

# Occupational Hazards in Ophthalmology

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**Abstract:** An occupational hazard is a hazard experienced in the workplace. Occupational hazards can encompass many types of hazards, including chemical hazards, biological hazards (biohazards), psychosocial hazards, and physical hazards. Community Ophthalmology was described as a new discipline in medicine promoting eye health and blindness prevention through programs utilizing methodologies of public health, community medicine and ophthalmology. The aim of study- To evaluate the various occupational ocular hazards in health settings and their causes, affected age group, sign/symptoms and prevention. A total of 145 Patients who were recognized as a case of occupational ocular hazards, were included in this cross-sectional study. The age group of the patients to be studied was between 20 to 60 years. An assessment of present complaints, detailed clinical history (present and past) and occupation related history as like type of work, working environment, place, working hours. Ophthalmological check up as external examination of the eyes, visual acuity, torch light examination, slit lamp examination, Fluorescein eye staining, Schirmer's test, refraction, direct ophthalmoscopy, was done. In case injury, B-scan, CT-scan, was also done. In our study the male female ratio was 2.3:1 and most common affected age group was 32-40 years (37.93%). Labor and farmer (28.28%) were more prone to occupation ocular hazards. Almost 75% patients had primary ocular complaints of watering and redness of eye and most common sign was conjunctival congestion and sub-conjunctival hemorrhage (67.59%).

**Keywords:** Community Ophthalmology, Fluorescein eye staining, Occupational hazard, Schirmer's test, Slit lamp examination, Sub-conjunctival hemorrhage, Visual acuity.

## 1. Introduction

An occupational hazard is a hazard experienced in the workplace. Occupational hazards can encompass many types of hazards, including chemical hazards, biological hazards (biohazards), psychosocial hazards, and physical hazards. In the United States, the National Institute for Occupational Safety and Health (NIOSH) conduct workplace investigations and research addressing workplace health and safety hazards resulting in guidelines.<sup>[1]</sup> The Occupational Safety and Health Administration (OSHA) establishes enforceable standards to prevent workplace injuries and illnesses.<sup>[2]</sup> In the EU a similar role is taken by EU-OSHA.

Community Ophthalmology was described as a new discipline in medicine promoting eye health and blindness prevention through programs utilizing methodologies of public health, community medicine and ophthalmology in 1978. This new discipline was first proposed by Bath in 1978 after observations of epidemics rates of preventable blindness among underserved populations in urban areas in the USA as well as underserved populations in so called 3rd world countries.<sup>[3][4]</sup> The new concept has been shown to be a sight saving blindness prevention strategy. Since inception in 1978 programs of Community Ophthalmology have been developed worldwide. The promulgation of programs of Community Ophthalmology can be traced through programs of WHO,<sup>[5]</sup> NGO's like AiPb,<sup>[6]</sup> and through the effort of individuals such as Professor Quarcoopome in Africa<sup>[7]</sup> and Professor Kirmani in Asia and Professor Bath worldwide.

An occupational disease is any chronic ailment that occurs as a result of work or occupational activity. It is an aspect of occupational safety and health. An occupational disease is typically identified when it is shown that it is more prevalent

in a given body of workers than in the general population, or in other worker populations. The first such disease to be recognised, squamous-cell carcinoma of the scrotum, was identified in chimney sweep boys by Sir Percival Pott in 1775. Most common occupational hazards in modern days are lungs diseases. Occupational skin diseases are ranked among the top five occupational diseases in many countries<sup>[8]</sup>

## 2. Types of Hazards

It includes projectiles, chemicals (splashes and fumes), and radiation (especially visible light, ultraviolet radiation [UV], and heat or infrared radiation [IR]).

**Projectiles/Mechanical-**A projectile posing a hazard to the eye can be of almost any size or shape, and it can travel at either high or low velocity. Common projectiles in an industrial setting might include pieces of a screwdriver blade, drill bit, grinding wheel, metal debris, rock, and steel rod. They can cause injuries ranging from corneal or conjunctival foreign bodies, to penetration of the eye, to blunt trauma. Some projectiles (especially metals) can be toxic to the eye. It comprises about 70 – 80 % of all work related eye injuries.

**Chemicals-** The industrial environment often includes hazardous chemicals. In many cases, the major concern is injury caused by a liquid chemical that splashes into the eye; however, fumes, vapors, and dry chemicals can also be sources of eye injury. Chemicals that could cause injury include acids, alkalis, organic solvents, and surfactants.

**Radiation-** The most common types of radiation encountered in industry are infrared radiation (IR) or

heat, ultraviolet radiation (UV), and visible light. Sources of IR in industry are primarily molten materials, specifically glass and metals. Many industries are automated, so that employees are not exposed to large amounts of IR, but activities such as glassblowing may produce significant exposures from low-level, long-term exposure (Oriowo et al., 1997). Epidemiological studies have demonstrated that long-term (chronic) exposure to IR in the glass and steel industries is associated with the development of cataracts (Pitts and Kleinstein, 1993). Relatively few of the available spectacle lens materials provide protection from infrared radiation. The best protector is a lens with a metallic coating (copper) that reflects IR (Pitts and Kleinstein, 1993).

**Electrical Hazards-** Electrocutation may result in damage to the central nervous system. In rare cases, an electric cataract can be observed.

**Other hazards:** As like heat exposure in cookers, arch exposure in welders, computer vision syndrome in computer users, ocular infection in swimmers etc.

**Occupational ocular problems in driving**

Driving can be defined as the ability to operate, control and direct the course of vehicles. Normal visual functioning is an essential requirement for driving

- Drivers need to be able to judge the distance
- Read road signs and traffic lights
- Assists driver to respond to changes in environment quickly and efficiently

**Worksite Hazard**

- Sources of motion that can create projectiles
- Employee movement patterns that could result in impact with stationary objects
- Sources of heat that could cause injury or exposure to Infrareds radiation
- Chemical exposures
- Sources of dust
- Sources of UV, visible or other radiation
- The layout of the workplace
- Electrical hazards.

**3. Material and method**

A total of 145 Patients who were recognized as a case of occupational ocular hazards, were included in this cross-sectional study conducted in the Department of Ophthalmology, Maharani Laxmi Bai Medical College, Jhansi, Uttar Pradesh, India over a period of 3 months from Aug. 2017 to Oct. 2017. The procedures followed were in accordance with the ethical standards committee on human experimentation (institutional or regional) and with the Helsinki Declaration of 1975, as revised in 2000. The necessary permission from the Ethical and Research Committee was obtained for the study.

**Inclusion criteria**

- The age group of the patients to be studied was between 20 to 60 years.
- Both male and female patients were included in the study.

**Exclusion criteria**

- Injuries due to assault, accidental fall, Road traffic accidents, were included in the study

An assessment of present complaints, detailed clinical history (present and past), and history of any ocular surgery, occupation related history as like type of work, working environment, place, working hours etc. Age, sex, socio-economic status, was recorded. Ophthalmological check up as external examination of the eyes, visual acuity, torch light examination, slit lamp examination, Fluorescein eye staining, Schirmer's test, refraction, direct ophthalmoscopy, was done. In case injury, B-scan, CT-scan, was also done.

**4. Observation**

**Table 3.1:** Sex wise patients' distribution

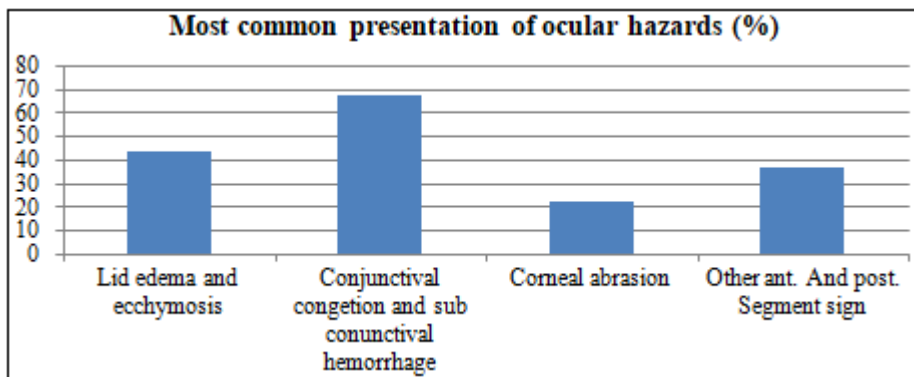
	Male	Female
No. of patients	101	44
Percentage (%)	69.65%	30.35%

**Table 3.2:** Sex wise patients' distribution

Age groups (in years)	No. of patients	Percentage (%)
20-30	31	21.38%
31-40	55	37.93%
41-50	39	26.9%
51-60	20	13.79%
Total	145	100%

**Table 3.2:** Occupation wise patients' distribution

Type of occupation	Type of ocular hazards	No. of patients	Percentage (%)
Labor and farmer	Mechanical injury, chemical (insecticide) exposure	41	28.28%
Swimmers	Infectious and chemical exposure	06	4.34%
Cookers (housewife and professionals)	Heat and smock exposure	22	15.17%
Force (police or army and fire brigade)	Mechanical and heat and smock exposure	15	10.34%
Welders	Arch exposure	12	8.28%
Sportsman	Mechanical exposure	24	16.55%
Chemical factory workers	Chemical exposure	04	2.76%
Electrician	Electric and arch exposure	02	1.38%
Computer technician	Eye strain	08	5.52%
Others	Mechanical, radiation, heat and electric exposure	16	11.03%
Total		145	100%



Foreign body in welder



Subconjunctival haemorrhage in labour

## 5. Discussion

Occupational ocular problems depends on-Nature of the work and Working environment. In our study the male female ratio was 2.3:1 (because of maximum outdoor worker are male) and most common affected age group was 32-40 years (37.93%) followed by 41-50 years of age group (26.9%). Labor and farmer (28.28%) were more prone to occupation ocular hazards because of 60-70 % population of India depends on laborer, agriculture and livestock activity, followed by sportsman (16.55%) Most of the agricultural works involves use of agricultural tools, fertilizers, insecticides and pesticides [9]. Almost 75% patients had primary ocular complaints of watering and redness of eye followed by itching and difficulty in vision and most common sign was conjunctival congestion and sub conjunctival hemorrhage (67.59%).

## 6. Conclusion

90 % of the occupational ocular hazards are preventable. Proper selection of protective eyewear depending on the nature of work and working environment helps in the prevention of potential eye hazards Ophthalmologists and other medical men not connected with industry often forget to inquire into the occupational aspect of disease. In the diagnosis and treatment of eye injuries and diseases it is most important to bear in mind the nature of the Patient's occupation. This search for "occupational causes" is, in fact, all important. Whenever a case of eye disease is being investigated we not merely should search for a "septic focus" but should always inquire into the working

conditions. Good visual acuity in addition to normal visual field, good stereopsis, normal color vision, eye coordination, good retinal adaptation is essential to avoid RTAs (Nwosu 1989).

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