prolonged use of ocular corticosteroids.

The study revealed that the common adverse effects of prolonged use of ocular corticosteroids were glaucoma, cataract, delayed wound healing, corneal thinning, and activation of infections. And glaucoma 20(50%) was the commonest, then cataract 10(25%), activation of infection 4(10%), delayed wound healing 3(7.5%), and corneal thinning 3(7.5%). This was because the intraocular pressures easily increased in a short time in patients.

Furthermore, the study revealed that most of the conditions started before the respondents, 22(55%), began to use the drug, and others, 18(45%), started after using the drug. This was because most of these conditions were congenital, traumatic, and others were age-related; therefore, there was a big possibility that the respondents had the conditions before using the drug.

The study revealed that the ophthalmologist said the cause of the conditions was mainly 18(45%) prolonged use of ocular corticosteroids, followed by 12(30%) age, and 10(25%) systemic conditions. This was because most of the respondents who took part in the study had been prescribed corticosteroids, as it was one of the requirements to take part in the study.

The study agrees with an article on ocular side effects of corticosteroids, which revealed that there were four important ocular effects of ocular corticosteroids, and these were steroid-induced glaucoma, cataract formation, delayed wound healing, and increased susceptibility to infection (Aggarwal et al., 2018).

Conclusions

The prevalence of the adverse effects was highest in females, amongst those below 25years, unemployed, and those with a lower educational level.

The study also revealed that the commonly used ocular corticosteroids were prednisolone, dexamethasone, hydrocortisone, and triamcinolone.

The study revealed that the common adverse effects of prolonged use of corticosteroids were glaucoma, cataract, delayed wound healing, corneal thinning, and activation of infections.

Recommendations

Patients should be advised to avoid self-medication to avoid the adverse side effects of prolonged use of ocular corticosteroids that would result from the self-medication of corticosteroids.

An eye specialist should be consulted about the corticosteroids to be informed about their adverse effects, so that they take caution when using the drug.

Should eye specialist health educators educate the clients and other health workers about the adverse effects of prolonged use of ocular corticosteroids to create awareness?

Eye specialists should opt for alternative drugs with little or no adverse effects instead of using ocular corticosteroids.

An eye specialist should do a proper prescription of the ocular corticosteroids for the clients, taking into consideration their effects on the client.

An eye specialist should carry out research to identify more adverse effects of prolonged use of corticosteroids to prevent them.

Should enhance regulatory mechanisms to monitor steroid prescribing and dispensing practices.

Acknowledgement.

I would like to send my sincere gratitude to my sweet parents for their unconditional love and financial support towards me.

Also, special thanks to my dear supervisor, Mrs. Alimwenda Viola, for her full-time guidance and assistance as I was doing my research.

Not forgetting the SJ Education Research Africa for their guidance, also.
My sincere thanks to the entire OCO family for the support and conducive environment for my study.

List of abbreviations

JRRH Jinja Regional Referral Hospital
IOP Intraocular pressure
SIG Steroid-Induced Glaucoma
TA Triamcinolone Acetonide
DA Dexamethasone Acetonide
FA Flucinolone Acetonide
KUTH Kigali University Teaching Hospital
Dr Doctor

Source of funding

The study was not funded.

Conflict of interest.

There is no conflict of interest.

Availability of data.

Data used in this study are available upon request from the corresponding author.

Author's contribution.

SN designed the study, conducted data collection, cleaned and analyzed data, drafted the manuscript, and VA supervised all stages of the study from conceptualization of the topic to manuscript writing and submission.

Authors biography

Suzan Nakimera is a student of the Diploma in Clinical Ophthalmology at the Ophthalmic Clinical Officers' Training School, Jinja.
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SJ Ophthalmology Africa
Vol. 3 No. 1 (2026): January 2026 Issue
https://doi.org/10.51168/2fdpw983
Original Article

PUBLISHER DETAILS:

SJC PUBLISHERS COMPANY LIMITED

Catergory: Non Government & Non profit Organisation
Contact: +256 775 434 261 (WhatsApp)
Email: info@sjpublisher.org or studentsjournal2020@gmail.com
Website: https://sjpublisher.org
Location: Scholar's Summit Nakigalala, P. O. Box 701432,Entebbe Uganda, East Africa