

Ocular Injuries among Adults in Owerri Municipal, Imo State, Nigeria

Ngozika Esther Ezinne., MOptom, OD^{1*}, Khathutshelo Percy Mashige, PhD, MOptom, CAS, BOptom, BSc², Awele Prisca Onianwa, OD³

^{1,2}Discipline of Optometry, University of KwaZulu-Natal, Private Bag X54001, Durban, 4000 South Africa

³Department of Optometry, Madonna University, Nigeria

***Corresponding Author:** Ngozika Esther Ezinne, Discipline of Optometry, University of KwaZulu-Natal, Private Bag X54001, Durban, 4000 South Africa, **Email:** ezinne.ngozi@gmail.com

Abstract

Purpose: To determine the patterns of ocular injuries among adults in Owerri Municipal, Imo State, Nigeria.

Method: This was a retrospective chart review of all patients who attended the Pizon eye clinic and Niger Optical services in Owerri Municipal, Imo State, Nigeria from January 2014 to January 2015.

Results: Case files of 847 patients aged 21-90 years with a mean age of 37.56 ± 14.31 years were reviewed. 150 (17.7%) patients including 101 (67.3%) males and 49 (32.7%) females had ocular injuries. The major causes of ocular injuries were blunt trauma (45.3%), projectile (26%) and assault (9.3%). Contusion (54.7%) and penetrating injuries (12%) were the most common types of ocular injuries. 64 (28.7%) ocular injuries were on the conjunctiva, 42 (10.7%) on the cornea and 25 (8.7%) on the eyelids. Most (28%) ocular injuries occurred at home, 21.3% at work places and 12.7% occurred during fights. 19 (2.7%) patients reported the injuries within 24 hours and 62 (41.3%) within 3-7 days. 73 (48.7%) patients had visual acuity of 6/6 to 6/18 and 12 (8%) <3/60 to no light perception on presentation and 101 (67.3%) had visual acuity of 6/6 to 6/18 and 9 (6%) 3/60 to no light perception after treatment.

Conclusion: Ocular injuries in Owerri Municipal are prevalent and their causes are largely preventable.

Keywords: Ocular injuries, adults, Owerri Municipal, Imo State, Nigeria

1. INTRODUCTION

Ocular trauma was initially described as a neglected issue,¹ but has now been highlighted as a major cause of visual morbidity² and blindness worldwide.³ As a cause of visual impairment, it has an immense impact on the individual, their family and the community which could lead to a variety of socioeconomic problems.⁴ A review undertaken by the World Health Organization (WHO) in 1998 estimated that ocular injuries were responsible for the following: 1.6 million people blind in both eyes, 2.3 million with low vision in both eyes, 19 million blind in one eye and 55 million with eye injuries that resulted in restricted activities for more than one day a year.⁵ Ocular injuries also constitutes 5% of all cases admitted in hospitals in developed countries and about 12.9% in developing countries.⁶ In addition, ocular injuries are common in developing countries because of issues such as non-compliance to ocular protective wear and poor working conditions among others.² Studies^{7, 8} have shown that most ocular injuries can be prevented

through measures such as use of protective wear at work places, home and during sporting activities that can predispose one to danger.

Although epidemiological data on ocular injuries has been described in the countries such as the United States^{7, 8} UK⁹ and Australia¹⁰, there is limited data in Africa and developing countries on this subject.¹¹ Ocular injury patterns including incidence and prevalence, causes and types are necessary for designing, planning and implementing preventive programmes. This study aimed to profile the patterns of ocular injuries among adults in Owerri Municipal, Imo state. Ocular injuries were classified as per World Health Organization (WHO) and Birmingham Eye Trauma Terminology System (BETTS).⁹ (Fig. 1). Adnexal injuries were not included in BETTS classification. A new classification of ocular trauma was proposed in 2009 where the authors suggested that the term "ocular trauma" include structures of ocular adnexa such as the lids, orbit, lacrimal apparatus, and the conjunctival, not just the eyeball or globe²¹.

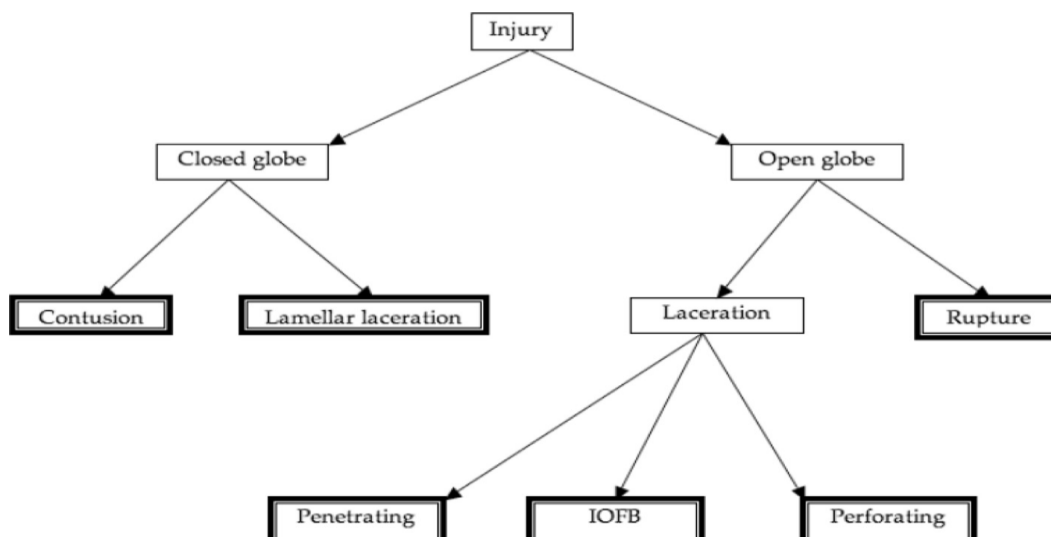


Fig 1. Birmingham Eye Trauma Terminology System classification of ocular injuries.

2. METHODS

Ethical approval to conduct this study was obtained from the Ethics Committee of the Faculty of Health Science, Madonna University, Nigeria and Clinical directors of the selected clinics in Owerri municipal. Medical records of 847 patients (aged 21 years and older) attending the selected eye clinics (Pizon eye clinic and Niger optical services) in Owerri Municipal, Imo State, Nigeria from January 2014 to January 2015 were reviewed. The records contained information on demographic characteristics, types of injuries, causes, ocular site of injury, time of injuries before presentation to the clinic, activity that led to the injury or the place where the injury occurred and visual acuities at presentation in the clinic and after treatment.

3. DATA ANALYSIS

The data obtained were imported into the Statistical Package for Social Sciences Software (SPSS) programme version 20 for analysis. Chi-square and Pearson’s correlation tests were used to investigate relationships between age, gender and occupation with type of injury. A p-value of less than 0.05 was considered statistically significant. The results were calculated in percentages and are presented in tables.

4. RESULTS

A total of 847 case files of patients aged 21 years and older with a mean age of 37.56 ± 14.3 years were reviewed. The results showed that 150 (17.7%) patients had ocular injuries. 101 (67.3%) were males and 49 (32.7%) were females. The right eye was involved in 65 (43.3%) patients, left eye in 61 (40.7%) and

both eyes in 24 (16%) patients. Many (40.7%) patients with ocular injuries were between 21-30 years old followed by 31-40 years (31.3%) and 41-50 years (16%). The age distribution of the patients is shown in Table 1. The major causes of ocular injuries were blunt objects (45.3%), projectile (26%) and assault (9.3%) (Table 2). Contusion (54.7%) and penetrating injury (12%) were the most common types of ocular injuries (Table 3). There were no significant associations between age, gender and type of ocular injuries (all p-values > 0.05). Sixty four (42.7%) ocular injuries were on the conjunctiva, 42 (28%) on the cornea, 25 (16.7%) on the eyelids, 11 (7.3%) on the lens and 8 (5.3%) on the globe. Ocular injuries were found to be associated with occupation ($\chi^2 = 2.57, p < 0.01$) and were highest in students (17.3%) followed by traders (12%) (Table 4).

Most ocular injuries occurred at home (28%) and work places (21.3%) (Table 5). 19 (2.7%) patients reported the injury within 24 hours, 40 (26.7%) within 1-3 days, 62 (41.3%) within 3-7 days (41.3%), and 29 (19.3%) after 7days. 73 (48.7%) patients had normal visual acuity (6/6 to 6/18) and 12 (8%) blind (<3/60 to no light perception) on presentation and 101 (67.3%) had normal visual acuity and 9 (6%) blind after treatment (Table 6).

Table1. Age distribution of the patients

Age in years	Frequency (n)	Percentage (%)
21-30	61	40.7
31-40	47	31.3
41-50	24	16
51-60	8	5.3
>60	10	6.7
Total	150	100

Table2. Causes of ocular injuries

Cause of injury	Frequency (n)	Percentage (%)
Aerosol	2	1.3
Assault	14	9.3
Blunt objects	68	45.3
Chemicals	9	6
Explosives	4	2.6
Flame	6	4
Projectile	39	26
Road traffic accidents (RTA)	8	5.3
Total	150	100

Table3. Types of ocular injuries among the patients

Variables	Frequency (n)	Percentage (%)
Closed globe		
Chemical	14	9.3
Contusion (Blunt injury)	82	54.7
Radiation	1	0.7
Thermal	7	4.7
Open globe		
Laceration	10	6.7
Intraocular foreign body	7	4.7
Perforating	1	0.7
Penetrating	18	12.0
Rupture	10	6.7
Total	150	100.0

Table4. Distribution of the patients according to occupation

Occupation	Frequency (n)	Percentage frequency (%)
Banker	4	2.7
Butcher	3	2
Carpenter	8	5.3
Civil servant	9	6
Company worker	14	9.3
Driver	11	7.3
Farmer	14	9.3
Footballer	2	1.3
House wife	8	5.3
Lecturer	3	2
Mechanic	1	0.7
Pensioner	7	4.7
Soldier	4	2.7
Sportsman	1	0.7
Student	26	17.3
Tailor	2	1.3
Teacher	4	2.7
Timbre worker	2	1.3
Trader	18	12
Unemployed	2	1.3
Welder	6	4
Youth corper	1	0.7
Total	150	100

Table5. Activity that led to the ocular injury

Activity performed	Frequency (n)	Percentage (%)
Road traffic accidents (RTA)	8	5.3
Domestic activity	42	28.0
Farming	12	8.0
Fighting/Assault	26	17.3
Working/Occupational activity	32	21.3
Play/Sports	19	12.7
Church activity	3	2.0
Not specified	8	5.3
Total	150	100.0

Table6. Visual acuity at presentation and after treatment

Visual acuity	On presentation		After treatment	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Normal	73	48.7	101	67.3
Moderate VI	39	26.0	23	15.3
Severe VI	26	17.3	17	11.3
Blind	12	8.0	9	6.0
Total	150	100	150	100

Keys: VI=visual impairment. Normal: 6/6–6/18; Moderate VI: < 6/18–6/60;

Severe VI: <6/60–3/60; Blind: <3/60–no light perception.

5. DISCUSSION

Ocular injuries are among the major causes of unilateral and bilateral blindness in the working age population in developing countries, yet the types, mechanism and causes of these injuries are not fully reported.² Causes, types and prevalence of ocular injuries vary across countries, locations within a country and times due to differences in factors such as environmental and socioeconomic.¹²

The prevalence of ocular injuries found in the current study is 17.7% which is markedly higher than 1.8% and 4.1% found in other hospital-based studies in Zaria¹³ and South-South, Nigeria¹⁴ respectively. The prevalence is more comparable to 16% reported in a study in Enugu State, Nigeria.¹⁵ These differences may be attributed largely to the differences in age ranges and duration of review periods used. For example, studies in Zaria and South-South Nigeria used a 2 year review period compared with the one year period used in the present study. Preventive measures such as occupational health and safety rules and regulations

protecting people at risk need to be designed and implemented to reduce the incidence of ocular injuries and its consequences.

The prevalence of ocular injuries was higher in males (67.3%) than in females (32.7%). This trend was also observed in a study in Benin City, Nigeria¹⁶ where 72% males and 28% females had ocular injuries. Various studies,^{8, 17, 18} have also shown higher prevalence figures of eye injuries in males than females. The greater proportion of males with ocular injuries is however expected given that males tend to perform more artisan jobs compared to females and these make them more prone to ocular trauma.²

There was a slight predominance of injury to the right eye (43.3%) in this study which is similar to reports by Okoye¹⁵ in Enugu, Mallika et al¹⁹ in Malaysia, and Omolase et al²⁰ in Owo, Nigeria. Blunt object (45.3%) was the most common cause of ocular injury followed by projectile (26%) and assault (9.3%) in this study. This is consistent with findings from North-West² and South-West²⁰ of Nigeria and India²¹. However, in Ethiopia²² Tanzania²³, Southern India²⁴ and other Nigeria studies,^{15, 25} sharp objects (stick and thorn) were recorded as the main cause of ocular injury. Flying particles like metallic chips were reported in Singapore²⁶ as the main cause of eye injuries. Ocular injuries from blunt and sharp objects are blinding and need urgent attention; therefore there should be awareness campaigns aimed at educating the public on preventive measures to reduce visual impairment due to ocular injuries.

The findings that most (42.7%) ocular injuries occurred on the conjunctiva are similar to those reported in other parts of Nigeria²⁰ and Ethiopia²⁷⁻²⁸ and could be due to the fact that the conjunctiva is the most exposed part of the eye. Many (40.7%) patients affected by ocular injuries in this study were between 21-30 years old. This finding is not surprising as this age group is active and is likely to engage in risky activities which may predispose them to ocular injuries. Violence, which has been reported to be prevalent in Nigeria, could also have influenced this result. Okoye¹⁵ and Omolase et al²⁰ reported similar findings in South-West Nigeria.

A significant proportion (28%) of ocular injuries occurred at home, most (53%) resulting from use of domestic equipment and assaults (38%), a finding similar to that reported in Columbia¹² However; a study in Australia¹⁰ reported 60% of

the eye injuries to have occurred at the work place while in rural Nepal,²⁹ 32% occurred at home and 37% at work place. A study in South-Western Nigeria²⁴ among the elderly reported most of the injuries to have occurred at the farm (37.2%), and home (35.9%). Preventive measures aimed at encouraging the use of protective eyewear at work place and during some domestic activities are advocated.

A high proportion (41.3%) of patients presented to the clinic between 3-7 days. These results are consistent with those reported by Ezegwui³⁰ in which 57 (52.7%) reported within one week in South-East Nigeria. In contrast, other studies²⁰⁻²¹ in India and South-West Nigeria reported that the most (65%) of patients with ocular trauma presented to the clinic between 24-48 hours of the injury. Proximity to health care facility could be responsible for the variations in the time of presentations. Studies in Singapore,²⁶ Nepal,²⁹ Addis Ababa³¹ and Delhi India³² reported that the risk of blindness was 2-4 times higher among patients who presented late for injuries. Studies from other countries^{13, 24, 27, 30, 32, 33} also showed that late presentation was associated with poor visual outcome. Early presentation to hospitals or eye clinic for treatment is important to avoid the negative consequences of ocular trauma.

Majority of patients (67.3%) had normal visual acuity (6/6 to 6/18) after treatment. Similar findings were reported in Columbia¹² and Egypt³³ and this could be due to the type of ocular injury they had which were mostly closed globe injuries and the fact that they also presented early to hospital or clinic.

The results of this study must be considered within the context of certain limitations. For example, this was retrospective chart review involving few clinics and short study period (1 year), and therefore, the results may not be generalized to the entire population.

6. CONCLUSION

The prevalence of ocular injuries among adults in Owerri Municipal, Imo State is relatively high and most of the causes are avoidable. Public campaigns and health education are warranted to significantly reduce the incidence of home and work related eye injuries. Assault is a significant cause of ocular injuries and a reflection of the level of violence in our society and should be addressed by all relevant stakeholders.

REFERENCES

- [1] Titiyal GS, Prakash C, Gupta S, Joshi V. Pattern of ocular trauma in tertiary care hospital of Kumaon Region, Uttarakhand, India. *J Indian Acad Forensic Med.* 2013; 35:116-119.
- [2] Adamu MD, Muhammad N. Pattern of ocular trauma in Gusau, North-West Nigeria. *Niger J Ophthalmol.* 2017; 25:11-13.
- [3] Shashikala P, Sadiqulla M, Shivakumar D, Prakash K H. Profile of ocular trauma in industries-related hospital. *Indian J Occup Environ Med.* 2013; 17: 66–70.
- [4] Oiticica-Barbosa M M, Kasahara N. Eye trauma in children and adolescent perspective from a developing country and validation of the ocular trauma score. *J Tropic Pediatrics.* 2015; 61: 238–243.
- [5] Patel D. Eye injuries: improving out practice. *CommEye Health J.* 2015; 91: 41-60.
- [6] Thylefors B. Epidemiological patterns of ocular trauma. *Aust N Z J Ophthalmol.* 1992; 20:95-98.
- [7] Macgwin G, Owsley C. Rate of eye injury in the United States. *Arch Ophthalmol.* 2005; 123: 970-976.
- [8] Brophy M, Sinclair SA, Hostetler SG, Xiang H. Pediatric eye injury-related hospitalizations in the United States. *Pediatrics.* 2006; 117: 1263-1271.
- [9] Khun F, Morris R, Witherspoon CD, Mester V. The Birmingham Eye Trauma Terminology System (BETTS). *J Fr Ophthalmol.* 2004; 27:206-2010.
- [10] McCarty CA, Fu CL, Taylor HR. Epidemiology of ocular trauma in Australia. *Ophthalmology.* 1999; 106:1847-1852.
- [11] Voon LW, See J, Wong TY. Epidemiology of ocular trauma in Singapore: perspective from the emergency service of a large tertiary hospital. *Eye.*2001; 15: 75-81.
- [12] Serrano JC, Chalela P, Arias JD. Epidemiology of childhood ocular trauma in a North-Eastern Columbian Region. *Arch Ophthalmol.* 2003; 121: 1439-1445.
- [13] Rafindal AL, Pam VA, Chinda P, Mahmud FA. Orbital and Ocular trauma at Ahmadu Bello University Teaching Hospital, Zaria, Nigeria. *Med.* 2013;7: 20-23.
- [14] Emem A, Uwemedimbuk E. Prevalence of traumatic injuries in a teaching hospital in South- South Nigeria. A two year review. *Adv Trop Med Pub Health Int.* 2012; 2(3):102- 108.
- [15] Okoye OI. Eye injury requiring hospitalization in Enugu Nigeria: A one-year survey. *Niger J Surg Res.* 2006; 8:34-37.
- [16] Okeigbemen VW, Kayoma DH. Pattern of Eye injuries in Children in Benin City, Nigeria. *Orient J Med.* 2013; 25: 19-23.
- [17] Shoja MR, Miratashi AM. Pediatric ocular trauma. *Acta Med Iran.* 2006; 44: 125-130.
- [18] Aghadoost D, Fazel MR, Aghadoost HR. Pattern of pediatric ocular trauma in Kashan. *Arch Trauma Res.* 2012; 1:35-37.
- [19] Mallika PS, Tan AK, Asok T, Faisal HA, Aziz S, Intan G. Pattern of ocular trauma in Kuching, Malaysia. *Malaysia Fam Phys.*2009; 3:140-145.
- [20] Omolase CO, Omolade EO, Ogunleye OT, Omolase BO, Ihemedu CO, Adeosun OA. Pattern of ocular injuries in owo, Nigeria. *J OphthalVis Res.* 2011; 6:114-118.
- [21] Qayum S, Anjun R, Rather S. Epidemiological profile of pediatric ocular trauma in a tertiary hospital of Northern, India. *ChinJTraumatol.* 2018; 21: 100-103.
- [22] Abraham DI, Vitale SI, West SI, Isseme I. Epidemiology of eye injuries in rural Tanzania. *Ophthalmic Epidemiol.* 1999; 6:85-94.
- [23] Onakpoya OH, Adeoye A, Adeoti CO, Ajite K. Epidemiology of ocular trauma among the elderly in a developing country. *Ophthalmic Epidemiol.* 2010; 17:315-320.
- [24] Krishnaiah S, Nirmalan PK, Shamanna BR, Srinivas M, Rao GN, Thomas R. Ocular trauma in a rural population of southern India: the Andhra Pradesh Eye Disease Study. *Ophthalmology.* 2006; 113:1159-1164.
- [25] Monsudi KF, Ayanniyi AA, Olatunji OF, Abdul Fattah I. Penetrating ocular injuries in a tertiary health facility. *Am J Med Sci Med.* 2013; 1:66-68.
- [26] Woo J, Sundar G. Eye injuries in Singapore--don't risk it. Do more. A prospective study. *Annals Acad Med.* 2006; 35: 706-718.
- [27] Negussie D, Bejiga A. Ocular emergencies presenting to Menelik II Hospital. *Ethiopian Med J.* 2011; 49:17-24.
- [28] Addisu Z. Pattern of ocular trauma seen in Garabet Hospital, Butajira, Central Ethiopia. *Ethiop J Health Dev.* 2011; 25:150-155.
- [29] Khattry SK, Lewis AE, Schein OD, Thapa MD, Pradhan EK, Katz J. The epidemiology of ocular trauma in rural Nepal. *Brit J Ophthalmol.* 2004; 88:456-460.
- [30] Ezegwui IR. Eye injuries at Abakaliki Nigeria. *IntJOphthalmol.* 2004; 4: 985-988.
- [31] Alemayehu WH, Shahin S. Epidemiology of ocular injuries in Addis Ababa Ethiopia. *J Ophthalmol East Central & Southern Afr.* 2014; 1: 27-34.

- [32] Vats S, Murthy GV, Chandra M, Gupta SK, Vashist P, Gogoi M. Epidemiological study of ocular trauma in an urban slum population in Delhi, India. *Indian J Ophthalmol.* 2008; 56:313-316.
- [33] Soliman MM, Macky TA. Pattern of ocular trauma in Egypt. *Graef Arch Clin &ExpOphthalmol.* 2008; 246:205-212.

Citation: Ngozika Esther Ezinne, Khathutshelo Percy Mashige, Awele Prisca Onianwa. Ocular Injuries among Adults in Owerri Municipal, Imo State, Nigeria. *ARC Journal of Ophthalmology.* 2018; 3(1): 4-9.

Copyright: © 2018 Authors. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.