

# Etiological Factors Contributing to Orbital and Oculoplastic Conditions at University Teaching Hospital in Zambia: A Comprehensive Analysis

## ABSTRACT

### Purpose:

Orbital, Oculoplastic including Ocular Oncology are not only sight threatening but potentially life threatening. This study examines the causes of these conditions at University Teaching Hospitals-Eye Hospital in Lusaka Zambia.

### Methods:

A retrospective review of 150 case files of patients with an Orbital, Oculoplastic and Ocular Oncology diagnosis presenting at UTHs-EH over a 4-year period, 2018-2021.

### Results:

Of the 150 cases 54% were under the age of 40 years. The most common condition seen was squamous cell carcinoma of the conjunctiva (SCC), usually confined to the globe, but sometimes spreading to the orbit. There was a positive association between HIV infection and SCC.

### Conclusion:

This study at University Teaching Hospital revealed a spectrum of orbital and oculoplastic diseases, with Squamous Cell Carcinoma emerging as a predominant concern. The insights gained pave the way for enhanced service delivery. These findings, while specific to Zambia, hold relevance for the broader African context, offering a basis for future assessments, interventions, and policy enhancements.

Key word: Oculoplastic, Ocular diseases

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## INTRODUCTION

Orbital, oculoplastic, and ocular oncology diseases involve conditions that affect the eye and its surrounding structures. They not only cause disfigurement but also visual dysfunction and, in some cases, can lead to death. Treatment for these conditions usually fall under the ophthalmological subspecialties of orbital disease, oculoplastic, or ocular oncology (1). These areas of specialization are increasing in high income countries but still in their infancy in low- and middle-income countries. The management of these conditions has some degree of overlap and requires a specialized range of medical facilities to be in place.

The management of orbital, oculoplastic, and ocular oncology diseases in Africa is problematic and the outcome less than optimal for the following reasons:

1. The presentation is often late.
2. There are few trained specialists in orbital and oculoplastic diseases.
3. There are often limited resources for investigation and treatment.

To improve services for patients with orbital, oculoplastic, and ocular oncology diseases in Africa we investigated the causes in a tertiary eye hospital in Lusaka, Zambia, with a view to future evaluation of management and outcome.

There are limited studies that discuss the causes and management of orbital, oculoplastic and ocular oncology diseases from low-income countries. As these oculoplastic are closely related in their management and treatment rather than examining individual orbital, oculoplastic and ocular oncology diseases as most studies do there is a need to look at them together to plan services for these conditions efficiently.

## OBJECTIVE

To report the causes of orbital, oculoplastic and ocular oncology diseases presenting at a tertiary eye hospital in Lusaka, Zambia.

## STUDY DESIGN

A retrospective study of all cases of orbital, oculoplastic and ocular oncology diseases seen at University Teaching Hospitals-Eye Hospital (UTHs-EH) between 2018-2021.

The information was collected using a purposely designed form and entered a laptop for analysis in Microsoft Excel 2019.

### Inclusion Criteria

Any condition that primarily affects the orbit of the eye, and any condition that requires oculoplastic treatment / surgery of the eyelids, lid margins, conjunctival fornixes, or tear ducts, which a general ophthalmologist in Zambia is not comfortable to manage.

### Exclusion Criteria

Conditions requiring oculoplastic treatment/surgery that a general ophthalmologist in Zambia is comfortable managing e.g. chalazion, pterygium.

## RESULTS

Of 311 case files listed in the register 47 were repeat entries, 49 could not be found and 215 could be traced, Of the 215, 31 were excluded for wrong diagnosis, 4 for incomplete information and 30 for duplicate files, leaving 150 case files analysis.

### Participant demographics

Of the 150 cases, 85 (56.7%) were female. The majority of cases, 121 (80.7%) had an oculoplastic diagnosis. Patients under the age of 20 years accounted 22.7% (n=34); 31.3% (n=47) were 20-39 years and 46% (n=69) over the age of 40 years. Table 1

Table 1 Demographics

VARIABLE	Orbital Disease n, %	Oculoplastic Disease n, (%)	Total n, (%)
2018	3	28	31
2019	6	28	34
2020	12	37	49
2021	8	28	36
Male	12 (8%)	53 (35.3%)	65 (43.3%)
Female	17 (11.3%)	68 (45.3%)	85 (56.7%)

0-9 years	7, (4.6%)	17, (11.3%)	24, (16.0%)
10-19	3, (2.0%)	7, (4.6%)	10, (6.7%)
20-29	1, (0.7%)	17, (11.3%)	18, (12.0%)
30-39	4, (2.6%)	25, (16.7%)	29, (19.3%)
40-49	9, (6.0%)	30, (20.0%)	39, (26.0%)
50-59	2, (1.3%)	13, (8.7%)	15, (10.0%)
60-69	2, (1.3%)	7, (4.6%)	9, (6.0%)
70-79	0, (0%)	2, (1.3%)	2, (1.3%)
80+	1, (0.7%)	3, (2.0%)	4, (2.7%)
<b>Total</b>	<b>29, (19.3%)</b>	<b>121, (80.7%)</b>	<b>150</b>

### Causes

The major cause of orbital disease was found to be orbital cellulitis/endophthalmitis (n=10) with squamous cell carcinoma with orbital extension (n=7) and other orbital tumours (n=7) being the second cause. Squamous cell carcinoma was found to be the leading cause of oculoplastic disease with 64 cases. Overall, 71 (47.3%) of all cases were due to squamous cell carcinoma. Table 2.

**Table 2: Major Causes**

Diagnosis	Orbital Disease		Oculoplastic Disease		Total	
	n	%	n	%	n	%
Squamous Cell Carcinoma	7	24.1%	64	52.9%	71	47.3%
Entropion/Ectropion	0	0.0%	12	9.9%	12	8.0%
Unspecified Conjunctival Growths	0	0.0%	11	9.1%	11	7.3%
Nasolacrimal Duct Obstruction	0	0.0%	10	8.3%	10	6.7%
Orbital Cellulitis	10	34.5%	0	0.0%	10	6.7%
Other orbital tumors	7	24.1%	0	0.0%	7	4.7%

Ptosis	0	0.0%	7	5.8%	7	4.7%
Dacryocystitis	0	0.0%	4	3.3%	4	2.7%
Retinoblastoma	3	10.3%	0	0.0%	3	2.0%
Trauma	1	3.4%	0	0.0%	1	0.7%
Suspected Thyroid eye disease	1	3.4%	0	0.0%	1	0.7%
Other causes*	0	0.0%	13	10.7%	13	8.7%
<b>Total</b>	<b>29</b>	<b>100.0%</b>	<b>121</b>	<b>100.0%</b>	<b>150</b>	<b>100.0%</b>

\* (others include staphyloma, dermoid cysts, pterygium, lid dermo-gangrene, molluscum contagiosum, severe lid lacerations, lateral canthal growths, lagophthalmos)

### Aetiology and Predisposing Factors

A positive test for HIV infection was found in 63 / 150 (42%) of patients. A history of trauma was given in 12 (8%) and the condition was present at birth in 9 cases (6%). Trachoma (n=7) or other infections (n=6) occurred in 8.7% of all cases. Table 3

**Table 3: Aetiology and Predisposing Factors**

Aetiology / Predisposing factors	Orbital Disease		Oculoplastic Disease		Total	
	n	%	N	%	n	%
HIV Infection	9	30.0%	54	45.0%	63	42.0%
Trauma	4	13.3%	8	6.7%	12	8.0%
Congenital	3	10.0%	6	5.0%	9	6.0%
Trachoma	0	0.0%	7	5.8%	7	4.7%
Known Infection	2	6.7%	4	3.3%	6	4.0%
Previous Eye Disease	0	0.0%	2	1.67%	2	1.3%
None	12	40.0%	39	32.5%	51	34.0%
<b>Total</b>	<b>30</b>	<b>100.0%</b>	<b>120</b>	<b>100.0%</b>	<b>150</b>	<b>100.0%</b>

### Association of HIV Infection and SCC

Analysis of the 116 cases aged 20 years and over showed that of the 71 cases with SCC, 55 (77.5%) had a positive HIV infection compared with 5 of 38 cases (13.2%) who did not have

SCC. Of the 7 cases with an unspecified conjunctival growth 2 cases (28.6%) were positive for HIV. (p value <0.001). Table 4.

**Table 4: HIV infection and SCC**

Diagnosis	HIV +	HIV -	TOTAL	% HIV +
SCC positive	55	16	71	77.5%
unspecified conjunctival growth, SCC	2	5	7	28.6%
Not SCC -	5	33	38	13.2%
<b>Total</b>	<b>62</b>	<b>54</b>	<b>116</b>	<b>53.4%</b>

## DISCUSSION

### Demoics

Females made up 56.7% of the 150 case files reviewed. This finding is similar to a study done in Nigeria by Balogun et al(1) which stated that of the 269 patients they reviewed with orbital and oculoplastic conditions 52.4% were female. However, our findings are in contrast with another study carried out in Nigeria(2) where 52.8% of their patients with these conditions were male. Table 5.

The data shows the most affected age range for these diseases was between 30-49 years (45%). These results are similar to those reported by Omotoye et al(2). Several studies(1,2,3) have found that Oculoplastic diseases were more common than orbital diseases and the findings of this study suggest the same with 80.7% of the cases being oculoplastic. It is of importance to note that overall, 54% of patients included in the study were under the age of 40 years.

**Table 5: Published papers on Orbital / Oculoplastic / Ocular Oncology**

Year/Author	Setting	Study Design	Summary of Findings	Conclusion
2012 E. Ackukuaku-Dogbe(4)	Ghana	Histological study of 190 orbital and adnexal tumours	<ul style="list-style-type: none"> <li>• 54.7% malignant,</li> <li>• 27.9% benign, (Retinoblastoma and Burkitt's lymphomas were excluded from this study)</li> </ul>	Squamous cell carcinoma (SCC) most common tumour
2014 Bolanle G Balogun(2)	Nigeria	Prospective study of 269 patients with orbital - oculoplastic disease.	<ul style="list-style-type: none"> <li>• 52.4% female</li> <li>• eyelid diseases 42.8%</li> <li>• orbital and peri- orbital lesions 16.4%</li> </ul>	

2019 Oluwatobi O Idowu et al(6)	Nigeria	Survey of 155 ophthalmologists about oculoplastic services.	<ul style="list-style-type: none"> <li>• common conditions eyelid trauma, orbital inflammatory disease</li> <li>• most common procedures, globe removal, eyelid reconstruction and lacrimal procedures</li> </ul>	Identified barriers, few trained oculoplastic surgeons, lack of training centres and access to services.
2017 Olusola J Omotoye (3)	Nigeria	Retrospective study of 180 patients	<ul style="list-style-type: none"> <li>• Conjunctival disorders 58.9%</li> <li>• Mean age 41.</li> </ul>	Need for training in oculoplastic surgery
2012 Marcus Jin tan et al(4)	Singapore	Prospective review of 623 patients with oculoplastic conditions	<ul style="list-style-type: none"> <li>• eyelid (60.3%),</li> <li>• orbital (20.6%),</li> <li>• lacrimal (16.3%),</li> <li>• dysthyroid (6.0%).</li> <li>• surgical procedures were: eyelid 77.4%, lacrimal 13.1%, orbit 9%.</li> </ul>	More surgical training with emphasis on Lacrimal and orbital pathologies as these have higher morbidity.
2018 Berete C.R et al (6)	Cote d'Ivoire	Retrospective study of 79 paediatric cases of orbital tumour	<ul style="list-style-type: none"> <li>• most common tumours retinoblastoma, Burkitt's lymphoma, rhabdomyosarcoma</li> </ul>	Early diagnosis is necessary to reduce mortality
2014 Rajiv B. Khaandekar et al(7)	Saudi Arabia	Retrospective Study of 4,146 patients with ocular tumours	<ul style="list-style-type: none"> <li>• 39.5% malignant</li> <li>• Retinoblastoma main tumour in children</li> <li>• SCC main malignant tumour in adults</li> </ul>	

In this study half (52.8%) of the adults with these diseases had SCC, a similar finding to other studies (5,8).

Eyelid pathologies - Ectropion/Entropion 12 (9.9%) and Ptosis 7 (5.8%) were the second leading cause of oculoplastic diseases in this study, while in Singapore(4) and Nigeria(2) they were the leading cause of oculoplastic conditions.

Orbital cellulitis (n=10, 34.5%) and Other Orbital tumours (n=7, 24%) were the main causes of Orbital diseases in our study. Surprisingly there was only 1 case in the 4-year period of thyroid eye disease, this may be due to case files being kept in medical clinics and not included in this analysis.

## Aetiology and Predisposing Factors

The most obvious finding to emerge from the analysis is that HIV infection was a major predisposing factor for SCC. The findings of this study are consistent with data obtained in other studies (9–11).

Ocular Surface Squamous Neoplasia (OSSN) refers to a range of tumours that affect the ocular surface of the eye which are be classified according to histopathological findings of the excised lesions. Early stages of OSSN include mild dysplasia and advanced stages invasive squamous cell carcinoma that, if left untreated can involve the eyelids, orbit, and the brain. There is a higher incidence of OSSN in Africa then other regions(12) associated with a higher prevalence of HIV infection. Table 6.

**Table6: Ocular Surface Squamous Neoplasia (OSSN)**

Year/Author	Setting	Study Design	Summary of Findings	Conclusion
2021 / P Julius et al(8)	Zambia	265 patients presenting with OSSN	<ul style="list-style-type: none"><li>• 63.8% HIV positive</li><li>• Invasive OSSN 45.3%</li><li>• Mean age 36</li></ul>	OSSN strongly associated with HIV infection.
2017 / S Gichuhi et al(10)	Kenya	Prospective study of 158 patients with OSSN	<ul style="list-style-type: none"><li>• Mostly female</li><li>• 71% HIV positive</li><li>• Delay in presentation associated with number of health facilities visited and being female</li></ul>	Early detection and referral of OSSN can reduce delay in presentation.
2021/ Oluyemi Fasina(10)	Nigeria	Retrospective study of 86 patients with OSSN	<ul style="list-style-type: none"><li>• 51.2% male</li><li>• Mean age 48.2.</li><li>• 50% HIV positive</li><li>• 34.9% Advanced tumour</li></ul>	OSSN occurs in younger age group and associated with HIV infection.

## Limitations and Strengths

As this is a hospital-based study it may not be representative of the population and the results cannot be generalised.

As it is a retrospective study using a paper-based data system at UTHs-EH, case files that had missing data and which were untraceable were not included in the research, therefore some information may have been missed.

Two strengths of the study are its scope and size. Few if any studies combine orbital, oculoplastic and neoplastic conditions and yet the specialist requirements for these conditions are often combined particularly in settings with limited resources. Knowing what they have in common and what they require which is different is important if services in this speciality are to be improved.

## CONCLUSION

This study identified that there is a wide range of orbital and oculoplastic diseases presenting at University Teaching Hospital. The major one being Squamous cell carcinoma. The findings of this research will act as a stepping stone providing significant information needed to improve service delivery for people suffering from these conditions. Our objective was to

shed light on the causes of these challenges, focusing on demographic patterns, major disease categories, and associated predisposing factors. The predominance of squamous cell carcinoma, especially in association with HIV infection, highlights the intricate interplay between infectious diseases and ocular manifestations, emphasizing the need for a holistic approach to patient management.

While our study provides valuable insights into the specific context of Zambia, the broader implications extend to the wider African region, where similar challenges are likely prevalent. The findings serve as a foundation for future evaluations of management strategies and outcomes, aiming to inform targeted interventions and policy changes.

#### **Ethical Approval**

**Ethical approval was obtained from LSHTM, ERES converge IRB and National Health Research Authority-Zambia.**

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