UNIT 4 OCCUPATIONAL DISEASES

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4.0 INTRODUCTION

In the previous unit, you have studied various non-communicable diseases. You have also studied about their prevention and control. Many non-communicable diseases like Cancers, accidents, mental health problems etc. have multiple causes. One of the cause of these diseases is occupational health hazards which is discussed in the present unit.

There are 100 million occupational injuries causing 0.1 million deaths in the world according to WHO. In India it is estimated that 17 million (17% of global burden) occupational non-fatal injuries and 45,000 fatal injuries occur each year. So our aim for occupational health will be

- To increase efficiency
- To increase production
- To decrease accidents and diseases

4.1 OBJECTIVES

In this unit you are going to study about the diseases caused by occupational health hazards. At the end of this unit, you will be able to:

- define occupational health ergonomics;
- identify factors affecting health of workers;
- enumerate occupational health hazards and occupational diseases; and
- list preventive measures and compact occupational hazards.

4.2 CONCEPT OF OCCUPATIONAL HEALTH

Occupational health is the study and prevention of environmental problems in worker population with in the work place.

Ergonomics is concerned with human engineering that means placing the work in an environment (job) which is adopted to his physiological and psychological Capacity.

The health of the worker is influenced by three factors, namely occupational (working) environment, domestic, social security and welfare measures.

4.2.1 Occupational Environment

You will appreciate that environment in which one works have a bearing influence on health of the worker by three types of interactions.

The first one is man with machine: In almost all the industries the machines are driven by power; poor installation of machines, the unguarded protruding moving parts, poor maintenance etc. results in accidents. Working for long hours result in fatigue, discomfort and decreased efficiency.

Second one is man with environment: The interaction between man and environment has an influence on his health.

The third one is man with man: The interaction between worker, his co-worker and employer. This depends on many psychosocial factors like job satisfaction, payment, welfare conditions, incentive etc. which has influence on their safety, security and mental health.

You can see in the following diagram given below that there is continues interaction between man, environment and the machine or the equipment needed for the works (Fig. 4.1)

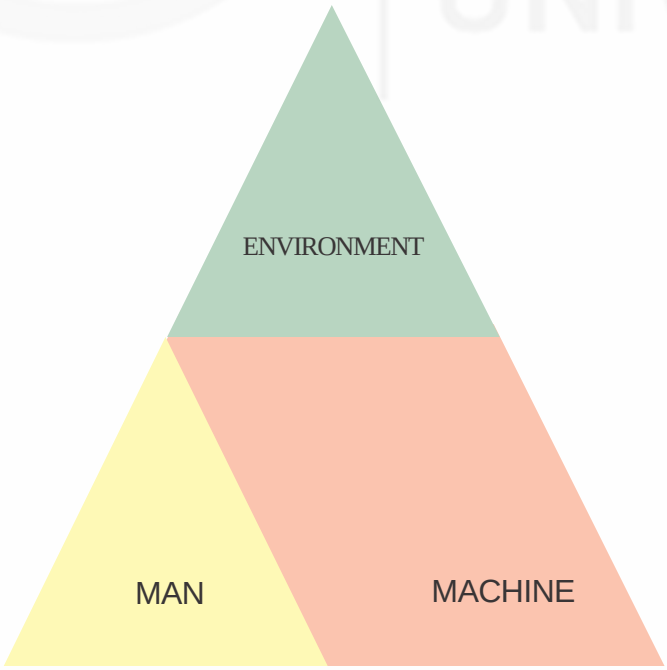

Fig. 4.1: Interaction of Man, Machine and Environment

The working environment also influence their environment and vice-versa. So that occupational environment effects their family life as well.

4.2.2 Occupational Hazards

An industrial worker is exposed to five types of hazards these are physical, chemical, biological, mechanical and psychosocial.

There are some other hazards like Cancer of skin, lungs, bladder and blood forming organs e.g. leukemia. Dermatitis eczema, folliculitis, urticarial rashes.

As you know that about 70% of our population lives in rural area and their main occupation is agriculture. Occupational health in agriculture sector is a new concept. Agriculture worker has multitude of health problems, a fact which is often forgotten because of the myth that occupational health is mainly concerned with industry.

As India's majority of population reside in rural areas and their profession is agriculture they have problems related to this field.

So in coming text you are going to study about the occupational diseases of agriculture workers in addition to other occupational diseases.

Check your Progress 1

1) Define Ergonomics.

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2) Name three types of interaction in work place.

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3) Enumerate occupational hazards.

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4.3 OCCUPATIONAL DISEASES

Occupational diseases are those which arise out of or in the course of employment. They can be grouped as follows (Table 4.1):

Table 4.1: Aetiological agents of occupational diseases

S. N.	Causative Agent	Disease Condition
1.	Diseases due to Physical Agents	
	a. Heat	Heat hyperpyrexia, heat exhaustion, heat syncope, heat cramp, burns and local effects
	b. Cold	Trench foot, frost bite, chilblains.
	c. Light	Occupational Cataract, Miner's nystagmus

S. N.	Causative Agent	Disease Condition
	d. Pressure	Caisson disease, air embolism, blast.
	e. Noise	Occupational deafness, Cancer, leukemia, aplastic anaemic, Pancytopenia Injuries and accidents Burns
	f. Radiation	
	g. Mechanical Factors	
	h. Electricity	
2.	Diseases due to Chemical Agent	
	a. Gases	Gas Poisoning
	b. Inorganic dusts	Pneumoconiosis Bagassosis
	c. Organic dust	Byssinosis, Tobocosis and farmers' lung
	d. Metal their compounds	Lead Mercury, Cadmium Poisoning
	e. Acids, Alkalis, Pesticides	Burns
3.	Biological Agent	Brucellosis, leptospirosis, anthrax actinomycosis, tetanus, encephalitis etc.
4.	Occupational Cancers	Cancer of skin, bladder, lungs
5.	Occupation Dermatitis	Dermatitis, eczema
6.	Diseases of Psychological Origin	Industrial neurosis, hypertension, ulcer etc.
7.	Occupational diseases of Agriculture Worker	Anthrax, leptospirosis, tetanus, tuberculosis and Q fever Accidents due to machinery used for farming, insect and snake bite, solar radiation and respiratory diseases.
8.	Occupational diseases to the Health Care Workers	Infections like HIV, hepatitis ,TB, backache, mental stress, varicose vein, sleep deprivation
9.	Occupational diseases to the Computer Professionals	Carpal turner syndrome, dry eyes, cervical spondylitis, insomnia, backache.

4.3.1 Pneumoconiosis and Its Prevention

Pneumoconiosis is also known as dust disease. There are group of diseases in the lung parenchyma occurring due to specific occupation, caused by inhalation of insoluble dust over a prolonged period of time.

As you know that there is no treatment for pneumoconiosis, the prevention is only intervention. So one need to prevent these disease to occur.

Clinically it is characterised by persistent cough, progressive breathlessness which

gradually cripples the person by reducing the working capacity due to fibrosis of lungs followed by complication like pulmonary disease and even carcinoma in some cases.

There are few factors which influence pneumoconiosis these are:

- Higher the concentration of dust greater the health hazards. The permissible limit is 200 mcg per cubic meter of air
- Composition of dust is also an important factor, more the complicated composition greater the health hazard
- Size of the dust is another important factor. Smaller the size of dust particle greater the tissue reaction
- Duration of exposure also determine the disease condition. Longer the duration of exposure greater the health hazard
- It is very important that individual response also determine the disease condition. If the health and nutrition status of an individual is better, lesser the chances of pneumoconiosis.

Table 4.2: Common Pneumoconiosis, causative agents and the industries of occurrence

Dust	Disease	Industry
Silica	Silicosis	Sand stone industry, stone quarrying and dressing, granite industry, pottery ceramics, gold, silver and mica industry
Asbestos	Asbestosis	Asbestos cement factory, fireproof textiles
Iron	Siderosis	Iron one and mines, iron and steel industries
Coal dust	Anthracosis	Coal Mines
Aluminum	Aluminosis	Aluminum Industry
Barium	Baitosis	Photography, Printing, barium diagnostic works
Berryllium Stone	Berylliosis Lithosis	Beryllium mining, manufacture of alloy. Stone Industry
Organic dusts	Cotton dust	Byssnosis Textile Industry
Sugar cane dust	Bagassosis	Cane sugar factory, paper and cardboard factories
Tobacco dust	Tobaccosis	Tobacco factories (Beedi, cigar, cigarette)
Mouldy hay Grain dust	Farmer's lung	Agriculture Industry

4.3.2 Lead Poisoning and Its Prevention

Lead Poisoning (Plumbism)

There are two sources of lead poisoning that is occupational and non-occupational.

1) Occupational type of plumbism is common in lead ore, glass paint, printed potteries and plumbing work industries.

2) Non-occupational source is by automobile exhaustion, water supply through lead pipes, fruite sprayed with insecticides containing lead, children having pica (eating lead containing mud etc.)

You can diagnose the lead poisoning by doing blood and urine examination which can be summarised by the following Table 4.3.

Table 4.3: Diagnosis of lead poisoning

Specimen	Normal Level	Dangerous Level
Blood lead	25–40 mcg/10 ml	770 mcg/100 ml
Urinary lead	0.2–0.8 mcg per liter	70.8 mcg per liter
Urinary amino lenulinic acid	6 mg per liter	60 mg per liter

You need to get some other laboratory investigations like haemoglobin which will be reduced, RBC count will be bereaved along with blood and urine lead level.

As we know prevention is required to combat occupational disease, which are discussed as follows:

- Preplacement examination

Consist of thorough examination of the individual before giving the job. It includes physical examination and routine investigations including chest x-ray. The suitable job should be given depending on physical and mental abilities that is fitting the job to the worker.

- Health Education

Employees at the risk of pneumoconiosis are educated about the hazards of dust inhalation over long period of time. They are educated about the hazards of smoking as precipitating factor.

- Provision of healthy physical environment will also prevent the disease. Adequate ventilation, good housekeeping are mandatory in the industries.
- Prevention of formation of dust at the point of origin by water sprays.
- Prevention of escape of dust in the environment also is very important. If the dust formation is not possible to control; at least the escape in the atmosphere should be prevented.
- Keeping moisture content below 20 per cent and spraying 2 per cent propionic acid controls bagassosis. Dust can also be removed by special ventilator arrangements.
- This is Specific Protection: Workers can be provided by use of mask and other protective devices.
- Early diagnosis and treatment

Workers should go for periodic medical examination including x-ray chest etc. to detect the disease condition at early stage.

- Disability limitation

This consist of limiting the further disability of worker by detecting the slightest degree of disability and immediately assigning other job.

- Rehabilitation required for the workers who have become handicapped due to development of fibrosis.

Prevention of further exposure to lead must be done by changing the job and further management health care facility should be done.

4.3.3 Occupational Cancers

The most common cancers due to occupational hazards are skin, lungs, blood forming organs like bone marrow, skin, lungs, blood forming organs like bone marrow, bladder etc.

- Cancer occurs on those sites where the action of carcinogens is constant, most intense and prolonged.
- They appear after prolonged exposure for about 10–15 years.
- They can also occur after cessation of exposure.
- It is more among male than in females.
- The localisation of tumor is remarkably constant in any one occupation.
- The incidence of cancer due to occupation is much earlier than that for cancers in general.
- Maintenance of high standards of personal hygiene is very important in prevention of cancers.

4.3.4 Occupational hazards of Agriculture Workers

Occupational health in agriculture sector is new concept. You may be belonging to rural area where you might have seen lot of accidents and multitude of health problems which is actually forgotten.

The agriculture worker is exposed to following health hazards -

- Zoonotic diseases are common among agriculture workers since they come in contact with animals. They are prone to develop diseases like anthrax, brucellosis, leptospirosis, tetanus, bovine tuberculosis.
- Accidents : Accidents in agriculture industry are becoming more frequent than before as result of increasing use of agriculture machinery. Insects and snake bites are additional problem in India.
- Toxic Hazards: Chemicals are being used increasingly in agriculture either as fertilizers, insecticides. Agriculture workers are exposed to toxic hazards from these chemicals.
- Physical Hazards : The agriculture workers may be exposed to extremes of climatic conditions such as temperature, humidity, solar radiation, which is an adverse effect on their health.
- Respiratory Diseases : Exposure to dust of grains, husks, coconut fibers, tea, tobacco, cotton etc. leads to lung diseases and specifically farmer's lung.

4.3.5 Occupational Dermatitis

These include dermatitis, eczema, folliculitis, urticarial, ulcers and even cancers of the skin.

The agent factors for occupational dermatomes are :

- Physical agent : Such as heat and radiation
- Chemical agents : Acids, alkalis, dyes, solvents, grease, tar, pitch and minerals like arsenic

- Biological agents : Such as virus, bacteria, fungi and certain parasites.
- Plant products : Such as leaves, fruits, flowers, vegetables etc.
- Sensitising Agents : These agents act as allergens such as photo developing materials, formalin, insecticides etc.

4.3.6 Accidents in the Industries

Accidents are common feature in most industries. In fact some industries are known for accidents e.g. coal and other mining industries, constructions work.

There are multiple causes of accidents like physical, physiological and psychological causes.

Environmental factor also play and important role in causation of accidents in the industry e.g. unsafe machines, noise pollution, excessive light and high temperature are some of the factors.

4.4 PREVENTIVE MEASURES TO COMBAT OCCUPATIONAL HAZARDS

Let us discuss the preventive measures and the legislative, medical and engineering measures.

4.4.1 Primary Prevention

Primary prevention includes pre placement examination, which is performed for the each worker before they join the job.

Provision of healthy physical environment is a must for healthy work force.

- Building of the workplace should be safe from stress and stains of the machinery. There should be proper lightening and ventilation. The temperature of workplace must be in between 25–27°C. Measures should be taken to control the dust; by wet or oiling method, exhaust etc.

  Hygiene of the work place is important, and needs proper water supply for the worker Provision of safe drinking water is equally important.

- For every 25 workers there must be one lavatory and urinal for every 50 workers.

  Welfare activities like recreational facilities, lunch room, family welfare services, crèche for children of employed mothers and insurance facilities to be provided.

  In specific protection like personal protective measures become a necessity to safe guard against occupational hazards. The example of personal protective measures are like use of helmets, goggles, ear plugs, respirators and immunisation against various communicable diseases etc.

4.4.2 Secondary Prevention

Early diagnosis is done by periodic examination, including laboratory investigation and radiological examination.

Prompt treatment is initiated as soon as the diagnosis is made. Personal monitoring is important whenever such hazard exist.

4.4.3 Tertiary Prevention

This includes disabilities limitation and rehabilitation. A careful attention is given to those who become physically handicapped during the course of their employment

either by accident or injury. Such persons are rehabilitated and given a suitable job, so that their psychological trauma is countered and becomes a useful person to himself, to the family and the country at large.

Check Your Progress 2

1) Name the occupational diseases of agriculture worker.

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2) Enumerate the measures to control pneumoconiosis.

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3) Lead poisoning is also known as.

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4) Enlist the occupational cancers.

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5) What are the preventive measures to combat occupational hazards?

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4.4.4 Legislative Measures

In India there are laws which have been framed to address the welfare of industrial workers. The laws are:

1) Indian factories Act, 1948
2) Family Pension and Deposit Linked Insurance Fund Act
3) Mines Act
4) Tea Plantation Act
5) Minimum age Act, 1948
6) Maternity Benefit Act
7) Laborer's Act
8) Industrial Dispute Act
9) Employees Provident Fund Act, 1952
10) Employees State Insurance Act, 1923

These laws are enforced to ensure the standards and safety of the workers which an employer must comply with.

The administration of Emyloyee State Insurance scheme under the Act is entrusted to an autonomous body called ESI corporation directly under the labour ministry and union minister for labour as the Chairman.

Benefits to Employees

- Medical benefit
- Sickness benefit
- Maternity benefit
- Disability benefit

- Dependent's benefit
- Funeral expenses
- Rehabilitation Allowance

4.4.5 Engineering Measures

- Design of building should be such to look into the safety issues of the workers. Attention should be paid to the flooring, height of the walls, ceilings, roof, doors and windows.
- Good housekeeping is another measure to ensure health safety.
- Enclosure: Enclosing the harmful material and process will prevent the escape of dust and fumes into the factory atmosphere.
- Isolation: Isolating the offensive process in a separate building to prevent workers from coming directly in contact with harmful substances.
- Local exhaust ventilation : Dust, fumes and other injurious substances can be trapped and extracted at the source before they escape into the factory atmosphere.
- Protective device: Protective devices like respirator, gas mask, ear plugs, helmet, safety shoes, aprons, gloves, gum boots, barrier creams, and goggles etc. helps reducing the occupational hazards.
- Environmental monitoring is an important aspect of occupational health. It is concerned with periodical environmental evaluation.

4.5 ROLE OF MIDLEVEL HEALTH CARE PROVIDER IN PREVENTION OF OCCUPATIONAL HAZARDS

The community health officer becomes first point of contact for workers. They will readily seek advice from an approachable, assessable health care professional.

Your role can be summarised as:

- Work place surveillance and health risk identification the community health nurse in collaboration with others team members of safety office. It helps to determine whether group of workers may be suffering actual or potential work related injury or illness.
- Comprehensive interventions or programmes to control and educate workers about potential health risk and strategies to prevent them.
- Health surveillance as a part of surveillance of occupational health community health officer surveys environment and evaluate health risk for workers. Medical surveillance includes immunisation for employees who are exposed to infectious biological agents.
- Reduction of workplace injuries/ illness due to early detection of work place hazards. Develop statistics to identify significant trends in occupational illness or injuries.
- Health promotion and protection is also an important responsibility of occupational health nurse by modifying the behaviour of individual / groups and encouraging them to accept responsibility in the matters which affect their health and which can be controlled.

- Enhancement of employee's well-being by gaining knowledge of risk factors in workplace. Familiarity with community resources and skill in utilising them is also important.
- Primary care : It is the set of nursing actions which are provided to manage illness or functional challenges in workplace it is important to prevent complication, promote recovery and facilitate rehabilitation of both occupational and non-occupational illness and injuries.
- Appropriate treatment, referral and follow up to facilitate early return to workplace. Recording and reporting should be done for each step.
- Counselling : It is the process of helping employees to clarify problems and make informed decisions and choices while giving positive reinforcement. It helps to deal with crisis situation. Confidentiality should be ensured. Legal obligations should be kept in mind.
- Rehabilitation/ case management : It may be either work or non-work related. Occupational health nurse implements knowledge gained from research/ epidemiological studies within workplace and work culture.

4.6 LET US SUM UP

The modern world is heading towards industrialisation. As the size and the complexities of the industries develop health problems are envisaged.

It is imperative that the occupational health will be more important in the coming years. We need a comprehensive occupational health services in India.

However, there are various organisations active in the field of occupational health

But we need more comprehensive occupational health services to the unorganised sector as well, namely agriculture, domestic helpers and labourers etc.

4.7 MODEL ANSWERS

Check Your Progress 1

1) Ergonomics is concerned with human engineering placing the worker in the environment which is according to his physiological and psychological capacity.

2)
   - Man with machine
   - Man with environment
   - Man with man

3) Physical, chemical, biological and psychosocial

Check Your Progress 2

1) Anthrax, leptospirosis, tetanus, tuberculosis and accidents.

2) a) Pre Placement examination
   b) Health education
   c) Provision of healthy physical environment
   d) Early diagnosis and treatment

3) Plumbosis

4) Skin, lungs, blood and blood terming organs, bladder

5) a) primary prevention b) secondary prevention c) tertiary prevention

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