

Pattern of Ocular Injury and Visual Outcome Among Children Seen in a Tertiary Eye Clinic in Nigeria

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Abstract:

Background: Ocular injury is one of the most frequent and preventable causes of unioocular blindness and visual impairment in children with a negative socio-economic impact on the affected child, the family and the society at large. This study aims to analyse the pattern of ocular injury and the visual outcome among children seen in a Tertiary eye clinic in Nigeria and make appropriate recommendations towards its prevention.

Methods: The case records of all children aged 16years and below that sustained eye injury over a 3yr period were reviewed for the study. Patients with incomplete records or those that did not attend follow up visits for at least six weeks were excluded from the study, the information obtained were coded and analysed using the Statistical Package for Social Sciences SPSS version 22.

Result: Eighty children were analysed for the study, their age ranged from 1yr to 16yrs with a mean of 9yrs \pm 4 and m:f ratio of about 2:1. Twenty-five (31.2%) presented within 24hrs of the occurrence of the injury, most of the injury occurred during playing and sporting activities among 54(57.5%) of them with blunt objects been the most common agent of injury (45.0%). Majority, 61(76%) had closed globe injury while the remaining 19(24%) had open globe injury. The visual outcome was good among a greater proportion of them with 41.2% been able to attain a final visual acuity (FVA) of 6/5-6/12. Fourteen (17.5%) suffered visual impairment while 23.8% were rendered blind with FVA of $<$ 3/60. There was no sequel of the injury among 49(61.3%) of them, while others had various complications with corneal opacity and cataract been the most common.

Conclusion: Ocular injury is a significant cause of unioocular visual loss and impairment in the environment and most of the injuries occurred during outdoor activities with blunt objects. It is therefore recommended that children should be supervised by adults during their playing or sporting activity and should not be availed the opportunity of playing with injurious agents. Eye health education will also be valuable to all parents, guardians and teachers in the environment to minimize the occurrence of ocular injury among their children and wards.

Keywords: Ocular injury, Childhood blindness, Visual loss, Unioocular blindness

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I. Introduction

Ocular injury is one of the most frequent and preventable causes of unioocular blindness and visual impairment¹. It affects both adults and children but children are more vulnerable making it the most common cause of acquired monocular blindness amongst them²⁻⁴. The estimated global annual incidence of ocular injury in children from various studies is 9 to 15 cases per 100,000 patients.⁵⁻¹¹ In Nigeria, it is also an important cause of unioocular blindness^{12&13}.

Most studies on Eye injury in the environment showed that children and young adults constitutes a significant proportion of affected patients¹⁴⁻¹⁷. Considering the fact that the socio-economic impact of long-term visual disability that often result from ocular injury among children is quite enormous; it will be valuable to study the pattern of ocular injury and their visual outcome among children seen in the environment and make appropriate recommendations towards its prevention.

II. Material and Methods

The case records of all children aged 16years and below that sustained eye injury over a three year period from January 2021 to December 2023 were retrieved for the study. The information from the records were extracted with the aid of a protocol form that was designed for the study. Information extracted included the Bio-data of the child, the causative agent of the injury, the activity associated with the occurrence of the injury and the duration between time of injury and presentation at the hospital.

The documented details of the initial clinical evaluation and relevant follow up notes were also extracted, these includes their initial visual acuity, the type of injury, diagnosis, type of Management, final visual acuity and the complications that resulted from the injury. Patients with incomplete records or those that did not attend their follow up visits for at least six weeks were excluded from the study. The information obtained were coded and analysed using the Statistical Package for Social Sciences SPSS version 22. The descriptive analysis of the results obtained are hereby presented in form of texts, tables and figures.

Approval for the study was obtained from the Ethical review Board of Ekiti State University Teaching Hospital (EKSUTH) Ado-Ekiti.

III. RESULTS

A total of 80 children aged 16years and below with ocular injury seen from January 2021 to December 2023 were analysed for the study, their age ranged from 1year to 16years with a mean of 9years \pm 4.

Table 1 shows the socio-Demographic characteristics of the children, they comprised of 54 males (67.5%) and 26 females (32.5%) with a male to female ratio of about 2:1, the predominant age group was 5-8yrs (28.8%), followed by 9-12yrs (26.2%). Sixty-three (78.8%) of them were school children while 15(18.8%) were pre-school children and only 2(2.4%) of them were out of school. The right eye was affected in 57.5% and the left eye in 42.5%. None of them had affectation of both eyes.

Table 1: Socio-Demographic Characteristics of 80 Children with Ocular Injury

<i>Variables</i>	<i>Number (%)</i>
Sex	
Male	54 (67.5)
Female	26 (32.5)
Age Group	
\leq 4years	16 (20.0)
5-8years	23 (28.8)
9-12years	21 (26.2)
13-16years	20 (25.0)
Educational Level	
Pre-school	15 (18.8)
Schooling	63 (78.8)
Out of School	2 (2.4)
Affected Eyes	
Right Eye	46 (57.5)
Left Eye	34 (42.5)

Table 2 shows the activity at the time of injury with playing/sporting activity been the most common activity that led to injury among 54(57.5%) of them. As regards presentation time, 44(55%) were seen between 24hrs and 72hrs of the occurrence of injury, 25(31.2%) in less than 24hrs and the remaining 11(13.8%) after 72hrs.

Table 2: Activity at Time of Injury

<i>Activity at the time of injury</i>	<i>Sex</i>		<i>Total (n%)</i>
	<i>Male</i>	<i>Female</i>	
Playing/Sports	42 (52.5%)	12 (15.0%)	54 (57.5%)
Fall/Accidental bumping against objects	6 (7.5%)	3 (3.7%)	9 (11.2%)
Fighting /Act of Discipline	2 (2.5%)	5 (6.3%)	7 (8.8%)
Domestic activities	4 (5.0%)	6 (7.5%)	10 (12.5%)
Total	54 (67.5%)	26 (32.5%)	80 (100.0%)

The agents that caused injury are as depicted in Table 3 with blunt objects been the most common agent in 36(45.0%) of the cases, while figure 1 illustrates the type of injury sustained among the 80 children., majority 61(76%) had closed globe injury while the remaining 19(24%) had open globe injury.

Table 3: Agents of Injury among the 80 Children with ocular Injury

Items	Agents of Injury	Number (%)
Sharp		23 (28.8)
	Broken bottle	3 (3.8)
	Knife	3 (3.8)
	Metallic rod	6 (7.5)
	Pencil	4 (5.0)
	Stick	7 (8.7)
Blunt Objects		36 (45.0)
	Ball	13 (16.3)
	Fist	11 (13.7)
	Hand	7 (8.8)
	Water bottle	5 (6.2)
Chemicals (Pesticides)		4 (5.0)
Others		17 (21.2)
Total		80 (100.0)

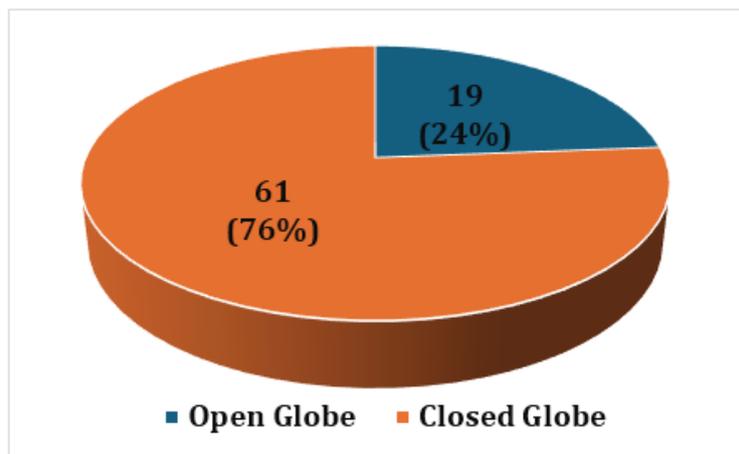


Figure 1: Distribution of the Type of Injury

Table 4 shows the diagnosis made among the 80 children, with Traumatic conjunctivitis and Iritis constituting the majority 28(35.0%), while figure 2 illustrates the type of management instituted; forty-six of them (58%) were managed conservatively while 34(42%) had surgical intervention.

Table 4: Diagnosis of Ocular Injury

Diagnosis Of Ocular Injury	Number (%)
Corneal laceration	11 (13.8)
Comeoscleral laceration	8 (10.0)
Hyphaemia	24 (30.0)
Subconjunctiva haemorrhage	9 (11.2)
Traumatic Conjunctivitis/Iritis	28 (35.0)

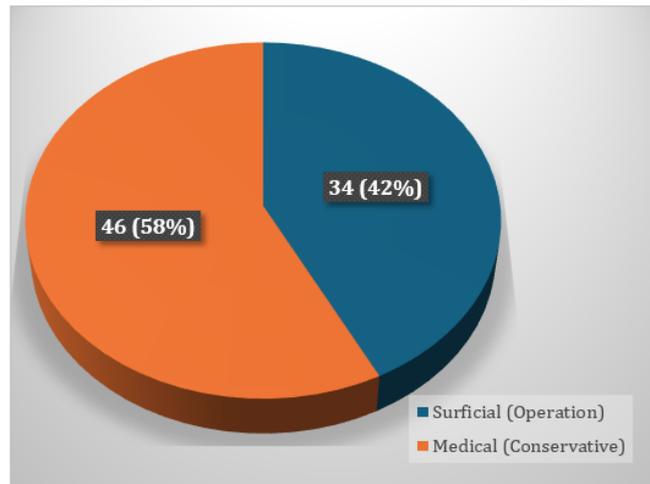


Figure 2: Types of Management given to the patients

Table 5 depicts the Initial and Final visual acuity in the affected eye, majority 22(27%) had good Initial visual acuity (IVA) of 6/5 – 6/12 and this figure increased to 33(41.2%) after management, 17.5% of them had a final visual acuity (FVA) of 6/18 – 6/60, while 23.8% of them were rendered blind with FVA < 3/60. Fourteen of them (17.5%) did not have their visual acuity determined because they were too young for the test.

Table 5: Initial and Final Visual Acuity in the Affected Eye

Visual Acuity (VA)	IVA		FVA	
	Frequency	Percentage %	Frequency	Percentage %
6/5 - 6/12	22	27.5	33	41.2
6/18 - 6/60	12	15	14	17.5
3/60 - CF	18	22.5	5	6.3
HM - LP	12	15	12	15.0
NLP	2	2.5	2	2.5
Not determined (child)	14	17.5	14	17.5

IVA = Initial visual acuity at presentation

FVA = Final visual acuity at 6weeks

CF = Count finger, HM = Hand movement, LP = Light perception, NLP = No light perception

Table 6 shows the complications of the ocular injury among the children., there was no sequel of the injury among 55(68.7%) of them, others had various complications ranging from a combination of both corneal opacity and cataract among 12(15%) of them. Three (3.8%) had only marginal corneal opacity without cataract and 4 (5.0%) ended up with phthisical eyes.

Table 6: Complications of Injury

Complications	Frequency	Percentage %
Corneal Opacity/Cataract	12	15.0
Corneal Opacity	3	3.8
Cataract	6	7.5
Phthisis bulbi	4	5.0
None	55	68.7

IV. Discussion

Ocular injury is a significant cause of ocular morbidity in children and the long-term visual loss and impairment that may result from it is quite enormous considering the socio-economic impact on the affected child,

the family and the society at large. In this study, there were more males than females with a M:F ratio of approximately 2:1, this is in consonance with other similar studies that reported male preponderance¹⁸⁻²³ This is because males especially boys of these age group are more likely to engage in high risk activities that can endanger their eyes such as sports, playing, fighting and other acts of violence than the girls that are more likely to engage in supervised domestic duties.

The predominant age group affected in this study were in the range of 5-8yrs (28.8%), this is similar to the age group of 5-9yrs reported by Abraham *et al*²⁴, some others also reported greater affectation of closely similar age group in their studies^{20,25-27} The most common activities that caused injury in this study were playing and sporting (67.5%) This is similar to the report of some other studies that reported more of outdoor activities^{19,27 &28} while some others reported more of indoor activities at home.^{13,18&23}

The agent of injury in most cases in this study were blunt objects such as balls, fist, hand and water bottle among 45.5% of the children, while sharp objects such as broken bottle, knife, metals, pencil and stick were the agents in 28.8% of them. This is similar to the report by Boret *et al*²² and Puodžiuvienė *et al*²⁹ that reported more blunt objects in their studies. However, some other studies in the environment and elsewhere reported more of sharp objects.^{18, 20, 24&27} This might be a reflection of the type of playing and sporting activities engaged in by children in such environments based on their socio-cultural norms.

Most of the children in this study (55%) presented between 24 and 72hrs of the occurrence of the injury. while 31.2% presented within 24hrs and just 13.8% presented thereafter. This presentation time is quite good considering the logistics of transportation and financial constraints which limits patients access to eye care in the environment. Moreover, most of the injuries do not occur in early morning, but rather during late afternoon or evening which is the playing time for the children. This presentation time is quite good compared to some other studies in the environment, for instance, in the study by Abraham *et al*²⁴ only 15% presented within 24hrs. On the other hand Serrano *et al*³⁰ claimed 73.7% of their patients reported within 24hrs while Sofi *et al*²⁸ reported that 66% of their patients presented within 24hrs, these high percentage of early presentation in their study might be due to better means of transportation facilitated by availability of ambulance services in such environment.

Majority of the children in this study sustained closed globe injury CGI (55%) while the remaining 24% sustained open globe injury OGI, many other studies^{20,22,29 &31} also reported more CGI in their studies while some others reported more OGI than CGI in their studies.^{19,23, 27 & 28} The type of injury sustained is based mainly on the nature of the injurious agents since most sharp objects will invariably lead to OGI and blunt objects will cause CGI. As regards the visual outcome in this study, a greater proportion of them (41.2%) were able to attain a final visual acuity (FVA) of 6/5-6/12, this is a remarkable improvement when compared with the 27.5% that had an initial visual acuity of 6/5 - 6/12. Concerning the FVA among the remaining children, 17.5% suffered visual impairment, 23.8% were rendered blind while the rest 17.5% could not have their visual acuity determined because they were too young for the test.

The level of FVA attained in this study is comparable to the 46.3% who had a FVA of 6/12 & better reported by Maurya *et al*.³² Also Kadappu *et al*³³ reported a good FVA of 6/12 or better in their study. On the other hand, some other studies in Nigeria reported a poorer outcome than this study.^{18, 19 &21} For instance only 9.3% of Okeigbemen *et al*¹⁸ were able to attain 6/12 while Kyari *et al*¹⁹ reported that 75% of their patients were blind at presentation but reduced to 62% after management and Onyekwe²¹ reported that 29.30% of his patients were blind with FVA < 3/60 while 30% had visual impairment.

It may not be appropriate to compare the visual outcome of eye injuries in all these studies because a lot of factors determine the visual prognosis in ocular injury; such as type of injury (CGI has better prognosis than OGI), the presentation time (early presentation has better prognosis) and their initial visual acuity (IVA), patients with good IVA will invariably end up with a good FVA as long as there are no untoward complications. The most common complication amongst them was a combination of cornea opacity and cataract (15%), while the greatest proportion (68.7%) did not have any sequel of the injury.

V. Conclusion and Recommendations

Ocular injury is still a significant cause of unioocular visual loss and impairment in the environment and most of the injuries occurred during outdoor activities with either sharp or blunt objects. It is therefore recommended that children should be supervised by adults during their playing or sporting activity and should not be availed the opportunity to play with injurious agents. Eye health education on the vulnerable nature of the eye

to injury will also be valuable to all parents, guardians and teachers in the environment to minimize the occurrence of ocular injury among their children and wards.

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