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Original Article

A CROSS-SECTIONAL STUDY ON WORK RELATED OCULAR INJURIES FROM A TERTIARY CARE TEACHING HOSPITAL OF CENTRAL INDIA.

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ABSTRACT

Background

Work-related eye injuries are more common and severe in developing nations such as India due to the lack of emphasis on occupational health and workplace safety. Literature has revealed that work-related eye injuries make up 22% of all ocular trauma cases in their study on ocular trauma. Therefore this investigation was conducted to study epidemiological aspects of work-related eye injuries.

Method

The hospital-based observational study was conducted on 362 individuals seeking treatment for work-related ocular injuries at the ophthalmology department of a tertiary care teaching hospital in Shahdol town, Madhya Pradesh. All the patients received a thorough clinical assessment at the ophthalmology department after capturing the relevant baseline information.

Results

Of the total 362 subjects, the gender-wise majority (n=331, 91.4%) were males. Most (n=224, 61.8%) of ocular injuries were observed in the younger age group (20 to 30 years). A history of previous ocular injury was noted in 7.7% (n=28). Most (n=188, 51.9%) were reported from welding work followed by grinding work (n=54, 14.9%) as the second most common. Corneal foreign bodies were noted among 47 (13%) study subjects. Just removing protective gear with no reason (n=18, 38.3%), removing protective gear due to sweating (n=12, 25.5%) & protective gear being uncomfortable (n=10, 21.3%) were the three most common reasons cited for not using protective gears for eyes.

Conclusion

The study offers an understanding of the epidemiological features of work-related ocular injuries in central India. Many of these injuries can be avoided by using suitable eye protection and receiving safety training.

Recommendations

An individualized intervention program for workers with eye injuries should be implemented due to their high susceptibility to recurring injuries.

Keywords: Tympanoplasty, Temporalis Fascia Graft, Cartilage Island Graft, Air-Bone Gap.
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Introduction

Eye (ocular) injuries are a significant component of work-related injuries. Job-related eye injuries have a substantial socioeconomic impact due to the pain and loss of productivity they cause, as well as the decrease in job capacity and quality of life [1,2]. The eye-wounded workers' unwillingness to follow cautious measures resulted in repeated eye injuries [3]. Repeated eye injuries elevate the likelihood of enduring visual impairment elevate the likelihood of enduring vision impairment [4, 5]. Work-related eye injuries are more common and severe in developing nations such as India due to the lack of emphasis on occupational health and workplace safety [6]. Literature has revealed that work-related eye injuries make up 22% of

all ocular trauma cases in their study on ocular trauma [7]. Injuries are more prevalent in unstructured sectors such as small grinding, welding, or fabrication firms compared to organized setups like factories. The informal sectors lack safety training and do not require workers to wear eye protection devices [8].

Many eye injuries can be avoided by using strong and efficient preventive measures. A comprehensive understanding of risk factors, injury types, and at-risk occupations is necessary to create effective preventative interventions. There is a scarcity of this data in India because of insufficient reporting and surveillance systems. Therefore this investigation was conducted to study various epidemiological aspects of work-related eye injuries.

Methods

Study design

An observational cross-sectional study was performed.

Study setting

This was a hospital-based study conducted at the Department of Ophthalmology, Atal Bihari Vajpayee Government Medical College, Vidisha, Madhya Pradesh, India. The study comprised all cases of work-related eye injuries seen in the outpatient department of the hospital from April 2022 to March 2023.

Sample size

Data from 362 study subjects was processed. Universe of the population who visited the study site in the study period was included.

Participants

Subjects seeking treatment for work-related ocular injuries at the ophthalmology department of a tertiary care teaching hospital in Shahdol town, Madhya Pradesh.

The study was conducted on individuals seeking treatment at the ophthalmology department of a tertiary care teaching hospital in Shahdol town, Madhya Pradesh. In this study, 'work-related eye injury' or 'work-related ocular injury' was defined as an eye injury caused directly by work activities or working factors.

Bias

Only one researcher conducted all the interviews to maintain uniformity and reduce the interviewer's bias. Respondent bias was tried to reduce as far as possible.

Data collection and analysis

All study participants were briefed on the purpose of the study along with the objectives and requested & encouraged to take part. The participants' confidentiality was ensured. Data about demographics and occupations was gathered. Subjects were interviewed by the ophthalmologist in their preferred language regarding work conditions, work settings, and use of protective equipment. The questions were asked verbally and recorded by the ophthalmologist. Demographic data was collected for each patient, including age, gender, and education. Information was also collected regarding the duration of experience in the current field, previous similar injuries, presence of protective eyewear at the workplace, self-attempted removal of foreign objects by the patient, and the method employed during self-removal attempts.

Participants' knowledge of occupational eye safety was assessed by asking about the time lapse between injury and ophthalmologist visits, awareness of work-related eye injury risks, the impact of repetitive foreign body injuries on vision, and the potential harm from self-removal of foreign objects from the eye. All the patients received a thorough clinical assessment at the ophthalmology department afterward. Each patient underwent a slit lamp examination. The location and depth of the foreign object were observed. A rust ring, signs of further infection, and a corneal scar from a previous foreign body incident were observed.

Statistical analysis

Every questionnaire was thoroughly reviewed for accuracy before analyzing the data. Information was encoded and inputted into an Excel spreadsheet. Data was subsequently entered into a statistical software program. The data was analyzed using the Statistical Package for Social Sciences for Windows, Version 20. Numerical data were presented using mean and standard deviation (SD), whereas categorical variables were displayed as frequencies (n) and percentages.

Ethical consideration

The study commenced following approval from the institutional ethical committee. Written informed consent was obtained from all the subjects.

Results

Of a total of 362 subjects, the gender-wise majority (n=331, 91.4%) were males. Most (n=224, 61.8%) of ocular injuries were observed in the younger age group (20 to 30 years). A history of previous ocular injury was noted in 7.7% (n=28). Regarding the timing of the injury, the majority (n=203, 56.1%) stated that they got injured during 12 noon – 3 pm. No variation was observed as per the season (winter, autumn, rainy & monsoon). Most injuries were unilateral.

Regarding the pattern of work-related eye injuries, of a total of 362 work-related eye injuries, most (n=188, 51.9%) were reported from welding work followed by grinding work (n=54, 14.9%) as second most common. Other patterns were identified as wood-cutting work (n=37, 10.2%), agriculture work (n=40, 11%) & construction work (n=29, 8%). (Table 1)

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Table 1: Pattern of work-related eye injuries (n=362)

Pattern of work	Number of cases	Percentage
Welding work	188	51.9
Metal grinding work	54	14.9
Wood cutting work	37	10.2
Agriculture work	40	11.0
Construction work	29	8.0
Others	14	4.0

Regarding the pattern of ocular injuries, of a total of 362 work-related ocular injuries, the majority (n=172, 47.5%) of injuries were contusion injuries. The second most common (n=56, 15.5%) ocular injury observed was laceration of eyelid injury. The next commonly seen ocular injuries were corneal foreign bodies (n=47, 13%) & injury due to chemicals (n=37, 10.2%) respectively. (Table 2)

Table 2: Pattern of ocular injuries (n=362)

The pattern of ocular injury	Number of cases	Percentage
Contusion injury	172	47.5
Laceration of eyelid injury	56	15.5
Corneal foreign bodies	47	13.0
Injury due to chemicals	37	10.2
Open globe injury	29	8.0
Others	21	5.8

Of a total of 362 work-related eye injuries, corneal foreign bodies were noted among 47 (13%) study subjects. Upon probing reasons for not using protective gear for the eye in such cases, the three most common reasons cited were, just removing protective gear with no reason (n=18, 38.3%), removing protective gear due to sweating (n=12, 25.5%) & protective gears are uncomfortable (n=10, 21.3%). (Table 3)

Table 3: Reasons for not using protective gear for the eye in cases of Corneal foreign bodies (n=47)

Reasons for not using protective gear for eye	Number of cases	Percentage
Just removed protective gear for no reason	18	38.3
Removed protective gear due to sweating	12	25.5
Protective gear is uncomfortable	10	21.3
Forgot to wear	5	10.6
Others	2	4.3

Of a total of 362 work-related eye injuries, corneal foreign bodies were noted among 47 (13%) study subjects. Upon probing reasons, mode of self-removal in such cases, the three most common modes cited were, self-removal not tried (n=24, 51.1%), using running tap water (n=11, 23.4%) & used corner of cloth (n=8, 17.0%). (Table 4)

Table 4: Mode of self-removal in cases of Corneal foreign bodies (n=47)

Mode attempted by study subjects	Number of cases	Percentage
Self-removal not tried	24	51.1
Used running tap water	11	23.4
Used corner of cloth	8	17.0
Used corner of currency note	3	6.4
Used corner of the paper	1	2.1

Discussion

This observational study conducted in a hospital aimed to analyze the demographic information, characteristics, and nature of work-related eye injuries along with related factors. The study examined various aspects of work-related eye injuries among 362 subjects, predominantly male (91.4%), with most injuries occurring in the younger age group (20 to 30 years).

Notably, welding work was the leading cause of eye injuries (51.9%), followed by grinding work (14.9%), wood cutting (10.2%), agriculture (11.0%), and construction (8.0%). The majority of injuries were unilateral, with contusion injuries being the most common (47.5%), followed by lacerations of the eyelid (15.5%), corneal foreign bodies (13.0%), and injuries due to chemicals (10.2%). Among those with corneal foreign bodies, reasons for not using protective gear included removing it without reason (38.3%), discomfort due to sweating (25.5%), and overall discomfort (21.3%).

In cases of corneal foreign bodies, self-removal was not attempted in over half of the cases (51.1%), with running tap water being the most common method of attempted removal (23.4%). These findings highlight the significant impact of specific work environments and practices on the occurrence and nature of work-related eye injuries, emphasizing the importance of preventive measures and proper protective gear to reduce the incidence of such injuries. A similar finding was noted by another author. He observed that ocular foreign bodies are prevalent among metal-grinding workers in Australia [9].

Consistent with previous research on work-related eye injuries, the majority of patients were male. Another study on the epidemiology of lifetime work-related eye injuries in the American population revealed that men are four times more likely to get eye injuries on the job compared to women. This is because men traditionally engage in high-risk tasks [10].

Most injuries in this investigation were noted to be unilateral. This aligns with the findings of previous research [11]. The majority of the injuries occurred in a younger age group, indicating that a lack of work experience may contribute to these eye injuries. This aligns with findings from a separate study carried out in South India on industrial eye injuries [12]. Research from Iran and Nepal provided evidence in favor of this concept [13, 14]. Studies in eastern and northern India found that most patients with occupational ocular damage were in the age bracket of 36 to 45 years, indicating that work experience did not decrease the occurrence of eye injuries. Comparable findings were documented in employees in China and Japan [15, 16]. Specific types of work are linked to an increased likelihood of eye injury. Metal welding and grinding were the primary causes of ocular injuries in the study, followed by agriculture. This aligns with several studies [17]. Some studies have shown that construction workers are more prone to work-related eye injuries. The difference is caused by the diversity of vocations in various places [18]. In this investigation, upon probing reasons mode of self-removal in such cases, the three most common modes cited were, self-removal not tried (n=24, 51.1%), using running tap water (n=11, 23.4%) & used corner of cloth (n=8, 17.0%). These injuries could be prevented. Prior research indicates that 90% of work-related eye injuries can be avoided [19,20]. Several studies have shown that numerous workers who were aware of and had access to protective eye gear chose not to wear it because of its poor fit, limited visibility, and discomfort [21,22]. Recommended protective equipment varies by occupation and may consist of safety glasses with impact-resistant frames and shatterproof lenses for tasks involving flying particles, or tight-fitting goggles to prevent liquid splashes or airborne particles. These must be worn with face shields or welding-specific shields or helmets to give extra protection for the eyes and face from extreme heat. Adhering strictly to the usage of suitable protective eyewear with clear visibility will significantly reduce work-related eye injuries.

Generalizability

The generalizability of the findings is always an important concern when the study is conducted at a single center in a particular geographical area. The findings of this study cannot be extrapolated as a thumb rule. However, findings may apply to a population having similar characteristics.

Conclusion

The study offers an understanding of the epidemiological features of work-related ocular injuries in central India. Due to a higher incidence of work-related eye injuries in younger individuals, early intervention is necessary to prevent irreversible visual impairment. Many of these injuries can be avoided by using suitable eye protection and receiving safety training. When developing preventive interventions, prioritize workers in metalwork, agriculture, and carpentry due to the higher incidence and more severe outcomes of injuries reported in these occupations.

Limitations

A larger population-based study of longer duration would help understand the demographic profile better. We did not study the employment pattern of the workers as temporary and permanent because they mainly belonged to unorganized sectors like welders, carpenters, painters, etc., unlike large factories. This is important because temporary workers have less work experience and no safety training thus making them more prone to eye injuries. Yet this study can serve as baseline data for further studies to generate inputs for the policymakers to design evidence-based interventions to reduce visual morbidity and economic loss due to work-related eye injuries.

Recommendations

An individualized intervention program for workers with eye injuries should be implemented due to their high susceptibility to recurring injuries.

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Conflict of interest

There was no conflict of interest.

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