

Case Report

Prevalence and Risk Factors of Ocular Trauma in Turner Machine Operators of Rawalpindi City

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PURPOSE: To determine the prevalence of ocular trauma and its risk factors in turner machine operators of Rawalpindi city of Pakistan.

METHODS: The cross-sectional study was conducted at the turneries of Rawalpindi City. The duration of this study was a one-year study i.e. between January 2016 to December 2016 and all the workers of turneries were included in the study by purposive sampling technique.

RESULTS: During the cross-sectional survey, 120 turner machine operators of Rawalpindi city were interviewed and checked. Only 50 of which were meeting the criteria of this research study for studying risk factors of ocular trauma in these workers.

The mean age of the patients was 32.74. The prevalence of ocular trauma among these professionals was 41.6%. The percentage of penetrating ocular injury was 14% whereas non-penetrating ocular injury was 86%. The main risk factor of Ocular trauma in the current study was the non-use of Eye safety measures in turnery professionals. The relative risk estimate of non-use of eye safety measures was found to be 1.024.

CONCLUSION: *Prevalence of ocular trauma was found similar to different studies conducted on occupational ocular trauma and the main risk factor was also similar to subjects of different occupations which is non-use of safety measures. Current findings can be used as a baseline for future large-scale studies on turner machine operators and this study will also help to develop preventive strategies to control the risk factors in turner machine operators.*

Introduction

Ocular trauma is a major cause of visual morbidity in the whole world. Most of the eye injuries are occupational. These eye injuries can be simple like ocular surface foreign bodies or minor corneal abrasions. These eye injuries can also be serious and complicated like perforating injuries that can result in blindness (4-5). Worldwide there are approximately 1.6 million people blind from eye injuries, 2.3 million bilaterally visually impaired and 19 million with unilateral visual loss. These figures of eye trauma are clearly showing that it's the most common cause of unilateral blindness in the world (6). Ocular trauma and corneal ulceration are significant causes of corneal blindness that are often under-reported but may be responsible for 1.5-2.0 million new cases of monocular blindness yearly (7). It has been reported that 5% of blindness in developing countries is trauma-related (8). The annual incidence of ocular trauma is 55 million, of which 750,000 cases require hospitalization each year, including some 200,000 open globe injuries (6). Trauma is often the most important cause of unilateral loss of vision, particularly in developing countries (9). Eye injuries account for a substantial proportion of all work-related injuries (10-12); including 12% of all workers compensation claims among carpenters (12), and 11% of all injuries to construction workers requiring an emergency room visit (11). Metalworkers have the highest rate of missed work due to eye injury of any specific occupational group, getting injured at 16-times the national average rate (13). It is estimated that 90% of all ocular injuries are preventable if proper eye safety measures are used by workers of different occupations (14). Many studies have been conducted in different countries to see occupational ocular trauma (15-30). The current study was specifically conducted on turner machine operators of Rawalpindi city to see the prevalence of ocular trauma and its risk factors.

Methodology

After getting approval from the ethical committee of Pakistan institute of community Ophthalmology Hayatabad Medical Complex Peshawar, the Cross-sectional study was conducted to study the prevalence and risk factors of ocular trauma in turnery professionals at turneries of Rawalpindi City. The duration of this study was a one-year study i.e. between January 2016 to December 2016 and all the workers of turneries from Rawalpindi city of Punjab province were included in the study. The sampling technique applied was purposive.

Inclusion Criteria: All working staff working on the turnery machine of the turneries of Rawalpindi city were included in this study.

Exclusion Criteria: Workers not properly responding/communicating were excluded from the study and workers who left working at these turneries because of any reason. Also, the subjects who did not go to the hospital because of minor injuries were not included in calculating the risk factor.

Data Analysis

SPSS (Statistical Package for Social Sciences) version 17 was used for the data analysis. Variables included in the study were:

Dependent Variable: The dependent variable in this study was ocular trauma.

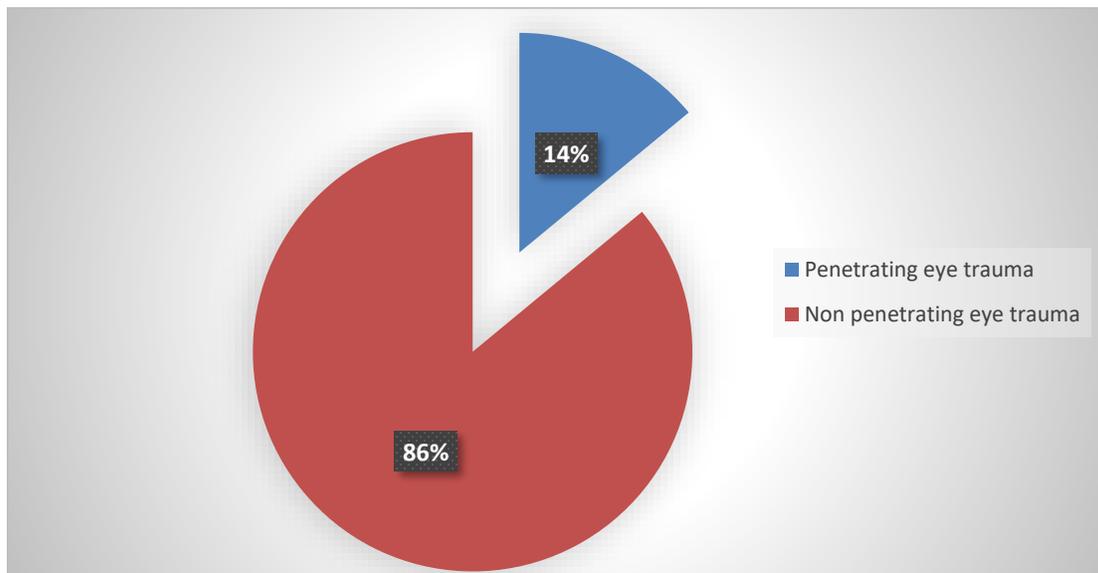
Independent Variables: The independent variables in this study include: Age, Safety measures, Safety Policy, the Health status of the subjects, Self-reported vision, Sleeping disorders, Tiredness, Equipment used.

Results

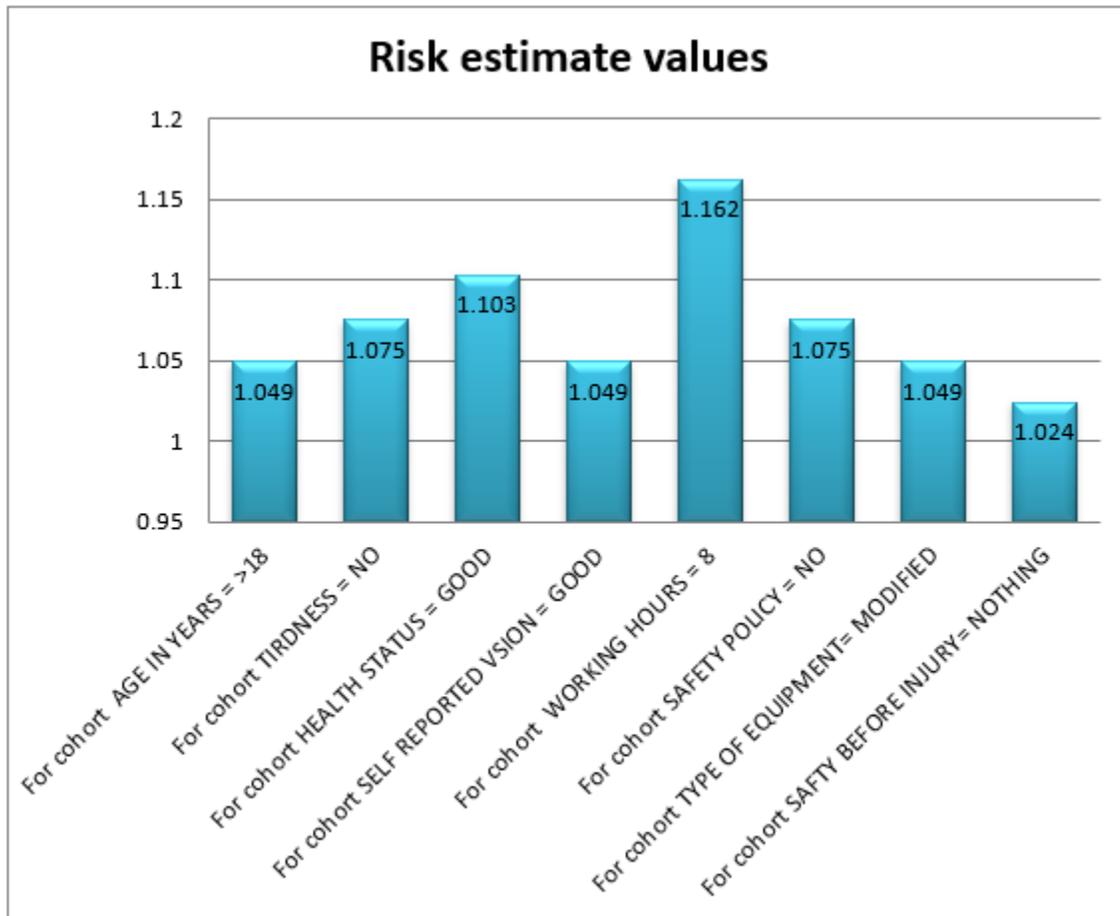
A total of 120 subjects were observed at different turnery shops of Rawalpindi city, of which 50 were meeting the criteria of my research area for finding risk factors. The mean age of the patients was 32.74 years. The prevalence of ocular trauma was simply calculated, which was 41.6% in these professionals of Rawalpindi city. This clearly shows that ocular trauma in turnery professionals in the current study is significant and it needs proper attention.

Similarly, the following Pie chart also shows that the common type of ocular injury in these professionals is the Non-penetrating type. The percentage of penetrating is 14% whereas, for non-penetrating injury, it's 86%. The other main thing was, to find out the risk factors of this.

The data below in the table and chart is clearly showing the whole situation of ocular trauma about different risk factors.



	Type of equipment		Safety before injury		Self-reported vision		Working hours		Safety policy		Age (years)		Tiredness		Health status	
	Modified	Raw	Nothing	Safety Measure	Good	Poor	8	9	Yes	No	<18	>18	No	Yes	Good	Poor
Eye injury	48	2	48	2	48	2	44	6	3	47	1	49	47	3	46	4
	96%	4%	98%	2%	98%	2%	88%	12%	6%	94%	2%	98%	94%	6%	92%	8%



Discussion

Different studies (15-30) show different results of the prevalence of occupational ocular trauma in different professions. In the current study, conducted at turnery workshops of Rawalpindi city, the prevalence of ocular trauma in turner machine operators was 41.6%. In this study, 98% of subjects were using no safety measure at the time of injury and 2 % were using spectacles. Another risk factor that was found to be important in these workers was safety policy. In the current study, it was found that there was no safety policy in 94% of turnery or lathe workshops. Among the study subjects, 98% were those who were without any eye safety measure at the time of injury. The results of the current study are close to a study conducted on industrial workers by Fiebai et al (23); which shows the prevalence of 60.2% and non-use of safety eyewear was 85%. Also, another study conducted on Sawmill workers by Uhumwangho et al (24); shows that eye injury in the majority of cases was due to non-use of protective eyewear and where the percentage of affected individuals was 98.4%.

Although in the above two studies there are little differences which are due to different occupations. Also in another study conducted by Vaz, F.S et al (26); around 62.5% of ocular injuries occurred because the workers failed to use safety eyewear provided by the company. In another study conducted in India by Mishra et al (31); none of the patients involved were wearing any kind of protective eyewear at the time of injury. Another study conducted by Arvind H.S et al (32); shows that 53% were the cases of occupational ocular trauma. Also, this study of Arvind showed that most of the ocular trauma was due to sharp objects. Machine tool operators were 32.3% and 87.7% were those who were not wearing any eye safety measure at the time of eye injury. In a study conducted in Bangladesh by Khan AK et al (33); occupational injuries were 42.5% of all the cases of ocular trauma.

Similarly, a prospective survey conducted at the Singapore General Hospital's emergency service by Voon et al (21); shows that work-related injuries accounted for 590 (71.4%) cases. The highest rate of work related to ocular injuries is because grinding, cutting metal, and drilling were the specific activities in more than 90% of the cases. Similarly results of a study conducted in China by Jie Zhang et al (19); shows similar results where the prevalence of work-related ocular trauma was observed as 42.9%. Only 7.1% used safety measures at the time of working whereas 92.9% were using no protective measure. Similarly in a retrospective study of ocular trauma conducted by Mingzhi Zhang et al (34); the most frequent types of injury were work-related injuries 46.5%. The main risk factor noted in work-related trauma was the non-use of proper safety measures. Another study conducted in Spain shows results closest to the current study. The study was conducted at the Hospital de by Larque-Daza et al (35); which shows that work-related eye injuries were 56%.

Another study conducted by Kantarcı et al (27); shows that 41.5% of workers did not report the use of protective glasses; however, 31.4% of workers reported their occasional use, and 27.1% of workers reported their routine use. This study also shows that the use of Safety measures in subjects is not so good. Another study conducted on Ocular trauma in an iron forging industry in the eastern province of Saudi Arabia by S. G. Ballal et al (36); shows that avoidable factors, such as negligence (negative human behavior) and lack of training, were especially common i.e. 83.1% in the workers. The prevalence for unilateral was 55.2% and it was highest among the 33-42 year age group. As occupations are different and also factors are different from our research study but still, eye trauma prevalence results are close to the current study conducted on turnery machine operators.

The results of the study of Fong et al (37); conducted on occupational ocular trauma also show the results closest to the current study on ocular trauma in turnery machine operators where ocular trauma was 44%. Its results are close to our findings. In another study by Northey et al (16); A large proportion of injuries were work-related, 40.2% (Retrospective Case Series), and 45.8% (Prospective Case Series). Protective eyewear use in work-related injuries was low, 27.6% (Retrospective Case Series), and 39.0% (Prospective Case Series). Also here results are close to our findings in turnery professionals although protective eye wears compliance rate is a little better than subjects of our subjects. Because the study was not conducted at the community level that's why the results of the above researches are a little different. Also, occupations are although related to workers of our study but still, their occupations and working environment are different from the working environment of the current study.

In a study conducted by Lombardi et al (17); eye injuries accounted for 25% of all claims for welders. In another study that was conducted on the risk factors of occupational ocular trauma by Blackburn et al (38); increased risk was observed for the following reasons: being distracted, use of tools, tool malfunction, performing an unfamiliar task, being rushed, working overtime, and feeling fatigued. These results are different from our findings because here law for protective eyewear is strictly implemented and the factors of eye injuries are different. Also in Eye injuries in welders are less as compared to our findings in turnery professionals because of different factors i.e. non-use of safety measures, age, etc. that are controlled in the USA.

Results of a study conducted in the UK on occupational injuries by G. J. Thompson et al (18); also show 31% of occupational eye injuries. At the time of injury, 34% were documented not to be wearing eye protection and 13% were documented as wearing eye protection.

In another study conducted by G. J. Thompson, 56% were not wearing any protection and 44% wore eye protection at the time of injury. Although this is a developed country still compliance with safety measures is poor and thus here the main factor of ocular injury is the same as that of our study. Also, ocular injury prevalence is 31% and is close to our findings. The results of a study conducted on ocular trauma in Mines worker also show results close to this study where Muzafar et al (39); observed 60.7% ocular trauma as a result of the blasts in mines.

Conclusion

All the researches done on occupational eye injuries (15-30) is clearly showing that different risk factors are affecting occupational ocular trauma prevalence. In this research study prevalence of ocular trauma is high i.e. 41.6 % but we can see and conclude that the results of different research studies on occupational ocular trauma conducted in different countries are very close in findings of ocular trauma with a current research study conducted in turnery machine operators of Rawalpindi city. In different researches different risk factors were found to be affecting ocular trauma prevalence including sleep disorders, tiredness, working hours, age, non-use of safety measures, etc. but It is confirmed from all the researches on occupational ocular trauma that safety measure is the key and common risk factor affecting the ocular trauma prevalence. If it is controlled, the prevalence of ocular trauma can be minimized to a very low level. All the researches discussed above in this research study are making one variable a key responsible risk factor for ocular trauma in turner machine operators or another such kind of professionals i.e. Non-use of safety measures. If we modify this factor, we can bring ocular trauma to a very low level in different occupations including the turnery profession. Current findings can be used as a baseline for future large-scale studies on turnery professionals as nobody did any research work on turnery professionals before. This study will also help to develop preventive strategies to control the risk factors in turner machine operators.

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