

OCCUPATIONAL TOXICOLOGY

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INTRODUCTION

Occupational toxicology is the study of adverse effects of chemical or physical agents that are encountered in the course of employment at particular workplaces. Occupational toxicology is a class term used to refer to the application of toxicology in all fields of work, ranging from a simple photocopy machine in an office to pesticides in agriculture. The range of hazards in certain occupations is exposed to employees through mediums of inhalation, dermal exposure, or even ingestion. Toxicology is intertwined with making decisions on what levels of chemical exposure are acceptable to humans on the field. The goal of occupational toxicology is to protect the health of workers. The ever-growing recognition of workplace exposure has increased public awareness of the health effects of toxic workplace exposure.

BRIEF ON INTERFACING FIELDS

Various other fields work hand-in-hand with occupational toxicology. Fields like occupational health, medicine, and epidemiology interface with this field to derive solutions to the multiple issues faced by workers.

- Occupational health is a field of public health that deals with promoting and maintaining the highest degree of physical, mental, and social well-being of workers in all occupations.
- Occupational medicine is a subject whose core revolves around the prevention, diagnosis, and management of occupational diseases. Such specific medical examinations involve pre-exposure examinations and periodic examinations of workers.

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- Occupational epidemiology involves studies that determine whether occupational exposures are the reason for the risk or cause of adverse health outcomes. It involves observation of the vulnerability of workers to chemical, biological, or physical agents present in their respective work environments.

COMMON OCCUPATIONAL DISEASES IN INDIA

According to Schedule 3, sections 89 and 90 of the Factories Act, 1948, some notable occupational diseases in India include:

- **Lead Poisoning:**

The heavy metal is absorbed primarily through the respiratory and gastrointestinal systems and negligibly through cutaneous exposure. The respiratory pathway primarily depends on particle size, allowing 30-40% of inhaled lead into the bloodstream, whereas gastrointestinal absorption allows about 10-15% of ingested lead into the bloodstream. General signs and symptoms can range from irritability, headaches, and vomiting to coma, seizures, and motor neuropathy.

- **Chrome Ulceration:**

The ulceration of skin due to contact with hexavalent chromium was described by Cummings as early as 1827. This disease is common among workers processing chrome ore, chromic acid, potassium, sodium, and ammonium bichromate. Acute poisoning takes place through the oral route, whereas chronic exposure is via inhalation or dermal contact. Chronic poisoning can lead to diseases ranging from eczematous dermatitis with edema to deep-seated ulcers [in areas having a break in the epidermis].

- **Asbestosis:**

Asbestosis is a type of interstitial pulmonary fibrosis. It is caused by the inhalation of asbestos fibres over a long period of time. It develops as scarring takes place in your lung tissue, restricting breathing and reducing oxygen levels in the bloodstream.

- **Byssinosis:**

It is a collection of respiratory conditions that arise due to exposure to raw non-synthetic textiles like cotton, hemp, jute, or flax. The release of an endotoxin from the cell wall of bacteria within textile fibres contributes to the symptoms. Symptoms manifest in the form of frequent cough and wheezing within a few hours of exposure.

- **Musculoskeletal injuries, noise-induced hearing loss,** and other major risks are also a result of unsafe and unregulated proceedings in a workplace, especially in workplaces relying on the hard-working lower class.

These examples cite some of the 29 ‘notable’ diseases and risks of occupational exposures, therefore deeming this specialised field extremely important. A vast percentage of the Indian population relies on labour work in various fields to provide for and survive. The health and safety of these workers have a positive impact on productivity and social development. The Indian law has many provisions for the specific working-class prone to frequent exposures to harmful toxins because the field of toxicology was used to determine the causation of deterioration of the workforce. In conclusion, occupational toxicology is a field that will help prevent irreparable damage and sustain the national economy.

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