Journal Homepage: -www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI:10.21474/IJAR01/11721
DOI URL: http://dx.doi.org/10.21474/IJAR01/11721

RESEARCH ARTICLE

OCCUPATIONAL HAZARDS IN OPHTHALMOLOGY

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Manuscript Info

Manuscript History
Received: 15 July 2020
Final Accepted: 18 August 2020
Published: September 2020

Key words:-
Eye, Occupational Injury, Protective Equipment

Abstract

Background:An occupational hazard is a hazard experienced in the workplace includesphysical, chemical, biological and psychosocial hazards. Occupational Ocular trauma holds significant proportion of visual morbidity worldwide. This can be prevented with the use of proper protective eyewear and strict compliance. This survey was conducted to study occupational related ocular hazard in our tertiary health care system hospital having patients involved in various occupations.

Method: A total of 90 occupational ocular injuries were recorded during study period. The age group of thepatients to be studied was between 20 to 60 years.Brief History of present complaints, detailed clinical history and occupation history as like type of work, working environment, place, working hours was recorded. Required Ophthalmological check-upwas done. All valid responses were tabulated and analyzed. Appropriate treatment was given.

Result: Our study showed that majority (85.6%) of patients were not wearing protective eye equipment. Male to female ratio was approximately 3:1. Major age group affected was between 31-40 years (41.1%). Welders (40%) were more prone to injury occupation wise.

Conclusions: Occupational eye injury is often severe and it contributes to significant loss. Incompliance of appropriate protective eye wear can lead to potential eye damage and permanent blindness.

Introduction:-

Ocular trauma remains a global preventable cause of visual morbidity. [1]Occupational hazard affects workers and their families and imposes a huge burden with respect to manpower and social costs. The incidence and severity of occupational hazards are higher in developing countries. This may due to lower level of priority assigned for occupational health and workplace safety. On the whole, ocular injuries at work are preventable and are attributable to the misuse or non-use of protective eyewear.[2] Major risk factors for ocular injuries include age, gender, socioeconomic status and lifestyle. The site where the injury occurs is also related to a risk situation[3]. In an Indian study, occupation-related accident constituted 20.1% of all ocular trauma[4].

Types of Hazards

Impact

Impact hazards include flying objects such as chips, fragments, particles, sand and dirt. These hazards typically result from tasks like chipping, grinding, machining, masonry work, wood-working, sawing, drilling, chiseling,

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powered fastening, riveting and sanding. These objects or sparks are usually very small but can cause serious eye damage ranging from corneal or conjunctival abrasions, to penetration of the eye. It comprises about 70 – 80 % of all work-related eye injuries.

Chemicals
The industrial environment often includes hazardous chemicals. The injury caused by a liquid chemical that splashes into the eye can lead to severe eye harm; however, mists, vapors or fumes and dry chemicals can also be sources of eye injury. Chemicals that could cause injury include acids, alkalis, organic solvents, and surfactants.

Heat
Heat injuries, including burns, can occur to the eye when workers are exposed to high temperatures, splashes of molten metal, or hot sparks. Heat exposure injury by cookers can occur in house wives and chefs.

Optical radiation
Laser work and other similar operations that create high concentrations of heat, ultraviolet, infrared and reflected light radiation are also potential eye hazards. Unprotected laser exposure may result in retinal burns, cataracts and permanent blindness.

Other hazards:
As like computer vision syndrome in computer users, ocular infection in swimmers, conjunctivitis in ophthalmologist etc. [5]

Eye protection should be routinely considered for useby welders, laborers, chemical process operators and handlers,carpenters, electricians, machinists, mechanics, millwrights, plumbers and pipefitters, Sheetmetal employees and tinsmiths, assemblers,sanders, grinding machine operators, sawyers and timber cutting andlogging workers.

Each type of protective eyewear is designed to protect against specific hazards.

Depending on occupation,safetyspectacles,goggles, welding shields and laser safety goggles should be used [6]

Material andMethods: -

A total of 90 Patients were identified between February and July ,2020 as a case of occupational eye injury in Departmentof Ophthalmology, S.S.G. Hospital, Medical College Baroda, Vadodara and observational study was done. Many patients present to our hospital with various injuries which took place at their work area as S.S.G. hospital, tertiary health care center of central Gujarat, with major industrial areas and factories in periphery of city and farming and related occupations being prevalent in rural areas of district.

Inclusion criteria:
Any patient(male/female) of age group of 20 to 60 years with history of occupational injury attending out-patients department and Emergency

Exclusion criteria:
Patient with history of trauma due to causes other than related to occupation like injuries due to assault, accidental fall or road traffic accidents

The demographic data of each patient including age, sex and address were recorded.

Occupation related history like type of work, working environment, place, working hours, use of personal protective measureswas recorded.

Required Ophthalmological assessment was carried out. Snellen's chart was used to record visual acuity. Slit lamp examination was carried out.Fluorescein staining of cornea was done to check for corneal abrasions and epithelial defect. Ophthalmological examination to check for subconjunctival hemorrhage, conjunctival tear, scleral tear, iris injury was done. Intraocular pressure was measured by applanation tonometry wherever required. Radiological investigations like X-Ray orbit, CT Scan, MRI were done wherever indicated. Pupillary reflex was recorded in all

cases. In all cases, posterior chamber examination was carried out by indirect ophthalmoscopy. USG B-scan was done in required conditions.

All responses were recorded and analyzed as below.

Results:-

Out of total 90 patients, 69 (76.7%) patients were male and 21(23.3%)were female.

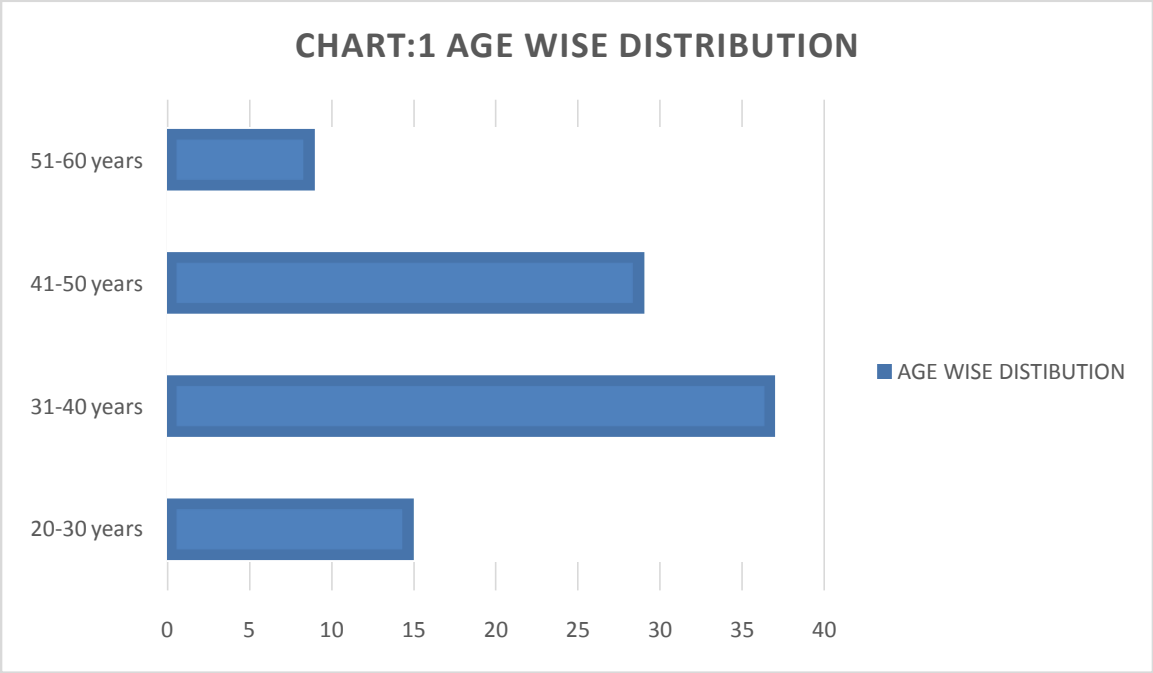
Table 1:- Sex Wise Distribution.

TOTAL	MALE	FEMALE
90	69 (76.7%)	21(23.3%)

Age wise distribution shows 15(16.6%) patients in age group of 20-30 years,37(41.1%) patients in age group of 31-40 years,29 (32.2%) patients in age group of 41-50 years and 9 (10.1%) patients in age group of 51-60 years.

Table 2:- Age Wise Distribution.

AGE GROUP	CASES	%
20-30	15	16.6%
31-40	37	41.1%
41-50	29	32.2%
51-60	09	10.1%



Occupation wise distribution:

In this distribution, Highest patients are welders (40%)having superficial corneal foreign body and Welding arc exposure.

Laborers and industrialworkers (30%) presented most commonly with mechanical injuries.

Mechanical injuries, injuries by vegetative matters and chemical exposure(insecticides) were seen in farmers(14.5%).

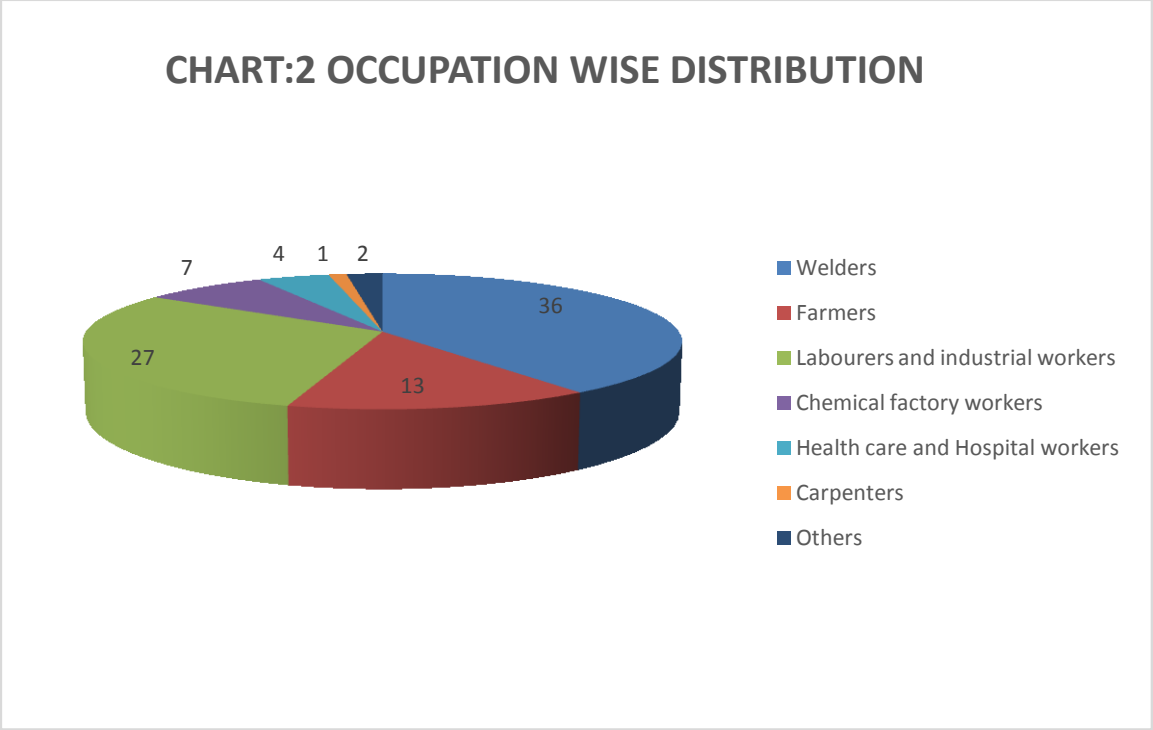
7.8%of patients had history of chemical exposure toacid, alkali and fumes and splash injury.

2 health care worker(2.2%) presented with conjunctivitis and 2(2.2%) hospital care worker had injury by disinfectant exposure

1 carpenter (1.1%) presented with in situ corneal foreign body leading to corneal perforation.
2.2% patients were involved in occupations with problem like computer vision syndrome and ocular injury while cooking.

Table 3:- Occupation Wise Distributution.

OCCUPATION	CASES	%
Welders	36	40%
Farmers	13	14.5%
Labourers and industrial workers	27	30%
Chemical factory workers	07	7.8%
Health care and hospital workers	04	4.4%
Carpenters	01	1.1%
Others	02	2.2%

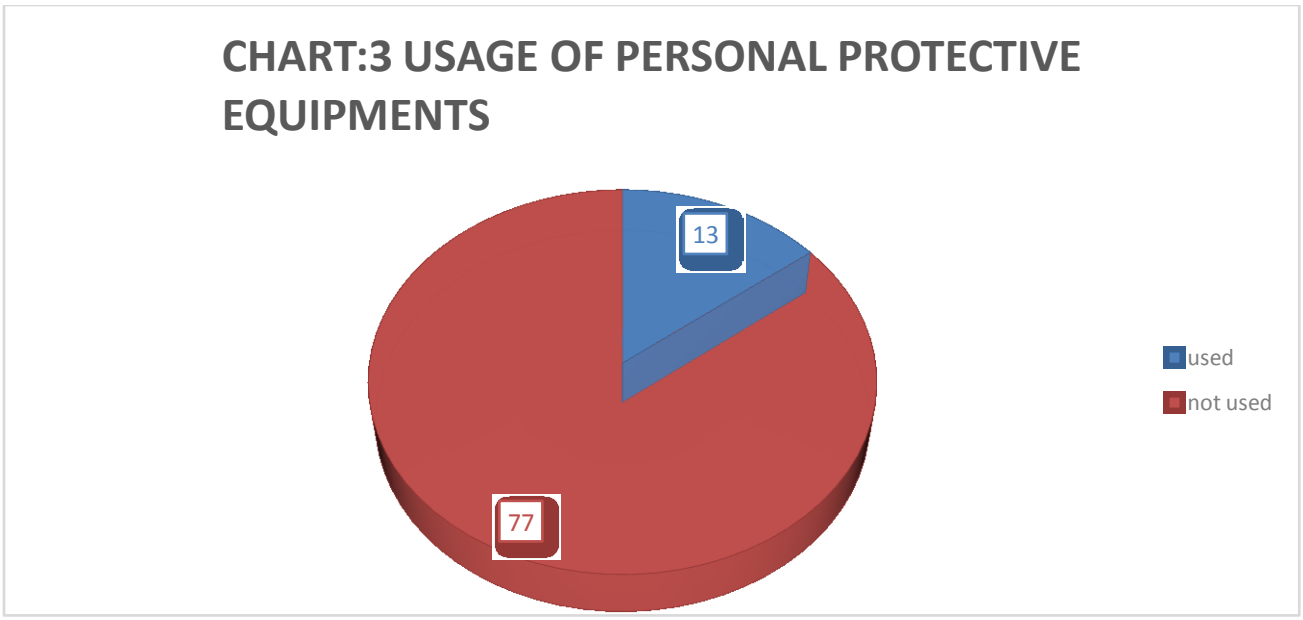


Distribution according to type of ocular injury:

Table 4:- Type Of Ocular Injury.

TYPE	CASES	**%**
Lid laceration and abrasion	07	7.8%
Conjunctival tear and abrasion	13	14.4%
Corneal foreign body and epithelial defect	58	64.5%
Corneal perforation	03	3.3%
Anterior chamber hyphema	05	5.6%
Posterior chamber involvement	04	4.4%

Out of 90 patients, only 13(14.5%) patients were wearing adequate protective equipment.



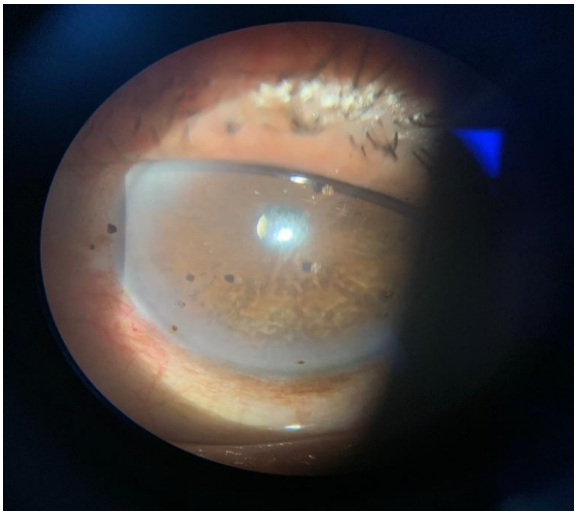


Image 1:- Multiple superficial corneal foreign bodies in welding workers.

Image 2:- Metal pin in situ with corneal Perforation in carpenter.

Discussion:-

Occupational ocular hazards depend on type and nature of work and environment. Welder, laborers and industrial worker were more prone to injury as significant prevalence of industrial area in Vadodara ,followed by agricultural workers having injuries by mechanical trauma by agricultural tools, insecticides and fertilizers. Male to female ratio was approximatively 3:1.

Corneal epithelial defect and superficial corneal foreign body (64.5%) was most common type of ocular injury. Majority of patients (85.6%) were not wearing adequate protective measures. This was due to less awareness among occupational workers and low level of priority assigned for workplace protection and safety protocols.

Conclusion:-

Occupational eye injury is often severe and it contributes to significant loss. It leads to loss of productivity and it is a major cause of absence from work. Incompliance of appropriate protective eye wear can lead to potential eye damage and permanent blindness. Comparative statistics of the Bureau of Laboure in the USA also show that 59% of the workers do not wear protective eye wear during work [7]. By providing sound work environment, proper education and training regarding ocular safety and usage of protective eye equipment, significant numbers of workplace eye injuries can be prevented. Though small amount of eye injury can happen even with protective eye wears.

Acknowledgement:-

None

Funding:
None

Conflict of interest:
None

Ethical approval: Ethical committee of hospital was briefed regarding study and approval was obtained.

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