The Ethiopian Journal of Health Development

Original article

Pattern of perforating ocular injuries at Menelik II hospital, Addis Ababa

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Abstact

Background: Eye injury is the most common cause of monocular blindness worldwide including Ethiopia. It is common in young and active people, and has economic as well as health implication. Many eye injuries are related to particular occupation and culture. The purpose of this study is to assess various determinant factors of perforating ocular injuries from an epidemiological point of view that may help in formulating measures of prevention and control.

Methods: A one-year prospective study was conducted at Menelik II hospital, department of ophthalmology. A questionnaire was developed and all patients diagnosed to have perforating type of ocular injuries were included.

Results: There were a total of 212 patients. The mean age was 22.4 with a standard deviation of $\pm$ 15.46. Male to female ratio was 3.42:1. Students and farmers comprised 122 (57.5%) of all the victims. One hundred twenty two (57.5 %) arrived at the hospital after three or more days and 115 (54.2 %) traveled more than one hundred kilometers. School, home, workplace, and entertainment places accounted for 26.4%, 25.9%, 25.0% and 15.1 % of injuries respectively. Primary surgical repair was performed for 123 (58 %) of patients, evisceration and enucleation was done for 39.6 % and 2.4 % respectively.

Conclusion and recommendation: Perforating ocular injury is a public health problem that lacks health care service at a community level. We recommend primary eye care service at all health institutions and appropriate preventive measures that specially addresses students and farmers. *[Ethiop. J. Health Dev. 2001;15(2):131-137]*

Introduction

The eye is an external organ and is unable to withstand an injury, which may be considered a minor one elsewhere in the body. The function of an eye requires it to be exposed which increases the possibility of injury (1). Globally in 1997 G.C. it was estimated that a total of 1.6 million cases of blindness, some 2.3 million cases of low vision and some 19 million cases of monocular blindness were due to eye injuries (2). Eye injuries are the most common cause of monocular blindness in Ethiopia (3-5) and in other developing countries (6-8) Eye injuries with outcome less serious than blindness can require extensive medical care, including surgery, hospitalization and repeated treatment over long periods.

Injuries from sharp objects cause a laceration with damage confined to the underlying tissue. The extent ranges from a puncture wound to a laceration transecting the globe. Injury from a blunt object causes

contusion and incase of sufficient high force the globe ruptures with a wide spread damage from internal hemorrhage. These two types of injury are referred to as *perforating eye injuries*, with an open wound and often prolapse of intra-ocular contents (9). Study done in 1995 G.C. in Menelik II Hospital showed that perforating type of ocular injury accounted for the highest portion (45.2%) of all eye injuries.

Accidental injury is common in young and active people, and has economic as well as health implication (10). Several studies from the Scandinavian countries have stressed the high frequency of eye injuries occurring at work (11). Since many eye injuries are related to particular occupation and cultures, the type of injury in developing countries are not necessarily similar. Eye trauma occurs frequently in developing countries and constitutes a major health problem (12). Accidents do not just happen, they are caused (13) and before discussing methods of preventing injuries of the eye, one must know the cause of accidents and decide on the most effective methods of eliminating or preventing them (14). The development of strategies for prevention particularly in high-risk groups is an important part of epidemiological studies (10).

The objective of this study is to assess various determinant factors of perforating ocular injuries from an epidemiological point of view that may help in formulating measures of prevention and control.

Methods

This was a hospital based study designed to assess the various determinants of perforating ocular injuries from an epidemiological point of view of patients coming to Ophthalmic department of Menelik II hospital from October 1, 1998 to September 31, 1999. All patients coming to the out patient department of the hospital both during emergency and routine visit were the source population. Out of these, all patients diagnosed to have perforating ocular injuries were included.

A questionnaire was designed and all the questions were close-ended. A pre-test was conducted in the hospital before the study was started, and some modifications were made based on the finding. Data was collected before surgery using the structured and pre-tested questionnaire on all patients coming to the regular and emergency out patient department of the hospital that were diagnosed to have ocular perforation. The principal investigator interviewed all patients who came to the regular out patient department. The other patients who came at emergency hours were interviewed by resident ophthalmologists.

The study included specific history on socio-demographic characteristics, time of injury, situation on which the accident occurred, the type of object causing the injury and distance travelled to obtain treatment. Physical examination was done, with special attention to visual acuity, using Snellen's visual acuity chart and slit lamp bio-microscopy to identify part and extent of the eye injury. The type of management of cases including repair, evisceration and enucleation was documented.

Data entry, cleaning and analysis was completed using EPI INFO version 6.04b statistical packages. Descriptive and analytic techniques like proportions, ratio, percentages and rates were used in the analysis. The study protocol was seen by research and ethical committee of the department of ophthalmology, and has been approved. Informed consent was obtained from each patient participating in the study and privacy and confidentiality has been maintained.

Results

The total number of patients with perforating ocular injury during the study period was 212. The mean age was 22.4 $\pm$ 15.46 years and their age ranged between one and eighty-four. One hundred forty nine

(70.3%) cases of injuries occurred in those who were less than 30 years old. The sex distribution of the patients was 77.4 % male and 22.6 % female, making the male to female ratio 3.42:1. When we see the occupation of the patients, 63 (29.7 %) were students, 59 (27.8 %) were farmers. Twenty-four (11 %) preschool children and 22 (10.4 %) housewives were also other victims. Other occupations, which comprised carpenters, garage workers, daily laborers etc accounted only for 20.8 %. One hundred and tweleve (52.9 %) of the patients were Oromos in ethnicity followed by Amharas that comprised 70 (33.0 %) (Table 1).

Distance traveled by the patient to reach Menelik II Hospital was considered in the study. One hundred and fifteen (54.2 %) of the patients traveled more than one hundred kms to get medical help, and only 60 (28.5 %) were from Addis Ababa. Environment where the trauma occurred was also considered, and 56 (26.4 %) were injured at school, 55 (25.9 %) at home, 53 (25.0 %) at work place and 32 (15.1 %) at entertainment place. The remaining 16 (7.5 %) were injured at other places such as on road, grazing land, tents, etc. When the accident occurred 32 (15.1 %) of the patients were drunken (Table 2).

When we compare frequency of injury, the left eye was injured in 118 (55.9 %) of the patients. One hundred twenty two (57.8%) of the patients arrived at Menelik II hospital after three or more days, out of which 71 (33.6 %) arrived after one week or more. Surgical repair was performed in one hundred and twenty three (58.0 %) of the patients. Evisceration and enucleation surgery was carried out in 84 (39.6 %) and 5 (2.4 %) of the patients respectively (Table 3).

The site of ocular injury is indicated in Fig 1. In two patients the injury was so severe that it was not possible to locate the ocular structures. Corneal laceration with uveal prolapse was seen in 45 (21.4 %) of the patients, and corneal laceration alone occurred in 35 (16.7 %). Corneo-scleral laceration with uveal prolapse and corneal laceration with lens damage accured in 28 (13.3 %) and 21 (10.0 %) of the patients respectively.

Visual acuity at the time of arrival as well as one week after repair surgery was taken in 192 of the patients expected to have vision. During arrival to out patient department, 164 (85.4 %) of the patients had no light perception or had visual acuity of counting fingers less than one meter. Only nine (4.7 %) of the patients had visual acuity of $\geq$ 6/ 18. The visual acuity after one week of repair showed that 81 (76.5 %) of the patients had visual acuity less than 3/ 60 (Table 4).

As Seen in Figure 2, flying objects (wood, glass, metal, bottle, stone, etc) were causes of injury to 52.4 % of cases, and assault with stick also contributed a significant number, 21.2%.

Discussion

Based on the results of this study, the proportion of children (less than 15 years) among all patients with perforating ocular injuries was 38.7%. This high paediatric preponderance is comparable to a study done by Michael et al, 1982 (Malawi) of 34.6 %, and in Arkansas by Niiranen et al in 1981, 38.8 % of all study subjects (12, 15). Possible explanation for this fact needs to consider both endogenous and exogenous predisposing factors. Endogenous includes factors like exploration drive, independence seeking behavior, tendency to take risk and tendency to fight. Among the exogenous (social or environmental) predisposing factors, culture encouraging violence and hindering supervision of children is mentioned (12,14,15). The age pattern and population size of Ethiopia, which is wide at base also, contributes for higher frequency of eye injury in paediatrics age group (16).

In this study the ratio of male to female was 3.42:1 that is consistent to hospital based study conducted in Malawi, 1982 of 3.4:1 (12). The explanation for this fact is greater liberty, risky occupation and stimulus to aggressiveness given to males in almost all societies. In Ethiopia it is also known that males have better access to health services (5).

Preschool children and farmers are often victims of trauma; the children become victims not only because of their innocence, but also because of the lack of supervision by their elders. More than half of the patients who came to the Hospital were Oromos. This could be due to its large group in terms of population size and is also the ethnic group that inhabits the area surrounding Addis Ababa. Most of the patients who attended Menelik II Hospital came from far places and arrived after three days of injury. This may be due to lack of health facilities with eye care service and reflects the poor eye services in the country in general and in rural areas in particular.

The occurrence of injury on the left eye was higher than that of the left eye. This may be explained by the fact that most people are right-handed and the left eye of the victim is the one, which is more vulnerable to an attack by a right-handed person. Site of injury was seen more on cornea or corneal tear with uveal prolapse, which is similar to the survey done in Malawi (1982) (12). This is possibly explained by anatomical location of the cornea which is more anterior.

Ideally, perforated eye should be managed with repair surgery. But in our case significant number 84 (39.6 %) of cases have been treated with evisceration, and this is either due to late arrival of the patients after developing endophthalmitis or severity of the injury.

Visual acuity at arrival was very low when compared to study done by Eugene et al in Baltimore (USA) in 1983 (18) and by David et al in 1988, Wisconsin (USA) (19). This is due to severity of injury and late arrival of patients after developing endophthalmitis in our study. It could also be explained by the presence of medico-legal interest of the patients, that they might not cooperate to respond positively. Visual acuity after one week of repair is not an indicator of outcome, since one week is too early to comment on. Cases of injuries from assault have contributed in twenty five percent of the injuries. Culturally most of the people involved in fighting, irrespective of their ethnic groups, target at destroying the eye.

We conclude that perforating ocular injury is a public health problem that occurs in all age groups, but dominating the youths. Occupationally students and farmers were the most affected group. Most of the patients traveled more than one hundred kilometers and arrived after three days of injury.

Recommendation

Efforts to prevent ocular injuries should particularly be directed to improve established habits. Since farmers and students were target groups mostly affected, social groups.

Primary eye care services at a community level are highly recommended. One week follow up is too short to have full picture of the out come, thus studies with longer follow up period one recommended.

Acknowledgments

We are grateful to Dr. Abebe Bejiga and Dr Negussie Deyessa for reviewing the paper and for their useful suggestions. We are also indebted to Ato Wondwosen Belete for his assistance during the typing and editing the manuscript.

Tables

Table 1: Socio-demographic characteristics of patients examined at Menelik II hospital, 2000

Characteristics	Number	Percent
Age		
0 - 4	24	11.3
5 - 14	58	27.4
15 - 29	67	31.6
30 - 49	49	23.1
50+	14	6.6
Mean ± SD	22.6±4.2	
Sex		
Male	164	77.4
Female	48	22.6
Male : Female Ratio	3.42:1	
Occupation		
Students	63	29.7
Farmers	59	27.8
Preschools	24	11.3
Housewives	22	10.4
Others	44	20.8
Ethnic Group		
Oromo	112	52.9
Amahara	70	33.0
Gurage	13	6.1
Tigre	4	1.9
Others	13	6.1
Total	212	100

Table 2: Some characteristics of patients examined at Menelik II hospital, 2000

Characteristics	Number	Percent
Distance Traveled (Kms)		
<25	60	28.3
25 - 49	17	8.0
50 - 99	20	9.4
100 - 199	60	28.3
200+	55	25.9
Area of Trauma		
School	56	26.4

Home	55	25.9
Work Place	53	25.0
Entertainment	32	15.1
Others	16	7.5
Alcohol Status		
Drumken	32	15.1
Sober	180	84.9

Table 3: Characteristics of patients examined at Menelik II hospital, 2000

Characteristics	Number	Percent
Duration at arrival to OPD (days)		
1	78	37.0
2	11	5.2
3	24	11.4
4 - 6	27	12.8
7+	71	33.6
Injurd eye		
Right	93	44.1
Left	118	55.9
Type of Operation		
Enucleating	5	2.4
Evisceration	84	39.6
Repair	123	58.0

Table 4: Visual acuity on arrival and first week after repair of patients examined at Menelik II hospital, 2000

Characteristics	Number	Percent
During arrival (n=192)		
6/18	9	4.7
(6/18 - 6/60)	9	4.7
(6/60 - 3/60)	1	0.5

(3/60 - 1/60)	9	4.7
(1/60 - LP)	95	49.5
NLP	[69]	35.9
One week after Repair (n=106)		
6/18	10	9.4
(6/18 - 6/60)	10	9.4
(6/60 - 3/60)	5	4.7
(3/60 - (1/60)	9	8.5
(1/60 - LP)	66	62.3
NLP	6	5.7

Figures

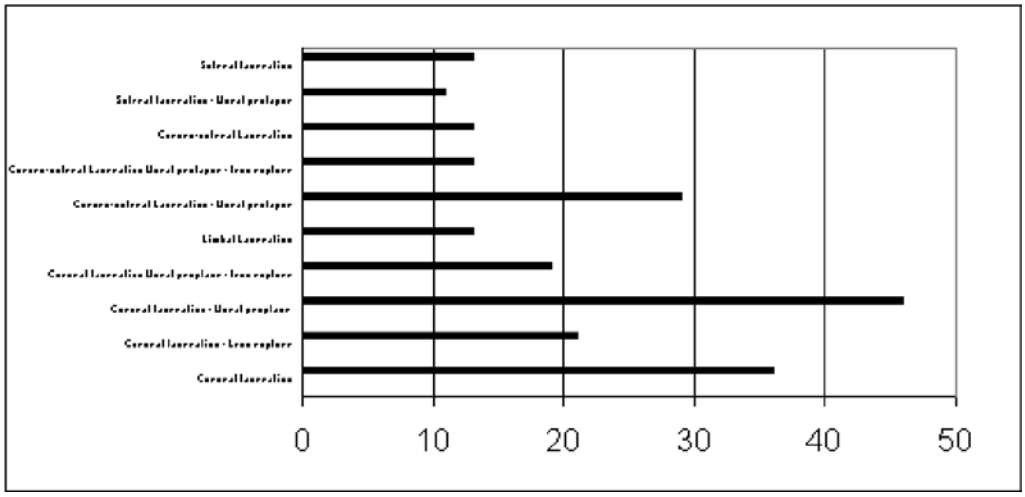

Figure 1: Site of injury of patients examined at Menellik II hospital, 2000.

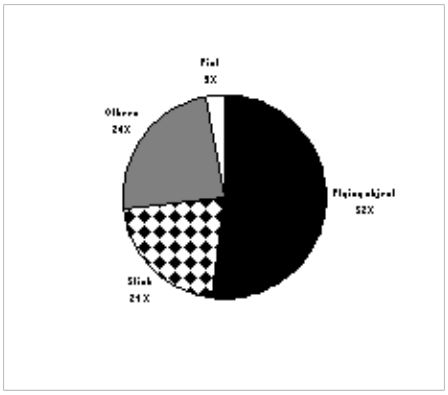

Figure 2: Materials as cause of eye injuries in patients examined at Menellik II hospital, 2000.

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