



Safeguarding Strategies Of Eye From Occupational Eye Injuries -A Review

Varshini D¹, Bhuvana Kalyani Choday¹

¹ Student, Department of Optometry, Samartha School of optometry

¹ Assistant professor, Department of Optometry, Samartha School of optometry

ABSTRACT

Background:

Occupational eye injuries are the major social and economic problems in work place. The safety laws demanding the mandatory demand for protective devices individually. Mostly work related eye injuries are reported in the occupation of construction, manufacturing service industries. Main cause of occupational eye injuries are of physical hazards, chemical hazards. High number of injured workers were not wearing eye protection at the time of work. Protection is mandatory against flying objects, glare and heat by using eye protectors. These can prevent the severity of eye injury. While purchasing spectacles one should specify "Industrial protection lenses which meet the requirements of OSHA standards".

Methods:

A Comprehensive review of the existing literature was conducted by focussing on studies that report the prevalence of eye injuries in farmers, sportsmen, welders, healthcare professionals and industrial workers. Most of the original article publications were included. This review was conducted by a thorough search of academic resources such as Google Scholar, and PubMed, specific search terms like 'occupational eye injuries,' 'eye protection,' 'work safety,' 'OSHA,' 'work related eye injuries' etc.

Result:

Farmers, Sportsmen, Welders, Industrial workers and Health care professionals were vulnerable occupation. There should be proper PPE along with some trained professionals in the work place, hence with this we can reduce the risk of ocular injuries and promote an eye safety environment.

Keywords: Occupation, eye injuries, safety, workers, eye protection, OSHA.

Introduction:

Occupationally acquired injuries comprise a major proportion of ocular trauma (8% to 70%)⁽¹⁾ although the work setting has been well recognised to cause a large proportion of eye injuries, 'few studies have detailed the circumstances, occupational and activity risks, and the level of eye protection used.

Eye injuries account for a substantial proportion of all work related injuries, including 12% of all workers' compensation claims among carpenters and 11% of all injuries to construction workers requiring an emergency room visit⁽²⁾. Welders are at particularly high risk for eye injuries. Occupationally welders expose to a number of sources of mechanical, radiant, thermal, or chemical energy. Farm workers, who works primarily in fields doing manual labour, they have high risk of eye injuries from a different type of hazards in the working environment. Exposure introduced by various systems of agriculture includes chemicals like pesticides, growth enhancers, and fertilizers, tools and machinery Occupational eye injuries constitute a major social and economic problem despite workplace safety laws stipulating mandatory utilisation of individual protective devices⁽³⁾ in most of the developed countries farming practices were mechanized from eye injuries mostly machine-related, either open or closed globe injuries. In contrast, with a lesser degree of mechanization, corneal ulceration is a most commonly manifested. In south East Asia paddy cultivation is predominant, harm from the paddy leaf in the course of harvesting reasons corneal abrasion which receives secondarily inflamed from loss of care or the usage of conventional eye medicines. In the resultant corneal ulcer (harvest ulcer or rice-harvesting keratitis) enormous reason of ocular morbidity and visible impairment. Work-associated accidents in agriculture bring about big financial losses, putting an full size burden at the agrarian network throughout the world⁵. A sawmill is a manufacturing facility wherein uncooked wood and logs of wood are processed and sawn into planks or forums through way of means of a machine. They generate quite a few environmental pollutants, such as sawdust, falling debris, falling objects, chemical substances used for timber processing and prevention, electric powered shocks, and diverse sorts of gas and gaseous emissions which are dangerous to fitness and visible system⁽⁶⁾. Interventional radiology (IR) methods can bring about occupational radiation doses which are excessive sufficient to warrant concern. While there is right consciousness and expertise of radiation dangers to personnel from IR methods, a loss of dependable values for eye doses has persisted⁽⁷⁾. In sporting activities the incidence shows high eye injuries were steadily increased⁽⁸⁾. However, as its miles expected, maximum of the ocular accidents may be preventable with the aid of using the usage of appropriate protecting eye devices (PED) and strict employee's compliance with the protection rules. Several kinds of PED are to be had and appropriate layout is primarily based totally on threat kind with inside the work place⁽⁹⁾. Work-related eye injuries can be prevented by wearing safety eyewear like goggles. While the use of safety eyewear is universally known and advocated by industry, compliance with safety guidelines among workers is poor. The reasons are behavioural (indifference and lack of awareness of workplace hazards and safety), lack of safety eyewear in workplaces or inappropriate design of the same^(5, 9).

Methods:

A Comprehensive review of the existing literature was conducted by focussing on studies that report the prevalence of eye injuries in farmers, sportsmen, welders, healthcare professionals and industrial workers. Most of the original article publications were included. This review was conducted by a thorough search of academic resources such as Google Scholar, and PubMed, specific search terms like ‘occupational eye injuries,’ ‘eye protection,’ ‘work safety,’ ‘OSHA,’ ‘work related eye injuries’ etc.

Discussion:

Almost limited PED usage is common and reasons differ due to geographic factors, culture determinants, educational level and socio-economic status. Injuries are related to specific occupational activity, being of high risk, such as welders, farmers, metalworkers, manufacturers and grinding workers. Many ocular injuries were also caused by chemical burns, which seem to be a common cause of ocular injuries. There is a need of ‘smartly’ skilled doctors at local primary care units to provide help at a first aid level and perform referrals, when necessary, by facilitating access in terms of good clinical practicing. Types of work related injuries reported to be corneal foreign bodies ,traumatic cataract , chemical burns which may cause complete destruction of the globe tissues , globe ruptures, hyphema of the anterior chamber, and lamellar lacerations. It is worth to be mentioned that many eye injuries caused by chemical burns occurred more often a seasonal occurrence, mostly during summer and autumn than winter and spring. Homes are filled with hazards, especially to babies and small children. Children's hospitals regularly see, patients with eye injuries caused by such common household items as scissors, knives, pop bottles, paper clips, wires etc. Caustic substances such as lime, caustic soda, oven cleaners (especially those in spray cans) and drain cleaners," are also responsible for many cases of severe visual loss. Such items must be stored where small children cannot reach them. As per Elli et al studies the table 1 shows various barriers for irregular usage of personal equipment devices (PED’S).

Table 1. Barriers reported for not using PED classified by environment/occupation and nationality.

Environment/occupation	Nationality	Barrier
Workplace (cocoa farmers)	South African	Unavailability and unaffordability, high cost of PED equipment (8)
Workplace (chemical workers)	Chinese	Low educational level, lack of safety consciousness and risk awareness (11)
Workplace (endodontists)	Greek	Inadequacy at the time of injury (12)
Workplace (quarry workers)	Indian	Non-compliance with PED regulations in the workplace (13)
Workplace (craft, repair and precision production workers)	English	Lack of need for PED (15)
Workplace (factory and construction workers)	Chinese	PED was regarded as a routine procedure (16)
Workplace (not reported)	Americans	Low education level in addition with improper use of PED (18)
Workplace (cocoa farmers)	South African	Lack of economic funds, uncomfortable, unavailability, not seeing well, lack of training and ignorance (21)
Workplace (chemical and grinding workers)	Canadian	Inappropriate for specific tasks undertaken, failure to required standards (22)
Workplace (grinding workers)	Australian	Poor compliance with PED use and inappropriate for the task undertaken (23)
Workplace (not reported)	Asians	Hot weather and uncomfortable PED (26)
Workplace (not reported)	American	The risk for performing a specific task was undertaken (27)
Workplace (grinding workers)	Australian	Inadequate protection while grinding. The use of PED supplies only frontal or frontal-side protection (28)
Workplace (grinding workers)	Indian	Racial or cultural variations, inappropriate PED and not correctly fitted (30)

Result:

Occupational eye injuries can be major causes of morbidity and disability. Severe ocular wounds such as globe ruptures, corneal foreign bodies, lamellar lacerations, traumatic cataract are grouped among such lesions. Just listing the previously mentioned injuries one can think that proper eye protection is a more complex issue than it appears. Sometimes, PED were not available in the workplace, or they were faulty and not suitable for the task undertaken or the climate, not to mention ignorance, inertia, underestimation, poor education, and other parameters that could influence workers' decision-making to take cautions. It has been also emerged that most eye injuries could be preventable by using appropriate PED. Educational initiatives by offering information on types of traumas and time of recovery or risk of permanent lesion would be useful. Summarizing information from this review, it appears challenging to promote first aid level services, interlinking primary, secondary and tertiary care through flexible, effective and cost analysis driven decision algorithms, by observing geo-spatial eye care needs, in order to improve outcomes.

By understanding the causes of work related eye injuries it's compulsory to use safety protocols and should provide personal protective equipment. So we significantly reduce the risk of eye injuries by providing a safety working environment for worker.

LIMITATIONS:

Study limitations a possible limitation of this review is that some relevant articles may have been missed as it is often occurring when a literature search is undertaken. Strict criteria may reduce the ability to expand inclusion sometimes. To minimize this eventuality, all articles were screened and checked by two researchers. Another limitation is that systematic review was based on a single but major database search and to buffer this limitation emphasis was given to all reported references of the included studies by screening them one by one. For this reason, not all eye injury types equally affect sufferers' quality of life and care demand. Additionally, this review does not analyse the impact of the delayed diagnosis or treatment of patients with ocular trauma, but it focuses on determinants related to the absence of inadequacy of protection measures. This paper mostly addresses issues of occupational medicine rather than clinical information related to ocular trauma. We acknowledge that emphasis is not given on factors determining the outcome of an ocular trauma from a clinical or surgical standpoint as our search offered little information on lesion type distinction (such as the involvement of the anterior or posterior ocular segment or the presence of sight-threatening findings including central corneal lacerations, damage to the macula, the optic disc or the optic nerve). Instead, emphasis is given on the occupational and socio-economic impact of ocular trauma and the need to provide related information to employers, employees, health professionals and health care providers. Retrospective and prospective research projects are required in order to match clinical and outcome information from secondary and tertiary hospital units with better prevention and social care initiatives.

References:

1. Fong LP, Taouk Y. The role of eye protection in work-related eye injuries. *Aust N Z J Ophthalmol.* 1995 May;23(2):101-6. doi: 10.1111/j.1442-9071.1995.tb00137.x. PMID: 7546684
2. Hauret KG, Bedno S, Loring K, Kao T-C, Mallon T, Jones BH. Epidemiology of Exercise- and Sports-Related Injuries in a Population of Young, Physically Active Adults: A Survey of Military Servicemembers. *The American Journal of Sports Medicine.* 2015;43(11):2645-2653. Doi:10.1177/0363546515601990.
3. Lombardi DA, Pannala R, Sorock GS, Wellman H, Courtney TK, Verma S, Smith GS. Welding related occupational eye injuries: a narrative analysis. *Inj Prev.* 2005 Jun;11(3):174-9. doi: 10.1136/ip.2004.007088. PMID: 15933411; PMCID: PMC1730216.
4. Mancini G, Baldasseroni A, Laffi G, Curti S, Mattioli S, Violante FS. Prevention of work related eye injuries: long term assessment of the effectiveness of a multicomponent intervention among metal workers. *Occup Environ Med.* 2005 Dec;62(12):830-5. doi: 10.1136/oem.2004.019570. PMID: 16299090; PMCID: PMC1740928.
5. Quandt SA, Schulz MR, Talton JW, Verma A, Arcury TA. Occupational eye injuries experienced by migrant farmworkers. *J Agromedicine.* 2012 Jan;17(1):63-9. doi: 10.1080/1059924X.2012.629918. PMID: 22191504; PMCID: PMC3286547.
6. Chatterjee S, Agrawal D. Primary prevention of ocular injury in agricultural workers with safety eyewear. *Indian J Ophthalmol.* 2017 Sep;65(9):859-864. doi: 10.4103/ijo.IJO_334_17. PMID: 28905831; PMCID: PMC5621270.
7. Ezinne NE, Ekemiri KK, Nwanali Daniel MA. Occupational Ocular Injuries and Utilization of Eye Protective Devices among Sawmill Workers in the Ojo Local Government Area of Lagos State, Nigeria. *Vision (Basel).* 2021 Dec 9;5(4):60. doi: 10.3390/vision5040060. PMID: 34941655; PMCID: PMC8706099.
8. O'Connor U, Walsh C, Gallagher A, Dowling A, Guiney M, Ryan JM, McEniff N, O'Reilly G. Occupational radiation dose to eyes from interventional radiology procedures in light of the new eye lens dose limit from the International Commission on Radiological Protection. *Br J Radiol.* 2015 May;88(1049):20140627. doi: 10.1259/bjr.20140627. Epub 2015 Mar 11. PMID: 25761211; PMCID: PMC4628470.
9. Barr A, Baines PS, Desai P, MacEwen CJ. Ocular sports injuries: the current picture. *Br J Sports Med.* 2000 Dec;34(6):456-8. doi: 10.1136/bjism.34.6.456. PMID: 11131235; PMCID: PMC1724256.
10. Kyriakaki ED, Symvoulakis EK, Chlouverakis G, Detorakis ET. Causes, occupational risk and socio-economic determinants of eye injuries: a literature review. *Med Pharm Rep.* 2021 Apr;94(2):131-144. doi: 10.15386/mpr-1761. Epub 2021 Apr 29. PMID: 34013184; PMCID: PMC8118212.
11. Patel D. Preventing eye injuries. *Community Eye Health.* 2015;28(91):51. PMID: 26989313; PMCID: PMC4790163.