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Profile of Ocular Trauma among Patients attending A Regional Referral Hospital in Tanzania

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Abstract

Background

Ocular trauma is a major cause of blindness worldwide. It has an impact on all the aspects of an individual's life. This study aimed to assess the profile of ocular trauma among patients who attended the eye clinic at Mawenzi Regional Referral Hospital.

Methodology

This was a descriptive retrospective cross-sectional hospital-based study of patients who attended Mawenzi Regional Referral Hospital from 31st August 2017 to 30th August 2019. It included all patients with ocular trauma who attended the hospital during the study period. All case notes of patients who had ocular trauma were retrieved. A total of 677 patients were attended for ocular trauma between August 2017 and August 2019; in which 329 and 348 patients were attended in first and second year respectively. A predetermined proportion of case files of patients to be included in the study was calculated for each year based on the total number of patients attended in the particular year. Therefore 48 case files were selected for the first year and 51 for the second year making a sample size of 99 case files. Data was analyzed using the Statistical Package for Social Sciences version 20.0.

Results

The magnitude of ocular trauma in our study was 5.1%. Unilateral eye trauma accounted for 85.9% of all the cases. The mean age was found to be 30 years with ages ranging from 1 to 85 years. The commonest age group affected was 16 to 30 years (35.4%). There was a male to female ratio of 2:1 with males having a higher rate of sustaining ocular injury (66.7%). Majority of the patients presenting at the hospital were from the rural areas (72.7%). Mechanical causes represented the highest percentage of cases (73.7%) with sticks being the commonest agents of injury (26.3%). Closed globe injuries presented more frequently (71.7%). The most common place of sustaining ocular injuries was reported to be at home (29.3%) and at the workplace (27.3%).

Conclusion

Ocular trauma was seen to be of significant magnitude at Mawenzi Regional Referral hospital. A large number of cases resulted from mechanical causes with sticks being the commonest agents. Closed globe injuries were found to be more common than open globe injuries. Most of the ocular trauma cases were sustained at home followed by the workplace.

Keywords: *Ocular trauma, Ocular injuries, Open globe injury, Closed globe injury.*

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Introduction

Ocular trauma refers to any wound or injury to the eye, its nearby related structures, the orbit or the structures surrounding the orbit (1). The eye only stands for 0.27% of the total body surface area and 4% of the face, yet it accounts for the third most common organ affected by trauma in the human body (2). The Birmingham Eye Trauma Terminology (BETT) classifies ocular trauma into open and closed globe injuries. It further classifies open globe injuries into ruptures and lacerations. The lacerations are then categorized into penetrating trauma, perforating trauma and intraocular foreign bodies. As for the closed globe injuries it includes burns, blunt trauma or contusions and lamellar lacerations (3).

Blindness resulting from ocular trauma is a major public health hazard and WHO reports the incidence to be about 55 million worldwide per annum. Moreover, ocular trauma is the cause of blindness in 1.6 million people globally (2). Additionally, the WHO report also shows that 2.3 million people have low vision bilaterally and 19 million have permanent vision loss in one eye due to trauma (4).

The effect on the tissues varies in different individuals depending on the impact of the ocular trauma ranging from minimal bleeding under the conjunctiva to as severe as rupturing of the globe. The prognosis is usually poor in patients presenting to the hospital with an apparently reduced visual acuity. Due to the frailty of the ocular structures, late presentation invariably leads to poor visual results (5). It was also reported that patients who presented on the same day of injury had a good visual prognosis compared to those who appeared 24 hours after sustaining the injury. Apart from causing physical impairment, it largely impacts a patient's socioeconomic and psychological status as well (2).

In spite of its hazardous effects, there is a scarcity of information regarding ocular trauma in Tanzania. This study, therefore, aimed at determining the proportion of ocular trauma, the causes and types of ocular trauma as well as the place of sustaining the trauma at a regional referral hospital in Tanzania. The findings from this study will enable us to set up preventive strategies that can be implemented by various stake holders in reducing the burden of ocular trauma in our country.

Methodology

Study area

The study was conducted at Mawenzi Regional Referral hospital, Moshi urban, Kilimanjaro region in Northern Tanzania. Mawenzi Regional Referral Hospital serves a population of around 1.7 million from seven districts of Kilimanjaro region which include Hai, Moshi rural,

Moshi urban, Rombo, Mwanga, Same and Siha. The hospital receives about 300 to 800 outpatients daily and can receive up to 250 to 350 inpatients. The population in this region indulges itself in different activities however, the main economic activity conducted in this region is agriculture which mainly includes farming in large plantations of coffee, sugarcane and sisal. Working in such an environment predisposes them to a higher risk of sustaining ocular injuries.

Study design

This was a descriptive retrospective cross-sectional hospital-based study of patients who attended Mawenzi Regional Referral Hospital from 31st August 2017 to 30th August 2019.

Sample size calculation

The minimum sample size of the study participants was calculated by using the Kish and Leslie formula for determination of proportion in cross sectional studies as shown below:

$$n = \frac{Z^2 P(1-P)}{E^2} = \frac{1.96^2 \times 0.069 \times (1-0.069)}{0.05^2} = 99$$

Hence, the minimum sample size was calculated to be 99 patients.

Where;

n= estimated sample size, Z= z score at 95% Confidence interval (1.96), P= prevalence of ocular trauma from previous related studies. We used the prevalence of 6.9% from a study conducted by Tsedeke et al in Ethiopia (8) and E= 5%, margin of error.

Sampling technique

All case notes of patients who had ocular trauma and attended the eye department within the study period were retrieved. These included the files of patients with ocular trauma, record books of patients and the Health Management Information System (HMIS) which is called Mfumo wa Taarifa za Uendeshaji wa Huduma za Afya (MTUHA) in Kiswahili, the local language.

A predetermined proportion of case files of patients to be included in the study was calculated for each year based on the total number of patients who sustained ocular trauma for the particular year. During the study period, 677 patients with ocular trauma were attended; 329 patients presented with ocular trauma in the first year from August 2017 to August 2018 and 348 patients presented in the second year from August 2018 to August 2019. Case files which met the inclusion criteria were thereafter consecutively included in

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the study until an acceptable sample size of 99 patients was reached. Therefore, the case files of 48 patients were consecutively sampled from the first year and 51 files from the second year making a total of 99 case files that were studied and analyzed.

Study Population

The study consisted of patients of all ages with a diagnosis of ocular trauma who were presented at Mawenzi Regional Referral Hospital from 31st August 2017 to 30th August 2019.

Inclusion criteria

Case files with complete information of patients who presented with ocular trauma at Mawenzi Regional Referral Hospital during the two-year period from 31st August 2017 to 30th August 2019. Ocular trauma was defined as sustaining trauma to the eye or the adnexa by an external force.

Exclusion criteria

Records that missed two or more pieces of information on demographic characteristics, cause of trauma, type of trauma and place where trauma was sustained were excluded.

Data collection and analysis

Data collection process was conducted for a period of 14 days in the month of September 2019. In order to ensure data was collected accurately and efficiently, records of only about seven patients were retrieved per day for a period of 14 days.

Data was collected at Mawenzi hospital medical records department where records were traced particularly from the eye department in which the outpatients' information was recorded in the MTUHA and the computer. Data was also sought from the surgical wards for records of patients admitted from the eye department. With the assistance of medical records personnel and a nurse from the eye department, the records of patients who attended the eye department from 31st August 2017 to 30th August 2019 were retrieved. The number of patients who attended the eye clinic during the study period was collected from the outpatient register. Case files that met the inclusion criteria were reviewed to extract information on sex, age, occupation, place of injury, residency, types and agents of injuries of each patient. The extracted information was documented in the questionnaire designed for the study. Descriptive data analysis was done using Statistical Package for Social Sciences (SPSS version 20.0).

Ethical clearance and consideration

The ethical approval to conduct this study was obtained from Muhimbili University of Health and Allied Sciences (MUHAS) Research and Ethics Committee. Permission to conduct the study was obtained from the Medical Officer in charge of Mawenzi Regional Referral hospital. All patients' records were kept confidential as they were identified by coded numbers instead of names.

Results

A total number of 13,193 patients attended the eye department during the study period, out of which 677 (5.1%) were presented with ocular trauma. Unilateral eye trauma was more common (85.9%) while the remaining (14.1%) had bilateral eye injury. The mean age of the patients with ocular trauma was 30 years with ages ranging from 1 to 85 years. The most affected age group was 16-30 years (35.4%). Males had a higher rate of sustaining ocular injuries (66.7%). The study population comprised of more patients coming from rural areas (72.7%) as compared to those from the urban areas (Table 1).

Table 1: Demographic characteristics of patients with ocular trauma attending the eye department at Mawenzi Regional Referral Hospital during the study period (N=99)

Demographic characteristics	Frequency	
	No	%
Age groups (in years)		
0-15	24	24.2
16-30	35	35.4
31-45	17	17.2
46-60	17	17.2
61 and above	6	6
Sex		
Males	66	66.7
Females	33	33.3
Residence		
Rural	72	72.7
Urban	27	27.3

The majority of the ocular trauma were due to mechanical causes (73.7%) in which stick injury accounted for 26.3% (Table 2).

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Table 2: Causes of ocular trauma among patients attending eye department at Mawenzi Regional Referral Hospital during the study period (N=99)

Causes of ocular trauma	Frequency	
	No	%
Mechanical cause		
Stick	26	26.3
Fist (during assault)	9	9.1
Iron rod	7	7.1
Road traffic accident	5	5.1
Stone	2	2
Ball	2	2
Glass	1	1
Pen	1	1
Not documented	20	20.2
Total	**73**	**73.7**
Chemical causes	7	7.1
Not documented		
Pesticide	2	2
Washing reagent	1	1
Total	**10**	**10.1**
Thermal causes		
Hot fluids	6	6.1
Fire	4	4
Spark (from open flame)	2	2
Total	**12**	**12.1**
Radiation causes Ultraviolet rays	2	2
Welding	2	2
Total	**4**	**4**

Closed globe trauma accounted for most of the cases (71.7%) with contusion (48.5%) being the commonest (Table 3).

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Table 3: BETT classification of ocular trauma among patients attending eye department at Mawenzi Regional Referral Hospital during the study period (3) (N=99)

Types of Ocular trauma	Frequency	
	No	%
Open globe trauma		
Foreign body	12	12.1
Penetrating injury	7	7.1
Rupture	5	5.1
Perforating injury	4	4
Total	**28**	**28.3**
Closed globe injury		
Contusion	48	48.5
Burn	23	23.2
Total	**71**	**71.7**

The most common place for sustaining ocular trauma was at home (29.3%) followed by workplace (27.7%) (Table 4).

Table 4: Place of sustaining trauma among patients attending eye department at Mawenzi Regional Referral Hospital during the study period (N=99)

Place of sustaining injury	Frequency	
	No	%
Home	29	29.3
Work	27	27.3
School	13	13.1
Road	5	5.1
Sports	1	1
Not documented	24	24.2
Total	**99**	**100**

Discussion

From our study, the proportion of ocular trauma at Mawenzi Referral Regional Hospital was found to be 5.1%. A study conducted by Zelalem in Central Ethiopia revealed quite similar findings where the magnitude of ocular trauma was reported to be 5.2%. In the same study, it was pointed out that hospital-based studies have revealed 5% to 16% of all admissions to the ophthalmology department were accounted for by ocular trauma (6).

The commonest age group affected by ocular trauma in this study was 16 to 30 years accounting for 35.4% of the patients followed by the age group of 0 to 15 years (24.2%). The mean age of ocular trauma in our study was 30 years which was similar to a study done in India in which the mean age was found to be 29.8 years (7). Another study with similar findings was the one conducted in Ethiopia in which most ocular trauma patients were the ones below 30 years of age (8). The age at which one sustains ocular trauma is crucial especially in young individuals because it has a great impact on their learning ability and development of skills required for their future.

Males in this study had a higher rate of sustaining ocular injuries (66.7%) as compared to the females (33.3%) with a male to female ration of 2 to 1. A study conducted in Uganda also portrayed a predominance of males over females with a ratio of 2.7 to 1 which is comparable to our study (10). This finding could be explained by the fact that males are usually involved in mechanical activities thereby increasing the risk of developing ocular injuries. Additionally, the increased number of males could be due to the fact that in our societies they have an upper hand over females economically and thus have better access to healthcare services as compared to females.

Most of the patients who presented to the hospital with eye injuries were from the rural areas (72.7%) and the remaining were from the urban residence (27.3%). Ben from Uganda similarly reported that majority of the cases presenting to the hospital were from the rural areas (82.1%) as compared to the urban areas (10). One of the possible reasons for such a finding could be explained by the fact that the majority of the patients were from the rural areas where farming is commonly practiced thus exposure to such injuries is quite probable. Furthermore, lack of awareness about ocular trauma and the prevention strategies to be taken in case of an injury might be an additional factor in having a higher rate of injuries among the population in the rural areas as compared to those living in the urban areas.

Under normal circumstances, most of the trauma cases usually happen by accident but 9.1% of the patients in this study reported injury from a fist during an assault as the cause of ocular trauma. This finding was very similar to the study done in Uganda where 9% of the ocular injuries were also due to assault (10). Since our study was a retrospective one, further details on the cases of assault could not be obtained. However, whenever a case of assault is brought to the hospital, the medical practitioner needs to advice the patients on taking medicolegal actions against the one who committed the assault so as to ensure a reduction in the occurrence of such cases in the future.

While evaluating for the causes of ocular trauma, mechanical agents accounted for 73.7% of all the other causes among which injuries from sticks were reported more frequently compared to other agents (26.3%). A study done in the Western Region of Nepal also revealed sticks being the most common cause of injury among the study population (4). Another study conducted in Mawenzi revealed that majority of the population served by Mawenzi Regional Referral hospital were involved in agricultural and pastoralist activities, therefore increasing the likelihood of exposure to sticks and chemical ocular injuries (11). In our study, chemical injuries were documented in 10.1% of the patients in which pesticides and washing reagents were mainly reported as the cause. This result was contrary to a study done in Uganda whereby chemical injury was reported in only 2.8% of the study population. However, the study from Uganda showed similarities to our study in terms of radiation injuries. In their study one patient reported ocular injury while welding using a metal-arc inert gas and a similar complaint was reported by two patients in our study (10). Moreover, in our study, two patients (2%) sustained ocular injury from ultraviolet light rays whereby these patients reported that they were competing with each other to see which one of them could look at the sun directly for a longer duration and as a result both of them ended up losing their eyesight.

Closed globe injuries represented the majority of the cases that were reported at Mawenzi hospital during the study period (71.7%) while open globe injuries accounted for 28.3% of all the ocular injuries. Likewise, a study done in Swaziland reported closed globe injuries in 80% of the study population and open globe injuries in the remaining 20% (1). In our study, the discrepancies in the findings may be attributed to the different mechanisms of injury resulting from variations in the agents that caused the ocular trauma.

Additionally, the high number of closed globe injuries in our study may be due to the fact that Mawenzi is the only government regional referral hospital in the area with an Ophthathalmologist, as a result, a lot of cases end up being referred to Mawenzi. Kilimanjaro Christian Medical Center (KCMC) which is a referral hospital for the Northern zone of Tanzania is also in close vicinity of Mawenzi hospital, however, all ocular trauma cases are first referred to Mawenzi hospital for management and then referred to KCMC only when they need intervention that is not available at Mawenzi. Moreover, the costs of service are much more affordable in a regional compared to a zonal referral hospital.

The place of sustaining the ocular injury in our study was commonly reported to be at home (29.3%) followed by the workplace (27.7%). Similar findings were reported in a study done in

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Delhi, India where by 32% of the injuries occurred at home and 29% occurred at the workplace (9). These findings could be explained by the fact that the majority of the patients came from the rural areas, and they spent most of their time either at home or at their workplaces where they practiced their farming activities.

Limitations of the study

One of the main setbacks of this study was that it was hospital based, conducted in a regional referral hospital where most of the cases are referred and thus it may not reflect the real picture existing in most parts of the country especially in the remote areas of the nation.

Conclusion

The proportion of ocular trauma among all the patients attending ophthalmology department at Mawenzi Regional Referral Hospital was found to be 5.1%. Majority of the patients were young adults, males and resided in the rural areas. The commonest cause of ocular trauma was injury from the mechanical agents with injuries from sticks being the leading cause of trauma. Closed globe injuries accounted for more than half of the cases. A large percentage of these ocular traumas occurred at home followed by the workplace. There is a need to create awareness to the general public through eye health promotion programs. This can be done by providing education to them on the importance of preventing ocular injuries by taking necessary precautions while performing their activities at homes and at their workplaces.

Conflict of interest

Authors declare no conflict of interest.

Authors' contributions

SS participated in writing the manuscript critically for important intellectual content prior to submission. CM collected the data, carried out the study and ran the data analyses. All authors read and approved the final draft of the manuscript for submission.

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References

1. Tholakele Z. A Two- Year Retrospective Study on Prevalence, Pattern and Outcome of Ocular Trauma in Mbabane Government Referral Hospital, Swaziland. Master's thesis. University of Nairobi; 2017.
2. Alem KD, Arega DD, Weldegiorgis ST, Agaje BG, Tigneh EG. Profile of ocular trauma in patients presenting to the department of ophthalmology at Hawassa University: Retrospective study. PLoS One 2019;14(3):1–10.
3. Sukati VN. Ocular injuries - a review. African Vision and Eye Health. The South African Optometrist 2016;71(2):86–94.
4. Kinderan Y, Shrestha E, Maharjan I, Karmacharya S. Pattern of ocular trauma in the Western Region of Nepal. Nepal J Ophthalmol 2012; 4(7):5–9.
5. Karve S, Kolte A, Alfia A, Rathi H. Study of Clinical Profile of Ocular Trauma at a Tertiary Eye Care Centre. International Journal of Contemporary Medical Research 2017; 4(12):4–7.
6. Addisu Z. Pattern of ocular trauma seen in Grarbet Hospital, Butajira, Central Ethiopia. Ethiop J Health Dev. 2011; 25(2):150–155.
7. Ranjan A, Islam N, Saha M, Chowdhury D. Causes and Clinical Profile of Cases of Ocular Trauma Attending a Tertiary Medical Center. International Journal of Scientific Study 2017; 5(3):3–7.
8. Tsedeke A, Yeshigeta G, Fessehaye A. A 2-year review of ocular trauma in Jimma University Specialized hospital. Ethiopian Journal of Health Sciences. 2011; 19(2).
9. Singh K, Mutreja A, Bhattacharyya M, Dangda S. Epidemiology and Implications of Ocular Trauma Admitted to a Tertiary Care Hospital in North India. US Ophthalmic Rev. 2017;10(01):64.
10. Ben D. Ocular injuries among patients attending Ruharo eye centre, Uganda. Master's thesis. Mbarara University of Science and Technology; 2006.
11. Mwanri AW, Lyari G, Msollo S.S. Nutritional Status and the Use of Traditional Medicine Among Diabetic Patients in Mawenzi Hospital, Tanzania. Tanzania Journal of Agricultural Sciences. 2017; 16(1):36-45.