Risk factors identification for ocular trauma in patients who presented in a suburban tertiary care hospital in Nigeria

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ABSTRACT

Objective: To determine the risk factors, and the pattern of ocular trauma in Irrua, a sub-urban community in Edo State, Nigeria.

Methods: A prospective study of all cases of ocular trauma seen in the Irrua Specialist Teaching Hospital, Irrua, Nigeria from January to December 2005. The age, gender, occupation, activity at time of injury, use of protective eye wear, visual acuity, and findings on ocular examination were recorded.

Results: One hundred and eighty-two patients were seen during the period of study. There were 130 males (72.2%) and 52 females (28.8%), with a ratio of 2.5:1. Motorcycle-related road traffic accident was the most common cause of ocular injury occurring in 56 patients (30.8%), followed by assault in 40 patients (22%), and farming in 35 patients (19.2%). The conjunctiva, lids, and cornea were the ocular structures mostly affected. Fifty one patients (28%) were blind in the affected eye, at presentation. Only 22 patients (12.1%) presented within 24 hours of injury.

Conclusion: Motorcycle-related accidents were the most significant cause of ocular injury. The use of protective helmets with plastic covering over the face should be enforced. Measures to reduce physical assault in schools, and in the civil society should also be enforced. Farmers should be encouraged to wear protective goggles.

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Ocular trauma, once described as the "neglected disorder",[1] is now been highlighted as a major cause of visual morbidity. Approximately, half of all the patients who presented to any eye casualty department was of ocular trauma.[2,3] Ocular trauma is a significant cause of visual impairment, and has a potential for causing blindness, hence it is important in the utilization of ophthalmic service resources.[4,5] Ocular injuries are of major socio-economic importance, particularly when their potential for causing blindness is considered. It is a significant cause of blindness worldwide, and especially so in Nigeria, and other developing countries where specialized eye centers are grossly inadequate. In Nigeria, it has been reported to contribute 9.9 - 16.9% of monocular blindness,[6,7] and 2.7 - 7.9% of blindness.[7,8] Previous studies in Nigeria reported the highest rate of ocular injuries to be among school children, and faulted unsupervised leisure activities.[9-11] Environmental, economic, psychosocial, legal, and other changes have taken place since these early studies. It is therefore possible that these changes may have influenced the pattern of ocular injuries in our environment.[5] This study was carried out to highlight the risk factors for ocular trauma, and the pattern of ocular injuries in Irrua, a sub-urban community in Edo State, Nigeria, and to make useful suggestions on ways to prevent avoidable blindness from the injury.

Methods. All cases referred to the Eye Clinic of Irrua Specialist Teaching Hospital, Irrua, Edo State, Nigeria, between January - December 2005 were included. Cases of eye injuries of the patients seen in the Accident and Emergency Unit of the hospital occurring alone, or co-existing with trauma, to other parts of the body were included, even if they were not referred to the Eye clinic. Trauma patients who did not have ocular injuries were excluded. The age, sex, occupation, activity at the time of injury, type of injury, arrival time, and use of protective eye wear (where applicable), were noted. The visual acuity of the patients was estimated using the Snellen's chart. The ability to count fingers at varying distances, or perception of hand movement,

or light was used when the patient could not see the Snellen's chart at 6 meters. Blindness was defined as inability to count fingers at 3 meters, or a visual acuity of less than 3/60. Visual impairment was defined as best corrected visual acuity of less than 6/18.[12] Eye examination was carried out with the aid of a pen torch, a slit-lamp biomicroscope, and direct ophthalmoscope. A consultant ophthalmologist did all examinations. Cases of eye injuries who presented to the accident and emergency unit were examined on the same day that they presented, even if they had co-morbidities, and the findings was recorded. Fortunately, all the patients with multiple traumas were able to undergo thorough ocular examination. An ethical approval was obtained from the Ethical Committee of the University of Benin Teaching Hospital, Benin City, Nigeria.

Results. A total of 182 patients with ocular trauma were seen during the period of study. There were 130 males (72.2%) and 52 females (28.8%). The male-to-female ratio was 2.5:1. Twenty-nine patients (16%) were below 10 years, 40 (22%) were between 10 and 20 years, 54 (29.7%) were between 21 and 30 years, 21 (11.5%) were between 31 and 40 years, 21 (11.5%) were between 41 and 50 years, 13 (7.1%) were between 51 and 60 years, while 4 patients (2.2%) were over 60 years old. **Table 1** shows the occupation and sex distribution of the patients. The undergraduates were the most commonly affected (21.4%). Involvement of the conjunctiva, either in the form of traumatic conjunctivitis, subconjunctival hemorrhage, or conjunctival laceration, was the most common type of injury encountered (20.9%). This was followed by traumatic iritis (19.8%) (**Table 2**). **Table 3** shows the place of injury. Road traffic accidents had the highest incidence of 37.4%, while injuries occurring at home were the least, accounting for 8.2%. The cause of ocular injuries is shown in **Table 4**. Twenty-two patients (12.1%) presented to the hospital within 24 hours of the ocular trauma. Fifty patients (27.5%) presented after 24 hours but in less than one week, 49 patients (26.9%) presented between one week and one month, 35 patients (19.2%) presented between one month and one year, while 26 patients (14.3%) presented after one year of the injury. At presentation, 51 patients (28%)

Table 1 - Occupation and gender distribution of patients.

Occupation	Male	Female	n	(%)
Pre-school	5	2	7	(3.8)
Primary school	12	7	19	(10.4)
Secondary school	14	8	22	(12.1)
Undergraduates	28	11	39	(21.4)
Farmers	29	6	35	(19.2)
Trading/Business	10	7	17	(9.3)
Commercial motorcyclists	12	0	12	(6.6)
Civil servants/Teachers	11	5	16	(8.8)
Others	9	6	15	(8.2)
Total	**130**	**52**	**182**	**(100)**

Table 2 - Type of ocular trauma.

Type of ocular trauma	n (%)
Conjunctivitis, sub conjunctival hemorrhage or conjunctival laceration	38 (20.9)
Corneal/conjunctival foreign body	15 (8.2)
Corneal abrasion/ulceration	18 (9.9)
Corneal/scleral laceration	5 (2.7)
Iritis	36 (19.8)
Lid laceration	7 (3.8)
Lid ecchymosis	9 (4.9)
Hyphaema	10 (5.5)
Cataract/lens dislocation	25 (13.7)
Vitreous hemorrhage	8 (4.4)
Retinal detachment	6 (3.3)
Hypoyon	2 (1.1)
Intra ocular foreign body	2 (1.1)
Optic atrophy	1 (0.5)
Total	**182 (100)**

Table 3 - Place of injury.

Place of injury	Male	Female	n	(%)
Home	9	6	15	(8.2)
School	22	12	34	(18.7)
Farm	29	6	35	(19.2)
Work	21	9	30	(16.5)
RTA	49	19	98	(37.4)
Total	**130**	**52**	**182**	**(100)**

RTA - road traffic accident.

Table 4 - Causes of ocular injury.

Cause of ocular injury	Male	Female	n	(%)
RTA (motorcycle related)	47	9	56	(30.8)
RTA (others)	2	10	12	(6.6)
Fist blow/slap/assault	25	15	40	(22)
Wood/vegetable matter	29	6	35	(19.2)
Gunshot	2	0	2	(1.1)
Missiles	3	1	4	(2.2)
Knife/matchete	8	0	8	(4.4)
Acid/Alkali	1	1	2	(1.1)
Whip/cane/belt	4	3	7	(3.8)
Domestic accident	4	5	9	(5)
Metal chips/particles	5	2	7	(3.8)
Total	**130**	**52**	**182**	**100**

RTA – road traffic accident

had visual acuity in the affected eye of less than counting fingers at 3 meters, 20 patients (11%) had counting fingers at 3 meters to 6/60, 22 patients (12.1%) had 6/36-6/18, 44 patients (24.2%) had 6/12-6/9, while 45 patients (24.7%) had visual acuity of 6/6 or better. Fifty-one eyes (28%) were blind based on WHO definition (Vision less than 3/60).[12]

Discussion. Ocular trauma is one of the major causes of uniocular visual loss, low vision, and blindness worldwide with great socio-economic consequences.[4-11,13-17] In recent times, a lot of changes have taken place in this country. Population has increased astronomically, and salary increase has resulted in enhanced financial empowerment resulting in increased number of vehicles on our roads.[5,18] Increase in road networking has been very slow, and the existing ones are not adequately maintained, resulting in congestion, and the attendant risk of road traffic accident.[19,20] Also, motorcycles have recently become a major means of transportation in Nigeria, and some other developing countries.[5,20,21] The male to female ratio of 2.5:1 reflects a clear male predominance. This agrees with previous studies on ocular trauma.[4,5,10,11,17,22-26] Males are more active in childhood and adolescence, and are more involved in physically exerting and dangerous activities than females.[5] The males are more involved in robbery and burglary which have increased as a result of the poor economy, and the high rate of unemployment in the country. They are also more involved in violence involving opposing cults on campuses. The high rate of unemployment has made motorcycles to become a major means of earning a living in the country. This factor has become so critical that even some unemployed graduates and some undergraduates use motorcycles, to earn a living or to support themselves at school. In a study of gender differences in eye injuries in Massachusetts, USA, majority of injuries in men were caused by projectile objects related to work or at home, while in women, it most often results from falls.[24] This is similar to the finding in this study where gunshot, missiles, knife, or machete wounds were much more common in males. The peak incidence was in the third decade of life, similar to previous reports from Glasgow and Benin City.[4,5] Motorcycle-related ocular injuries rank highest in this study in contrast to previous studies, which documented unsupervised leisure activities in school children as the most common cause.[9-11,22] It is also in contrast to the recent studies in Ibadan and Benin City, which documented occupational activities and assault as the most common cause of ocular injuries.[5,23] This is due to the fact that the Ambrose Alli University, Ekpoma, is only 5km from Irrua Specialist Teaching Hospital. The students of this university mainly use motorcycle as a means of transport to, and from, their hotels and places of residence, mostly located outside the campus. Besides this, most villages around Irrua and Ekpoma are unreachable with vehicles due to bad roads, hence the inhabitants of such villages use motorcycles as a means of transportation to nearby towns either for business or social activities. This is very obvious on market days, when the local farmers use motorcycles to carry their farm produce to the towns to sell. In a similar study in the United Kingdom, road traffic accidents were found to be the leading cause of ocular injuries in patients with major trauma.[26] Some of the students of the Ambrose Alli University also have personal motorcycles, which they also use for commercial purposes. None of these motorcycle riders were wearing protective helmets at the time of injury. They are also very reckless in driving, and unaware of the Highway Code resulting in frequent collision with themselves and other vehicles. Sometimes, they even collide with pedestrians. These motorcycle riders frequently carry 2 persons at once, and may sometimes carry a farmer and his farm produce, thereby making the motorcycle more difficult to control, and easily susceptible to accident. School children, farmers, and traders are the most commonly affected occupations in this study, partially similar to previous studies in Benin City.[5,22] Farmers are very susceptible to ocular injury from vegetable matter, sand particles, and chips. In a study of penetrating ocular injuries in the United Kingdom, it was reported that ocular injuries commonly occurred in the home while undertaking "do-it-yourself", or gardening in the domestic environment, and that they were associated with a failure to wear eye protection in all cases.[27] School children may sustain ocular injury during playing at home and in school, especially more when they are left unsupervised. Out of the 7 cases of ocular trauma due to whip, cane, or belt, 2 were inflicted on children by their teachers. Such injury is needless, and can be avoided by reviewing corporal punishment in schools. This was also highlighted in the previous studies.[5,17]

The conjunctiva, cornea, iris, and lids were the eye structures mostly affected. This is expected because of the anterior location of these structures. Blunt injuries are still more common than perforating eye injuries, and are generally believed to have a better prognosis, though this may be misleading if thorough ocular examination is not conducted.[5,23] Severe intraocular complications such as retinal detachment, may be masked by what appears to be a "harmless" hemorrhage into the anterior chamber (hyphema). These may be detected by the aid of imaging techniques such as ultrasound scan, which is becoming more widely available in the country.

Fifty-one patients (28%) were blind in the affected eye at presentation. This is mainly due to the severity of the injury and the late presentation, as shown by the

recent study in Benin City.[5] This is more so in a suburban community like Irrua, where the usual first resort was to a local eye healers or patent medicine dealers, before coming to the hospital. They usually come then with complications like secondary glaucoma, infections, cataract, and phthisis bulbi. Only 22 patients (12.1%) presented within 24 hours of injury. These were usually the patients with high socioeconomic and educational status. The shortest interval of presentation was 30 minutes of injury, when a female student was attacked by the wife of a lecturer with acid.

In conclusion, ocular trauma is still common in Nigeria, and it is of public health importance. Students, farmers, and traders were the occupations most at risk of ocular injuries. Injuries from motorcycles are becoming more common. The government should, therefore, through the law enforcement agents, begin to enforce the legislation on the use of protective helmets for motorcycle riders, as well as the passengers. These helmets should have a protective transparent plastic cover over the face. The government should also provide a good road networks. In order to reduce proliferation of the use of motorcycles for commercial purpose, the government should embark on measures to improve the economy to alleviate poverty and provide jobs for the large number of unemployed youths. School teachers should avoid flogging, farmers and welders should be encouraged to wear protective goggles at farm and workplace, law enforcement agents should be trained to deal with the civil society in more humane and less violent way, and a more drastic measures including legislation, should be taken to stop secret cult activities in schools. Public health enlightenment should also be undertaken to educate people on the need to seek early, and appropriate treatment in cases of ocular injury.

References

1. Parver L. Eye trauma, the neglected disorder. ***Arch Ophthalmol*** 1998; 5: 143-169.
2. Chiapella AP, Rosenthal AR. One year in an eye casualty clinic. ***Br J Ophthalmol*** 1985; 69: 865-870.
3. Vernon SA. Analysis of all new cases seen in a busy regional center ophthalmic casualty department during 24-months period. ***J Soc Med*** 1983; 76: 279-282.
4. Macewen CJ. Eye injuries: a prospective survey of 5671 cases. ***Br J Ophthalmol*** 1989; 73: 888-894.
5. Omoti AE. Ocular trauma in Benin City. ***African Journal of Trauma*** 2004; 2: 67-71.
6. Nwosu SN. Blindness and visual impairment in Anambra State, Nigeria. ***Trop Geogr Med*** 1994; 46: 346-349.
7. Ayanru JO. Blindness in Midwestern State of Nigeria. ***Trop Geogr Med*** 1974; 26: 325-332.
8. Olurin O. Causes of Blindness in Nigeria - A study of 1,000 hospital patients. ***West Afr Med J Niger Med Dent Pract*** 1973; 22: 97-107.
9. Ajayi BG, Osuntokun A. Perforating eye injuries in Ibadan. ***W Afr J Med*** 1986; 5: 223-228.
10. Olurin O. Eye injuries in Nigeria. ***Am J Ophthalmol*** 1971; 72: 152-166.
11. Abiose A. Eye injuries in Lagos: A review of 157 cases. ***Nig Med J*** 1975; 5: 105-107.
12. WHO International classification of diseases. 10th revision. 1994. Available from URL: http://www3.who.int/icd/current version/gh53.htm
13. Elebesunu M. Aetiology of childhood blindness in Benin City, Nigeria. ***J Pub Health*** 1987; 101: 59-62.
14. Onwasigwe EN, Onwasigwe CN, Umeh RE. Ocular injury in children. ***Nigerian Journal of Ophthalmology*** 1994; 2: 9-12.
15. Adeoye AO, Olateju SO, Soetan EO. Communal conflict related ocular trauma. ***Nig J Clin Pract*** 2002; 5: 1-4.
16. Umeh RE, Umeh OC. Causes and visual outcome of childhood injuries in Nigeria. ***Eye*** 1997; 11: 489-95.
17. Otoibhi SC, Osahon AI. Perforating eye injuries in children in Benin City, Nigeria. ***Journal of Medicine and Biomedical Researc***h 2003; 2: 40-45.
18. Osime OC, Ohanaka EC. Road traffic accidents in a semi urban community in Edo State of Nigeria. ***Journal of Medicine and Biomedical Research*** 2003; 2: 18-24.
19. Odelowo EO. Pattern of Pedestrian injuries from road traffic accidents in Nigeria. ***West Afr J Med*** 1992; 11: 130-4.
20. Odelowo EO. Pattern of trauma resulting from motorcycle accidents in Nigeria: a two-year prospective study. ***Afr J Med Sci*** 1994; 23: 109-112.
21. Ohanaka EC, Ighedosa SU. Epidemiology of road traffic accidents in Benin City, Nigeria. ***Nig J Surg Sci*** 2001; 11: 14-18.
22. Edema OT. Retrospective study of eye injuries. ***Nig J Surg Sci*** 1995; 5: 63-67.
23. Ajaiyeoba AI. Ocular injuries in Ibadan. ***Nigerian Journal of Ophthalmology*** 1995; 3: 18-20.
24. Koo L, Kapadia MK, Singh RP, Sheridan R, Hatton MP. Gender differences in etiology and outcome of open globe injuries. ***J Trauma*** 2005; 59: 175-178.
25. Mackiewicz J, Machowicz-Matejko E, Salaga-Pylak M, Piecyk-Sidor M, Zagorski Z. Work-related, penetrating eye injuries in rural environments. ***Ann Agric Environ Med*** 2005; 12: 27-29.
26. Guly CM, Guly HR, Bouamra O, Gray RH, Lecky FE. Ocular injuries in patients with major trauma. ***Emerg Med J*** 2006; 23: 915-917.
27. Bhogal G, Tomlins PJ, Murray PI. Penetrating ocular injuries in the home. ***J Public Health (Oxf)*** 2007; 29: 72-74.