Diseases related to occupational hazards

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Objectives

By the end of the session students should be able to;

- Enlist, major diseases related to occupational hazards

  Physical hazards, heat, light, pressure, noise, radiation, electricity, mechanical factors

  Chemical agents

  Gases, fumes, dust, metals and their compounds, solvents

  Biological agents

  Occupational cancers

  Occupational dermatosis

- Understand sign and symptoms, and diagnosis of occupational diseases of public health importance

Occupational and work related diseases?

Definition

- Occupational diseases are adverse health conditions in the human being, the occurrence or severity of which is related to exposure to factors on the job or in the work environment.

- Such factors can be:

  - Physical: e.g. heat, noise, radiation
  - Chemical: e.g. solvents, pesticides, heavy metals, dust
  - Biological: e.g. tuberculosis, hepatitis B virus, HIV
  - Ergonomic: e.g. improperly designed tools or work areas, repetitive motions
  - Psychosocial stressors: e.g. lack of control over work, inadequate personal support
  - Mechanical: these mainly cause work accidents and injuries rather than occupational diseases.

Characteristics of occupational diseases

- The clinical and pathological presentation are identical to that of non-occupational diseases; e.g. asthma
- Occupational disease may occur after the termination of exposure. Eg: asbestos-related mesothelioma (a cancer affecting the lung and abdomen) which can occur 30 or 40 years after the exposure.
- The clinical manifestations of occupational disease are related to the dose and timing of exposure; e.g. at very high airborne concentrations, elemental mercury is acutely toxic to the lungs and can cause pulmonary failure, while at lower levels of exposure, elemental mercury has no pathologic effect on the lungs but can have chronic adverse effects on the central and peripheral nervous systems.
- Occupational factors can act in combination with non-occupational factors to produce disease; e.g. exposure to asbestos (five-fold increase in lung cancer); and the long-term smoking of cigarettes (increases the risk by 50 and 70 fold.

Diseases due to physical agents

Heat	Heat hyperpyrexia, exhaustion, syncope, cramps, burns
Cold	Trench foot, frost bite
Light	Occupational cataracts, miner's nystagmus
Pressure	Caisson disease, air embolism, blast (explosion)
Noise	Occupational deafness
Radiation	Cancers, leukemias, aplastic anemia, pancytopenia
Mechanical factors	Injuries, accidents
Electricity	Burns

Diseases due to chemical agents

Gases	CO2, CO, HCN, N2,NH3,HCL
Dusts (pneumoconiosis)	Coal dust (anthracosis), silica (silicosis), asbestos (asbestosis, Ca lung), iron (siderosis) Cane fiber (bagassosis), cotton dust (byssinosis), tobacco (tobacossosis), hay or grain dust (farmers lung)
Metals and their compounds	Toxicity from Lead, mercury, cadmium, mercury, arsenic
Chemicals	Acids, alkalis, pesticides
Biological agents	Brucellosis, leptospirosis, anthrax, tetanus, encephalitis, fungal infections
Occupational cancers	Skin, lung, bladder
Occupational dermatosis	Dermatitis and eczema
Psychological origin	Industrial neurosis, hypertension, peptic ulcer

Pulmonary dust diseases

- Pneumoconiosis is disabling pulmonary fibrosis that results from the inhalation of various types of inorganic dust, such as silica, asbestos, coal, talc and china clay.
  - e.g. silicosis and asbestosis

Silicosis

- Crystalline silica (SiO_2)
- **Occupations:**
  - mining (coal, mica, gold, silver, lead, zn)
  - stone cutting and shaping, sandblasting (building and construction)
  - glass and ceramics manufacture
  - Iron and steel industry

Time to develop: 7–10 years, sometimes less. Prolonged exposure to higher concentrations of dust

Presentation: dyspnoea on exertion , pulmonary tuberculosis and cardiac or respiratory failure , impaired TLC (total lung capacity)

Diagnosis: x-ray ….snow storm appearance

Progressive disease and converts to TB

“prevention and regular physical examinations ”

Asbestosis

- Inhalation of asbestos fibres
- Occupations:
  - mining and extraction
  - exposure to asbestos … insulation
  - making of asbestos cloth
  - manufacture of asbestos cement pipes and other products, vinyl floor tiles and in brake and cloth lining

Sign & symptoms: interstitial fibrosis of the lungs, pleural thickening, calcification.

- Bronchogenic carcinoma, pleural and peritoneal mesothelioma
- progressive dyspnoea on exertion, cough, expectoration, chest pain, cyanosis and clubbing of the fingers

Diagnosis: asbestos bodies in sputum (asbestos fibres coated with fibrin), X-ray findings , ground-glass appearance in lower 2/3 rd lung

Progressive diseases

“ prevention and periodic examinations”

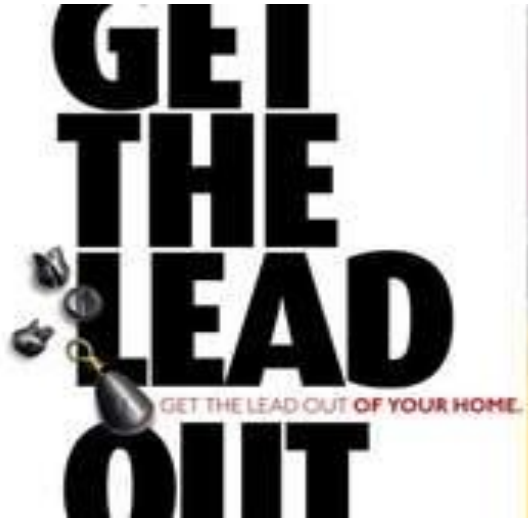

DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA


Mesothelioma

Lead poisoning

- Occupational usage (Industrial):
  - Storage batteries, glass, ship building, printing and potteries, rubber

- Non-occupational :
  - Gasoline, drinking water via lead pipes, paints, toys



Modes of absorption

- Inhalation of fumes and dust
- Ingestion through food or drink
- Skin absorption “tetraethyl lead”

Clinical features

- 70 microgram/ 100 ml…..clinical signs and symptoms
- **Inorganic lead:**
  - Plumbism
  - Abdominal colic
  - Obstinate constipation
  - Loss of appetite
  - Blue lines on the gums
  - Anemia
  - Wrist and foot drop

organic lead:

Insomnia

Headache

Mental confusion

Delirium

Lead poisoning .....cont

- Lab diagnosis:
  - Coproporphyrin in urine (screening test)
  - Amino levulinic acid in urine
  - Lead levels in blood and urine

- Prevention:
  - Substitution
  - Isolation
  - Local exhaust ventilation
  - Personal protection
  - Periodic examinations personal hygiene; handwashing
  - Health education

Occupational cancers

Carcinogenic agent	Organ affected
Arsenic	Skin and lung
Chromium compounds, hexavalents	Lung
Nickel	Lung and nasal sinus
Polycyclic aromatic hydrocarbons	Skin
Coal tars	Skin, scrotum, lung, bladder
Benzol	Blood (leukaemia)
B-naphthalamine	Bladder
Ionizing radiation	Skin, bone, lung, blood (leukaemia)
Asbestos	Lung, pleura, peritoneum

Occupational dermatitis

- **Causes:**
  - Heat, cold, moisture, friction, pressure, x-rays, acids, alkalis, solvents, grease, tar, pitch, bacteria, fungi, leaves, vegetables, fruits
- **Classification**
  - Primary irritants
  - Sensitizing substances
- **Prevention:**
  - Pre-selection
  - Protection
  - Personal hygiene
  - Periodic assessments

Radiation hazards

- **Industrial exposures:** manufacture of radioactive paints, painting of luminous dials for watches, mining of radioactive ores, sand workers, x-rays rooms
- **Effects of radiation:** Acute burns, dermatitis, blood dyscrasis, malignancies, genetic effects.
- **Prevention :**
  - Shielding in x-ray areas, monitoring 6 monthly, for their film badge or pocket electronic device, adequate workplace ventilation, replacement and periodic exams.
  - Pregnant ladies should not be allowed to work in the area

Prevention of occupational disease

Medical measures

- Pre-placement exams
- Periodic examinations
- Medical and health care services
- Notifications
- Supervision of working environment
- Maintenance and analysis of records
- Health education and counseling

Engineering measures

- Designing of the buildings
- Good house keeping
- General ventilation
- Substitution
- Dusts
- Enclose
- Isolate
- Local exhausts ventilations
- Protective devices
- Environmental monitoring
- Research

Legislations

- Policies and regulations for factories, work places, health of the workers eg insurance, sickness policies, disability benefits, ect


Safety
First !


THANK
YOU

References

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- Occupational health. A manual for primary health care workers. Available at: https://www.who.int/occupational_health/regions/en/oehemhealthcareworkers.pdf?ua=1