Global Journal of Medical and Health Science
Volume 10, Number 3; May-June,2023;
ISSN: 2836-5577| Impact Factor: 7.76
https://zapjournals.com/Journals/index.php/Medical-Health/
Published By: Zendo Academic Publishing

EXAMINING THE IMPACT OF OCULAR INJURIES ON MENTAL HEALTH IN BANGLADESH: A PUBLIC HEALTH PERSPECTIVE

[1]Mohammad Ali Rahman Ph.D [1]Ayesha Begum Khan, [2]Prof. Ahmed Hasan Chowdhury, [1]Farida Akter Sultana Ph.D, [3]Md. Kamal Hossain Ph.D

Article Info

Keywords:
Eye injury, Epidemiology, Occupational eye injury, non-occupational eye injury, Bangladesh

Abstract

Eye injuries represent a significant cause of preventable vision loss globally, affecting individuals irrespective of their socio-economic status or demographic profile. This study aimed to investigate the epidemiological profile of both occupational and non-occupational ocular injuries in Bangladesh. A descriptive cross-sectional study was conducted on 117 purposively selected eye injury cases treated at four eye hospitals in Dhaka, Tangail, and Rajshahi, Bangladesh. The study collected data on various socio-demographic factors and the circumstances surrounding the eye injuries. The findings revealed that the majority of respondents were male (69.2%), with a mean age of 29.70 years. Secondary-level education was prevalent among the study subjects (24.8%), and the monthly income of most participants (62.4%) fell within the range of 12,000-30,999 Bangladeshi Taka. The leading causes of eye injuries were identified as the lack of protective measures at work, carelessness, and road traffic accidents in workplace, home, and other settings, respectively. Activities such as maintaining or cleaning instruments at the workplace, looking after children at home, and riding vehicles were commonly associated with eye injuries. Statistical analysis revealed significant associations between eye injuries and participants' age, gender, occupation, educational qualification, and monthly family income. This study sheds light on the prevalence and risk factors associated with eye injuries in Bangladesh, emphasizing their occurrence in various settings, including home and the workplace. It highlights the urgent need for comprehensive preventive measures at personal, community, and national levels to mitigate the burden of eye injuries in Bangladesh, considering their impact not only on individual health but also on productivity and mental well-being.

[1] *Department of Research Education and Training, Al-Noor Eye Hospital, Dhaka,1207, Bangladesh*
[2] *Department of Ophthalmology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka 1000, Bangladesh*
[3] *Department of Ophthalmology, Al-Noor Eye Hospital, Dhaka,1207, Bangladesh*

Introduction

Eye injury is damage to the eye that results from direct physical contact. People of any age can lose their eyesight unilaterally or bilaterally due to eye injuries and this is reported to be the most common cause of loss of vision after a cataract (Islam & Quddus, 2017). Eye injuries can occur at any place and for a variety of reasons. Every year, a great number of eye injuries occur in the domestic, school, recreational, and work settings both in developed and developing countries (Shah et al., 2009).

According to research conducted by the American Academy of Ophthalmology and the American Society of Ocular Trauma, nearly 2.5 million ocular injuries occur in the USA at home annually (Occupational Health and Safety, 2009) where home eye injuries in Scotland accounted for about 30.6% of all eye injuries in 2015 (Desai et al., 2015). On the other hand, a population-based study in Nepal noted that 32% of eye injuries occurred at home (Khatry et al., 2004). In comparison, the scenario in Nigeria is different because a hospital-based survey reported that about 50% of eye injuries occurred at home, which is actually higher than the reports mentioned above (Onyekonwu & Chuka-Okosat, 2008). Although there is no nation-wise data on eye injuries that occur in residential settings in Bangladesh, a hospital-based cross-sectional study found that home is the most common place for eye injuries because 40.1% of the study subjects reported that their eye injuries occurred indoors (Slam et al., 2018). In addition, it identified the playground as the second most common place for eye injuries among school-going children.

Eye injuries can occur among children of all ages, from infants through teens when they participate in sports, recreation, craft making or doing other household activities. According to the National Eye Institute of USA, sportsrelated injuries are the most common cause of vision loss in school-age children (Kadrmas Eye Care New England, 2019). In addition, young children may accidentally get exposed to various potentially harmful substances, such as pesticides, detergents, and bleach, which may get splashed into their eyes and may cause chemical burns, and may sometimes lead to permanent vision loss. On the other hand, older kids may develop a chemical burn if products they are using, such as paint or glue, get into their eyes while working on a project. Corneal abrasions can occur if dirt, sand, or other irritant material gets into the eyes. Most corneal abrasions are minor but they may induce serious consequences if left untreated (Mayo Clinic, 2022).

Next to domestic settings, the workplace is the most frequently reported location of eye injury. The prevalence of ocular injuries in developed countries ranges from 88 to 1920 out of 100 000 population (Martin-Prieto et al., 2020). The annual incidence of occupational eye injuries in Hong Kong was estimated to be around 8000 cases or around 125 cases per 100 000 population, and they contributed up to 8% of all occupational injuries recorded in selected hospitals (Yu et al., 2004). In a study conducted in North India, occupational ocular injuries constituted 22% of all occupational injuries (Dahiya & Dua, 2020). The manufacturing industry, construction site, textile sector, and agriculture-based industry are reported to be more prone to eye injuries in low-middle income countries like Bangladesh probably due to the less priority given to occupational health and safety in general in the economic development process. According to several studies (Gobba et al., 2017; Jovanovic et al., 2016; Serinken et al., 2013; Cao et al., 2012), the relative risk of suffering an occupation-related eye injury is higher in men, younger and less experienced workers, and in those who do manual work.

The impact of ocular trauma is not limited to the individual's health only but also has a profound socioeconomic impact regarding the less productivity by young men and the requirement of treatment at caring facilities and provisions of rehabilitation. In 2018 in Spain, 17,579 workers were on sick leave due to a work-related eye injury (Martin-Prieto et al., 2020). According to the U.S. Occupational Safety and Health Administration, eye injuries in the workplace cost the U.S. about $300 million a year, which is the total from less productivity, health care costs, and worker compensation claims (Total Safety, 2015). Further, according to a study, eye damage is likely

to produce severe psychological suffering, such as anxiety, acute emotions of terror, numbing of emotional reactions, mood shifts, and even poor cognition (CDC, 2021). A study looking at the pattern, causes and management of eye injuries in Bangladesh has found that sharp objects/instruments are the most common cause of eye injuries among the study subjects followed by lime, foreign bodies, wounds/bruises, blunt substances, chemicals and acids (Islam & Quddus, 2017).

When compared to the developed countries, the incidence, and severity of occupation-induced eye injury is higher in developing countries. This could be due to the less attention given to occupational health and safety rules, policies, programs, and practices in the workplace. Bangladesh has a thriving economy. According to World Bank Data, the total labour force in Bangladesh was reported to be 69,816,327 in 2021 (World Bank, 2022). Of these, a significant portion of the workforce is formally employed in the agriculture, fishing, manufacturing, construction, hunting and forestry, electricity, gas, and water supply industry. Bangladesh is no exception as eye injuries, both work- and non-work-related, are a neglected area of research in Bangladesh. A very limited number of studies have examined ocular injuries, but no studies to our knowledge have been published from Bangladesh with regard to the epidemiology of occupational and non-occupational eye injuries and reports on the risk factors. Ongoing surveillance studies and epidemiologic investigations are critical components for advocacy efforts to increase awareness among all relevant stakeholders and to undertake prevention measures for ocular trauma. Therefore, this study aimed to explore the epidemiological nature of both occupational and non-occupational eye injuries based on patients treated in four selected eye hospitals in Bangladesh.

Methods:

This descriptive cross-sectional study was conducted in 4 eye hospitals in Bangladesh (Two in Dhaka, one in Tangail, and one in Rajshahi) among patients who seek treatment for eye injuries. Regardless of age and sex, any patient who came for treatment only for an eye injury rather than an eye disease was included as a participant in this study. A purposive sampling technique was used for selecting both the study place and the sample. All the study hospitals were managed by one international organization namely Al Basar International Foundation. No sample size was calculated or targeted to achieve this as it was a descriptive study using convenience sampling. In this study, the socio-demographic profile of the respondents such as age, gender, occupation, religion, educational status, marital status, and monthly family income were considered as independent variables, and any type of eye injury at work, home, and other areas were considered as dependent variables. Data was collected from 1st March 2022 to 20th May 2022 and the number of patients who came to the hospitals with eye injuries during this period was the target population.

A structured questionnaire was used to collect data from the study subjects. Based on the various literature focusing on occupational and non-occupational eye injuries (Martin- Prieto et al., 2020; Dahiya and Dua et al., 2020; Slam et al., 2018; Islam and Quddus, 2017; Khatry et al., 2004; Yu et al., 2004), this study's questionnaire was developed. The questionnaire was validated and reviewed by the advisor of the Research, Education, and Training Department of Al Basar International Foundation, Bangladesh, and three eye consultants of Al-Noor Eye Hospital (run by Al Basar International Foundation), Dhaka, Bangladesh. A field test was conducted on 10 targeted study subjects in a similar setting. After carrying out the necessary modifications, the final version of the questionnaire was administered.

This questionnaire had three parts. The first part was designed to extract information about the socio-demographic profile of participants. Participants' history of eye injury was gathered through the second segment of the questionnaire. It included the cause of the eye injury as well as the activity, date, time, and type of injury when it occurred. The last part was dedicated to obtaining information about working place whose eye injury happened at that place. In order to collect data, two steps were followed. In the first step, eye injured patient's name, age,

date of injury, date of a hospital visit, and phone number were collected through a checklist by all the selected hospitals where the study team had a data entry operator stationed and trained. At the end of each week, the completed checklists were handed over to the Research team in Dhaka Head office. Prior to this, a half-day long orientation program about the checklist, the study purpose, and the data collection process was given to data entry operators of all the selected hospitals by the Research team. The second step started as the research team members approached the eye-injured patients through phone calls.

After the collection of data, they were cleaned by thorough checking. At the end of each day of data collection, every questionnaire was checked whether it was filled completely and consistently. Then, they were stored along with a unique identification number. The data was analysed with Statistical Package for Social Sciences (SPSS) for Windows version 24.0 by the research team. Prior to analysis, data was entered into the computer after preparing a format according to the coding mentioned in the questionnaire. Descriptive and inferential analysis was performed simultaneously. Inferential analysis was done according to the objectives of the study. After crosstabulation, a Chi-square test was done between discrete and qualitative variables to check for statistically significant association. $P<0.05$ was considered to be statistically significant.

Prior to implementing the study, written and verbal permission was sought from the concerned authority. After getting proper consent, the study was executed. In addition, verbal consent was also sought from all the study subjects before data collection. In the case of children, verbal consent was obtained from their parents. The questionnaire was translated into Bengali for better understanding by the participants and to omit data errors. A translator expert was hired for translating the questionnaire in order to maintain validity and authenticity.

Results:

A total of 158 patients with eye injuries were visited to the study places at the time of data collection. Of these, 132 were eligible as the study sample but it was possible to reach 117 participants for data collection. Thereby, the final sample size settled to 117.

Table 1: Distribution of participants according to their socio-demographic profile (N=117)

Variables	**Category**	**Frequency (N=117)**	**Percentage**	**P value**
Age in years	1-5	4	3.4	**<0.001**
	6-10	6	5.1	
	11-18	16	13.7	
	19-30	51	43.6	
	31-40	17	14.5	
	41-50	14	12.0	
	51-60	4	3.4	
	61-88	5	4.3	
	Mean ± SD	**29.70 ±15.95**		
Gender	Male	81	69.2	**<0.001**
	Female	36	30.8	
Occupation	Service Holder	13	11.1	**<0.001**
	Day labour	11	9.4	
	Business owners	12	10.3	
	Construction Worker	9	7.7	
	Driver	3	2.6	
	Farmer	8	6.8	
	Retired	3	2.6	

	Housewife	25	21.4	
	Student	27	23.1	
	Unemployed	2	1.7	
Religion	Islam	108	92.3	0.588
	Hindu	9	7.7	
Educational qualification	Primary	25	21.4	**0.021**
	Secondary	29	24.8	
	Higher Secondary	22	18.8	
	Graduate	18	15.4	
	No education [a]	23	19.6	
Marital status	Married	80	68.4	0.676
	Unmarried	37	31.6	
Monthly family income in Bangladeshi Taka [b]	12,000-30,999 (Lower income)	73	62.4	**0.038**
	31,000-99,999 (Lower middle income)	44	37.6	

[a] 4 participants were under five years of age, therefore, they were not included. [b] Income group has been categorized on the basis of JICA report (JICA, 2016).

Table 1 shows that the age groups of 1-5 and 51-60 had the lowest eye injury (n= 4, 3.4%), whereas those between the ages of 19 and 30 and 51-60 had the highest (n= 51, 43.6%). The overall mean age of the participant was 29.70 ±15.95. In comparison to women (n= 36, 30.8%), men (n= 81, 69.2%) had greater eye injury. Male to female ratio was 2.24 to 1. Students (n= 27,23.1%) are the largest group to sustain an eye injury, followed by housewives (n= 25,21.4%), service holders (n= 13,11.1%), business owners (n=12,10.3%), day labors (n=11,9.4%), construction workers (n= 9,7.7%), farmers (n= 8,6.8%), drivers and the retired person (n= 3,2.6%), and the unemployed (n= 2,1.7%). The majority affected were Muslims (n= 108, 92.3%), followed by Hindus (n= 9, 7.7%). In terms of Educational qualification, 24.8% had completed Secondary school, 21.4% completed Primary school, 29.6% had No education, 18.8% had Higher Secondary education and 15.4% had a graduate degree. The majority of those with eye injuries were married (n= 80, 68.4%), followed by the unmarried group (n= 37, 31.6%). The majority of participants (n= 73, 62.4%) monthly family income fell into the USD 120– USD 309 (lower income), and the rest fell into USD 310– USD 999 (lower middle income) income groups.

In relation to eye injuries, the study found significant association with age, gender, occupation, educational qualification, and monthly family income of the participants. On the other hand, there was no association found between religion and the marital status of the participants with eye injuries.

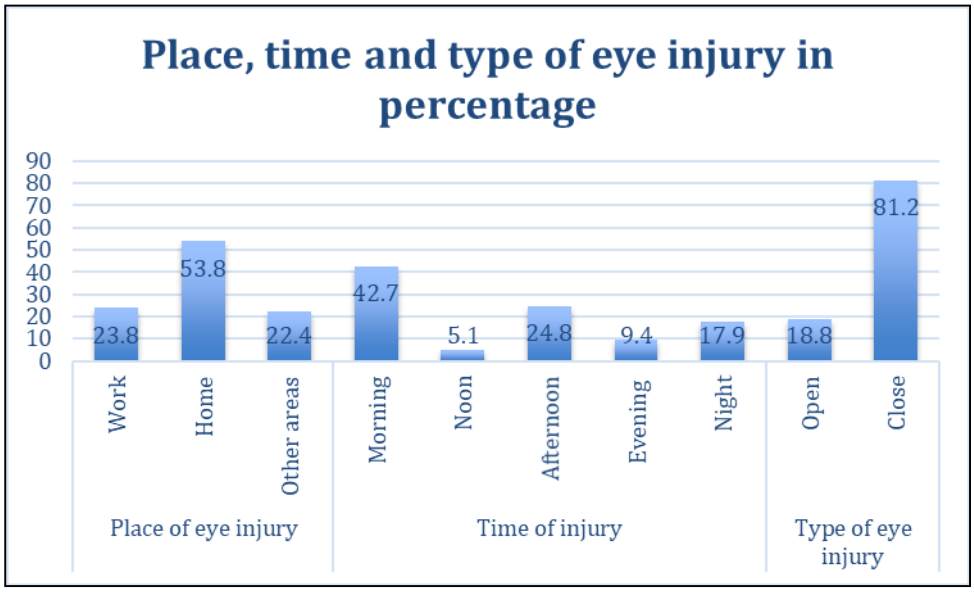

Figure 1: Distribution of participants according to place, time, and type of eye injury.

According to the distribution of work-related eye injuries (n = 117) by location (Figure 1), the majority of eye injuries happened at home with 53.8% of cases (n = 63), followed by the workplace with 23.8% of cases (n = 28), and other locations with 22.4% of cases (n = 26). Considering the distribution of injuries in the different times of a day

(Figure 1), the majority of injuries (about half) occurred during the morning (42.7%, n=50) followed by afternoon (24.8%, n=29), night (17.9%, n=21), evening (9.4%, n=11), and noon (5.1%, n=06). When comparing the frequency of eye injuries between closed and open types (Figure 1), it is observed that closed-type eye injuries were more prevalent than open-type eye injuries (18.8% vs. 81.2%, n = 95).

Table 2: **Distribution of participants according to the causes of eye injury (N=117)**

		Frequency	**Percentage (%)**
Causes of eye injury at the work	Carelessness	8	6.6
	Not using/lack of protective measure	11	9.40
	Improper physical conditions in the workplace (floor, noise, heat, chaos/untidiness)	4	3.4
	Not duly trained	2	1.7
	Lack of experience	1	0.9
	Total	**28**	**23.8**
Causes of eye injury at the home	Carelessness	22	18.7
	Hurrying	9	7.6
	Human contact	15	12.8
	Fall	7	6
	Assault	5	4.3
	Tiredness	3	2.6
	Contact with inanimate matter	1	0.9
	Fall from the tree	1	0.9
	Total	**63**	**53.8**
Causes of eye injury at the other areas	Fall to the ground	4	3.5
	Human contact	5	4.2

Carelessness	4	3.5
Assault	3	2.6
Contact with inanimate matter	9	7.7
Total	**26**	**22.4**

Table 2 pictures that the leading factors contributing to ocular injuries at work include not employing or having insufficient protective measures (9.4%, n=11). Carelessness (n=8, 6.6%), improper physical circumstances at work (floor, noise, heat, chaos/untidiness) (3.4%, n=4), improper training (n=2, 1.7%), and inexperience (n=1) are additional causes of eye damage at work. There are numerous factors that have been identified as home eye injury causes. The most common reason for eye damage at home is carelessness (18.7%, n=22), which is followed by human contact (n=15, 12.8%), fall (n=7, 6%), and tiredness (2.6%, n=3). With rates of 0.9%, falling from a tree and contact with inanimate matter are identified as the less common causes of eye injuries at home. Regarding the other areas' causes of eye injury, it is confirmed that contact with inanimate matter has the highest major risk (7.7%) followed by human contact as the second-highest major risk (4.2%),), falling to the ground and carelessness having similar risks of 3.5% each and assault having a minor case of 2.6%.

Table 3: Activities during eye injury (N=117)

		Frequency	**Percentage (%)**
Activities at the work place during eye injury	Maintaining or cleaning instrument	12	10.1
	Grinding or cutting metal	4	3.4
	Pruning	4	3.4
	Hammering or nailing	3	2.6
	Assault	2	1.7
	Fighting	2	1.7
	Handling chemical	1	0.9
	Total	**28**	**23.8**
Activities at the home during eye injury	Looking after child	20	17.1
	Doing household chores	19	16.1
	Exposure to household materials	16	13.7
	Domestic violence	4	3.4
	Gardening	2	1.7
	Playing	1	0.9
	Closing door	1	0.9
	Total	**63**	**53.8**
Activities at the other places during eye injury	Outdoor playing	2	1.7
	Misuse of sports kits	6	5.2
	Exposure to unwanted subjects	2	1.7
	Riding on vehicles	8	6. 9
	Walking	3	2.6
	During study	2	1.7
	Drinking tea	1	0.9
	Crossing the road	2	1.7
	Total	**26**	**22.4**

Table 3 illustrates the activities of the participants at the time of eye injury at the workplace, home, and other areas. A total of 28 (23.8%) participants have had eye injuries at the workplace. About 7 activities were mentioned by the respondents which were done by them during the occurrence of their injury. Among these, the highest 12 (10.1%) study subjects were maintaining or cleaning instruments during eye injury, followed by grinding or cutting metal, pruning, hammering or nailing, assault, fighting, and handling chemical by 4 (3.4%), 4 (3.4%), 3 (2.6%), 2 (1.7%), 2 (1.7%) and 1 (0.9%), respectively. On the other hand, there were 63 respondents whose eye injury occurred at their home where 7 activities were mentioned by them. The maximum 20 (17.1%) respondents were looking after their child during their eye injury. Playing and closing the door were separately identified by a minimum of 1 (0.9%) study subjects in this case. In addition, doing household chores, exposure to household materials, domestic violence, and gardening were mentioned by 19 (16.1%), 16 (13.7%), 4 (3.4%), and 2 (1.7%) participants, respectively as the activities which were being performed by them at the time injury occurrence. Further, 9 activities were stated by the 26 respondents whose injury happened at other places. Of these activities during eye injury, misuse of sports kits was mentioned by the outmost 6 (5.2%) participants. Furthermore, there were 5 (4.3%) participants who were on the bus at the time of their injury. Besides, riding a bike, walking, outdoor playing, exposure to unwanted subjects, during the study, crossing the road, and drinking was opined by 3 (2.6%), 3 (2.6%), 2 (1.7%), 2 (1.7%),2 (1.7%),2 (1.7%), and 1 (0.9%) participants, respectively as the activities in this regard.

Discussion:

This study described the epidemiology of ocular trauma in Bangladesh. It identified the population subgroups at risk of eye injury with respect to age, gender, education, income, and occupation. From four hospitals, outpatient cases were identified and analysed to know the causes, location, and time of eye injuries. An additional focus was on occupational injury as an important subset of cases. The findings of this study will be helpful for developing preventative measures to reduce the incidence and burden of eye injury which is a major public health problem in Bangladesh.

Demographics and eye injury

People of the 19-30 age sample were found to have the highest number of cases (51/117). It is this age group when people become more outgoing, become economically active and women get married and as housewives, they may sustain eye injuries while doing many housekeeping works including cooking. Males in general were found to be at higher risk. It is not unusual in a country like Bangladesh where people are less aware of many health and safety issues and eye injury may not be an issue to which many people pay attention when they play, work, or just stay home doing household chores including cooking. Younger and adult males are engaged in a lot of high-risk activities and occupations as is well known in Bangladesh that have a very poor impact on occupational health and safety, some occupations being inherently high risk for eye injury. Studies in other LMIC countries also found the younger adult male population to be at high risk of eye injuries. For instance, Khatry and colleagues tried to estimate the incidence of ocular injury from an eye care clinic in rural Nepal in 2004 and found men aged 20–29 years suffered more eye injuries than women and other age groups (Khatry et al., 2004). Similarly, a Nigerian study reported male predominance in ocular injuries than females, and their mean age was 22.34 ± 2.34 years during injury (Oyediran et al., 2021).

Education and income, and eye injury

The majority of the cases involved people with no or less than higher secondary education. It is possible that this population group has low awareness about the eye health and safety injury risk and consequences and they take less or no protective measures. Another explanation can be their lower educational attainment make them engaged in low-income high-risk activities and occupations that make them more vulnerable to eye injuries. This finding

regarding education is verified by the results stratified by income group as the lower income group was found to be at higher risk of eye injury compared to higher income. Education and income are related and together, it can be said that people with lower socioeconomic status (low education and income) are at high risk of eye injuries. This statement is supported by a prospective, hospital-based, observational study conducted among 402 patients in India in 2019 where a very large proportion of study subjects had lower academic qualifications and nearly half of the participants were of lower and lower middle socioeconomic status (Maurya et al., 2019). Also, a hospital-based study in Bosnia and Herzegovina in 2021 noted a higher prevalence rate of eye injuries among respondents in the lower and middle socio-economic status categories (Zvorničanin & Zvorničanin, 2021).

Education and awareness programs among people of lower socio-economic status particularly the younger males should be targeted by the government's Ministry of Health, ophthalmological societies, eye hospitals, and NGOs with an interest in eye health. School teachers and religious leaders can be trained to provide mass awareness about the seriousness of eye health and the consequences of eye injury among school children and general community members. Community-based health education intervention on eye health literacy of adults in Vietnam was found effective as it increased awareness and knowledge of red eye preventive measures (Paudel et al., 2022). On the other hand, it was found that teachers were able to identify the eye defect of children and refer them to eye professionals after receiving proper training (Sudhan et al., 2009). In addition, school-going students can participate in eye condition screening programs as a study in the UK showed that 8-12-year-old eye health-trained students made the community people aware of eye health which resulted in some of them completing eye exams (Y S et al., 2018).

Occupation:

As per our study, most of the ocular injury patients were students (23.1%) followed by housewives (21.4%). Other larger groups of patients included service holders, business owners, day laborers, construction workers, and farmers respectively. Housewives because of their nature of work (cooking, child rearing and playing with them, dealing with household cleaning agents and other chemicals) may be at high risk of eye injury. Students during traveling, and playing may sustain eye injuries. This could be due to the premature nature of young students, as well as a desire for more attention from authority while students play with or use sharp wooden objects. A safety education program aimed at both adults and young students while handling potentially hazardous objects in daily activities may help to reduce the number of eye injuries. Furthermore, while some injuries are difficult to prevent, safety environment management is a simple strategy to further prevent a serious eye injury in students (Choovuthayakorn et al., 2020). This is consistent with the study conducted by El-sobky *et al* in Menoufia University Hospitals (Hamed et al., 2019). Day laborers and construction workers are at high risk because of their manual tasks, workload, materials handled, and lack of safety measures and equipment. This finding is particularly important in Bangladesh because the construction industry is one of the main industries, with a workforce of 3.5 million (according to the construction workers union and REHAB) (Masum, 2022).

Place, time, and type of eye injury

The majority of the patients with eye injuries were engaged in household activities with 53.8% of cases whereas other patients were injured at the workplace with 23.8% of cases. A higher frequency of ocular injuries was recorded during the morning, constituting 42.7% of the subjects. This may be due to the ideal time of engaging work for every class of people. On the other hand, ocular injuries were found to be quite less during noon as it is a leisure period and people take rest. In regards to the types of eye injury, closed and open globe injuries occurred in 95/117 (81.2%) and 22/117 (18.8%) of patients, respectively in this study which is dissimilar to a prior author finding conducted in hospital settings (Cao et al., 2012). This signifies that eye patients with mild to moderate

injury usually visit to the study sites. As the current study sites are not tertiary eye hospitals, patients with severe eye injuries especially open globe injuries do not visit these hospitals very often.

Causes of Eye Injury

This study looked at the causes of eye injuries in different arrangements such as workplaces, homes, and other areas. It was noticed that not using/lack of protective measures was the principal cause of ocular injuries at the workplace. This finding is consistent with a study conducted in western Turkey in 2013 (Serinken et al., 2013). Previous research has shown that in a significant percentage of workplaces, eye-protective measures are not implemented as needed (Ho et al., 2008). However, 90% of occupation-related eye injuries could be prevented by the use of proper protective eyewear (Serinken et al., 2013). In hospital-based data, there is a marked variation in the proportion of individuals with eye injuries who report the use of eye protection (Waller et al., 1989; Fong et al., 1995). When compared to the developed countries, the incidence, and severity of occupation-induced eye injury is higher in developing countries. This could be due to the lesser attention given to occupational health and safety rules, policies, programs, and practices in the workplace.

Thus, it is suggested that employers should arrange personal protective equipment for each and every worker as well as ensure its proper use and application. On the other hand, most of the eye-injured participants at home identified “carelessness” as the cause of eye injury. “Carelessness” can be defined as failure to give sufficient attention to avoiding harm or errors (Oxford University Press, 2023). This behaviour is common during any household activity. In order to prevent injuries including eye injury, people should pay more attention to doing domestic chores. Road traffic accident (RTA) was found as a major cause of eye injuries in other areas in this present study. RTA is a major cause of vision loss in the young adult population and a prior hospital-based observation study found that almost a quarter of eye injured patients were due to RTA in North India in 2021 (Maurya et al., 2021). This is suggestive of developing and enforcing stricter road safety laws to ensure a safe road traffic system both for drivers and pedestrians.

Activities during Eye Injury

In this study, the frequency and type of activities at the time of eye injury were identified. Maintaining or cleaning instruments (10.1%, 12/28), doing household chores or exposure to materials (29.8%, 35/63), playing outdoors, and transportation (6.9%, 8/26) were found to be more common activities leading to eye injury at the workplace, home and other places respectively. In terms of labour health and workplace safety, eye injury in the workplace has important consequences not only with its preventable effects on young employees who are in their beginning years of working life but also with its permanent hazards on worker's health and substantial loss of workforce (Serinken et al., 2013). Chen *et al*., (2009) demonstrated that injury risks are higher in workers without any special training on workplace safety, who do not use protective equipment during handling instruments at the workplace. So, it is suggested that workers use comfortable protective eyewear with good peripheral vision and a good fit at the workplace while cleaning, and handling instruments.

Strength and Limitations

This study was the first-ever study focused on occupational and non-occupational eye injuries in Bangladesh. It was a comprehensive study covering a large geographic area of Bangladesh which can remain as a baseline study to compare findings from future similar types of research. The hospitals of this study focused on the low-socio economic background group which represents the majority of the population in Bangladesh. One limitation of this study is that it is a hospital-outpatient-based study; therefore, trends cannot be stipulated to other types of injuries (either less or more serious) directly to the general population. Another limitation of this study is its relatively small size which limited the ability for internal subgroup comparison. Also, no follow-up procedure was carried out on outcome measures as this was cross-sectional in nature.

Conclusion:

The higher frequency of injuries among young workers supports the need for prevention and control measures to be implemented as early as possible in a worker's career, and special consideration should be given to workers who are males, have no education, as well as students and housewives, who may sustain eye injuries while performing many unconscious risky activities and domestic chores activities respectively. Many people consider their home to be a safe space; even so, the risk of eye injury is high, with 53.8% of cases occurring at home in our study. A safe environment for children, adolescents, elderly patients, and all household occupants should be made available. Preventative measures should also be implemented at the workplace to prevent eye injuries in order to create a safe environment for employees, particularly in high-risk industries such as industry, agriculture, and construction.

We must therefore consider that our data is only a brief overview of a three-month trend and will serve as a baseline for future studies over longer time periods, such as 5-7 years, to gain a better understanding of the risk and trends, and to look further at associations to reduce the burden of blindness and visual impairment from occupational and non-occupational eye injuries.

References

Cao, H., Li, L., & Zhang, M. (2012). Epidemiology of patients hospitalized for ocular trauma in the Chaoshan region of China, 2001-2010. PloS One, 7(10), e48377. https://doi.org/10.1371/journal.pone.0048377

CDC. (2021, September 28). Vision loss and mental health. Centers for Disease Control and Prevention. https://www.cdc.gov/visionhealth/resources/features/vision-loss-mentalhealth.html

Chen, S.-Y., Fong, P.-C., Lin, S.-F., Chang, C.-H., & Chan, C.-C. (2009). A case-crossover study on transient risk factors of work-related eye injuries. Occupational and Environmental Medicine, 66(8), 517–522. https://doi.org/10.1136/oem.2008.042325

Choovuthayakorn, J., Worakriangkrai, V., Patikulsila, D., Watanachai, N., Kunavisarut, P., Chaikitmongkol, V., Luewattananont, D., & Tananuvat, N. (2020). Epidemiology of eye injuries resulting in hospitalization, a referral hospital-based study. Clinical Ophthalmology (Auckland, N.Z.), 14, 1–6. https://doi.org/10.2147/OPTH.S234035

Corneal abrasion (scratch): First aid. (2022, August 12). Mayo Clinic. https://www.mayoclinic.org/first-aid/first-aid-corneal-abrasion/basics/art-20056659

Dahiya, M., & Dua, M. (2020). Epidemiological profile of occupational ocular injury in a tertiary eye care centre of North India. International Journal of Community Medicine and Public Health, 7(6), 2164. https://doi.org/10.18203/2394-6040.ijcmph20202506

Desai, P., Morris, D. S., Minassian, D. C., & MacEwen, C. J. (2015). Trends in serious ocular trauma in Scotland. Eye, 29(5), 611–618. https://doi.org/10.1038/eye.2015.7

Eye injuries in Children and how to prevent them. (n.d.). Kadrmas Eye Care New England. Retrieved April 27, 2023, from http://www.kadrmaseyecare.com/eye-health--care-blog/eyeinjuries-in-children-and-how-to-prevent-them-childrens-eye-health-and-safety-month

Eye injuries still major cause of workplace injuries, lost productivity. (2015, February 11). Total Safety. https://www.totalsafety.com/eye-injuries-still-major-cause-of-workplace-injuries-lostproductivity/

Fong, L. P., & Taouk, Y. (1995). The role of eye protection in work-related eye injuries. Australian and New Zealand Journal of Ophthalmology, 23(2), 101–106. https://doi.org/10.1111/j.1442-9071.1995.tb00137.x

Gobba, F., Dall'Olio, E., Modenese, A., De Maria, M., Campi, L., & Cavallini, G. (2017). Workrelated eye injuries: A relevant health problem. Main epidemiological data from a highlyindustrialized area of northern Italy. International Journal of Environmental Research and Public Health, 14(6), 604. https://doi.org/10.3390/ijerph14060604

Hamed, A.-K., El-Sobky, H. K., Ellakwa, A. A., & El-Sawy, M. A. (2019). Incidence and pattern of ocular trauma among ophthalmic patients in Menoufia University Hospitals. Menoufia Medical Journal, 32(4), 1430. https://doi.org/10.4103/mmj.mmj_254_18

Ho, C.-K., Yen, Y.-L., Chang, C.-H., Chiang, H.-C., Shen, Y.-Y., & Chang, P.-Y. (2008). Casecontrol study on the prevention of occupational eye injuries. The Kaohsiung Journal of Medical Sciences, 24(1), 10–16. https://doi.org/10.1016/S1607-551X(08)70067-6

Islam, M. S., & Quddus, A.H.G. (2017). Pattern, Causes, and Management of Ocular Injuries at Rural Community Setting of Bangladesh. Pak J Ophthalmol, 33(4), 246–252.

JICA. (2015). Emerging Middle –Income Class in Bangladesh. Retrieved April 27, 2023, from https://www.jica.go.jp/bangladesh/bangland/pdf/about/Middle%20Income%20Survey.pdf

Jovanovic, N., Peek-Asa, C., Swanton, A., Young, T., Alajbegovic-Halimic, J., Cavaljuga, S., & Nisic, F. (2016). Prevalence and risk factors associated with work-related eye injuries in Bosnia and Herzegovina. International Journal of Occupational and Environmental Health, 22(4), 325–332. https://doi.org/10.1080/10773525.2016.1243081

Khatry, S. K., Lewis, A. E., Schein, O. D., Thapa, M. D., Pradhan, E. K., & Katz, J. (2004). The epidemiology of ocular trauma in rural Nepal. The British Journal of Ophthalmology, 88(4), 456– 460. https://doi.org/10.1136/bjo.2003.030700

Labor force, total - Bangladesh. (n.d.). World Bank Open Data. Retrieved April 27, 2023, from https://data.worldbank.org/indicator/SL.TLF.TOTL.IN?locations=BD

Martin-Prieto, S., Álvarez-Peregrina, C., Thuissard-Vasallo, I., Catalina-Romero, C., CalvoBonacho, E., Villa-Collar, C., & Sánchez-Tena, M. Á. (2020). Description of the epidemiological characteristics of work-related eye injuries in Spain: a retrospective study. BMJ Open, 10(10), e035696. https://doi.org/10.1136/bmjopen-2019-035696

Masum, O.. (2022). No safety measures for construction workers. Retrieved April 27, 2023, from BDnews24.com,https://bdnews24.com/bangladesh/no-safety-measures-for-constructionworkers

Maurya, R. P., Singh, V. P., Mishra, C. P., Jain, P., Kumar, A., Prajapat, M. K., Bosak, S. K., Patel, E., Verma, S., & Narayan, S. (2021). Eye Injuries in Motor Vehicle Accidents: Epidemiology, Spectrum of Injuryand Analysis of Risk Factors. IP International Journal of Ocular Oncology and Oculoplasty, 7(1), 30–39. https://doi.org/10.18231/j.ijooo.2021.007

Maurya, R. P., Srivastav, T., Singh, V. P., Mishra, C. P., & Al-Mujaini, A. (2019). The epidemiology of ocular trauma in Northern India: A teaching hospital study. Oman Journal of Ophthalmology, 12(2), 78–83. https://doi.org/10.4103/ojo.OJO_149_2018

Onyekonwu, G. C., & Chuka-Okosat, C. M. (2008). Pattern and visual outcome of eye injuries in children at Abakaliki, Nigeria. West African Journal of Medicine, 27(3), 152–154.

Oxford University Press. (2023). Careless. Retrieved April 27, 2023, from https://www.oxfordlearnersdictionaries.com/definition/english/careless

Oyediran, O. O., Oladosu, T. O., Oiwoh, O. K., Ayandiran, E. O., & Ojo, I. O. (2021). Prevalence and pattern of ocular injuries among ophthalmic patients in a referral centre, Ekiti state, Nigeria.

International Journal of Ophthalmology and Clinical Research, 8(3). https://doi.org/10.23937/2378-346x/1410130

Paudel, P., Kovai, V., Burnett, A., Naduvilath, T., Ho, S. M., Fricke, T., & Giap, N. V. (2022). Effects of a community-based health education intervention on eye health literacy of adults in Vietnam. International Journal of Health Promotion and Education, 60(3), 149–163. https://doi.org/10.1080/14635240.2021.1905028

Serinken, M., Turkcuer, I., Cetin, E. N., Yilmaz, A., Elicabuk, H., & Karcioglu, O. (2013). Causes and characteristics of work-related eye injuries in western Turkey. Indian Journal of Ophthalmology, 61(9), 497–501. https://doi.org/10.4103/0301-4738.119435

Shah, A., Blackhall, K., Ker, K., & Patel, D. (2009). Educational interventions for the prevention of eye injuries. Cochrane Database of Systematic Reviews, 4, CD006527. https://doi.org/10.1002/14651858.CD006527.pub3

Slam, M. S., Islam, M. N., Shahrier, M. S., Rahman, M. S., & Uddin, M. N. (2018). Overview of Ocular Injury in Southern Part of Bangladesh: A Hospital Based Study of 406 Cases. J OphthalmolClin Res, 2(2), 1–4.

Sudhan, A., Pandey, A., Pandey, S., Srivastava, P., Pandey, K. P., & Jain, B. K. (2009). Effectiveness of using teachers to screen eyes of school-going children in Satna district of Madhya Pradesh, India. Indian Journal of Ophthalmology, 57(6), 455–458. https://doi.org/10.4103/0301-4738.57157

Survey: Nearly half of eye injuries occur at home -- occupational health & safety. (n.d.). Occupational Health & Safety. Retrieved April 27, 2023, from https://ohsonline.com/Articles/2009/07/07/Survey-Finds-Nearly-Half-of-Eye-Injuries-Occur-atHome.aspx

Waller, J. A., Payne, S. R., & Skelly, J. M. (1989). Injuries to carpenters. Journal of Occupational and Environmental Medicine, 31(8), 687–692. https://doi.org/10.1097/00043764-19890800000015

Y , S., M, R., Ar, B., & A, D.-N. (2018). Eye heroes: A model of raising awareness about eye health by training children to be eye health champions. Journal of Community Medicine & Health Education, 08(06). https://doi.org/10.4172/2161-0711.1000639

Yu, T. S. I., Liu, H., & Hui, K. (2004). A case-control study of eye injuries in the workplace in Hong Kong. Ophthalmology, 111(1), 70–74. https://doi.org/10.1016/j.ophtha.2003.05.018

Zvorničanin, J., & Zvorničanin, E. (2021). Socioeconomic status and decreasing incidence of ocular injuries in Bosnia and Herzegovina. Seminars in Ophthalmology, 36(7), 517–522. https://doi.org/10.1080/08820538.2021.1893350