NATIONAL OPEN UNIVERSITY OF NIGERIA

SCHOOL OFHEALTH SCIENCES

COURSE CODE: PHS 413

COURSE TITLE: Occupational Health and Safety

PHS 413: OCCUPATIONAL HEALTH AND SAFETY

(Adapted from NSS 507: OCCUPATIONAL HEALTH NURSING).

COURSE GUIDE

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Introduction

Occupational health is an aspect of public health programme. It was established to ensure that the health status of everybody in any occupation is protected, maintained and promoted. The course provides a comprehensive overview of the relationship of the occupation and human health. It considers the physical, mental and social dimensions of man (holistic view) in the work environment. It is believed that man is an embodiment of physical, spiritual, mental and social being interacting with his total environment. When all the components of man are in a healthy relationship with each other adequately, employee performance in any occupation is assured and enhanced. Creating a healthy workplace and a healthy workforce in any occupational environment is the best way to position that occupation to better delivery of services.

Occupational health takes care of the diseases, accidents, emergencies and other hazards faced in the work environment and how the problems can be prevented, improved and controlled. Because of the morbidity and mortality associated with industrialization, industrial legislations were enacted solely for the protection and safety of employees in any paid occupation.

It is very difficult to cover all the aspects of occupational health. Nevertheless, the first part of the course is an overview of Occupational Health; it includes the study of historical development of occupational health, principles of occupational health, occupational health problems, occupational diseases, occupational accidents and emergencies, occupational radiation and cancers, occupational skin diseases, occupational safety requirements and industrial legislation.

Secondly, the course provides information on occupational practices available for the protection of employees from hazards in any work environment. It includes the study of the type of planning and organization of health practices; types of Occupational Health services, principles of occupational hygiene, benefits of Occupational Health practices/services, prevention and control of Occupational Health diseases and accidents, occupational health programmes and how to promote and maintain a healthy work environment.

Thirdly, the course occupational health team explains the role of each Occupational Health team member including the International Labour Organisation (ILO) in protecting the health of the employees especially the doctors, nurses, community health practitioners and health educators. It explains in particular the specific roles played by all in sexually transmitted

infections, occupational rehabilitation, safety behaviours and responsibilities; methods and strategies for teaching occupational health at work settings.

The course is written as a guide for instructors, community health students, medical and nursing students, as well as those in health technology. It serves as a reference material for all health professionals including doctors, nurses, community health practitioners and others in health industry. It also serves as reference material to management in industries, factory inspectors, safety officers; representatives of workers on whom so much depends in advancing and promoting the course of the employees.

Course Overview

The course explains to you all aspects of Occupational Health. It highlights important sections as well as background issues leading to the course. It gives you an idea of what Occupational Health is, its historical development, principles, health problems and relationship with the environment; the aims and objectives, the way man's health is affected by the nature of work he does to support life. It helps you understand rationale for Occupational Health, types of industrial legislation enacted to ensure employee protection and survival.

Occupational health practices/services help you understand the processes taken to ensure that the health status of the employees are protected, promoted and maintained. It involves detection of the presence of different types of diseases, accidents and hazards that can occur in any occupation; planning and organizing how the services are to be provided to ensure competency and continuity; the types of programmes/services to cover

principles of hygiene to adopt and the effects of the problems on the employees. It also determines the preventive and control measures to adopt to ensure that morbidity and mortality of the employees due to diseases and accidents are minimized or even eliminated.

The health team responsible for the provision of Occupational Health practices and their roles are discussed. Each team member carries out different but interrelated roles. Particular discussion was made on the characteristics and roles of community health practitioners that are directed at the prevention and control of occupational health problems, protection, promotion and maintenance of employee health status as well as promote healthy relationship between employers and the employees in any occupational environment, increased productivity and cost. Every occupation including factories, agriculture, banking etc need healthy and well motivated worker if that occupation is to deliver high quality services. It therefore means that effective management of Occupational Health is the key to achieving progress.

The workplace has a significant impact on employee's health. Poor management of workplace health can lead to work-related ill-health and high levels of sickness. This gives real course for concern because of the costs involved, the impact on service delivery and the consequences for individual worker. Sickness absence is the key issue and is the key indicator of how well an occupation is managed. Work is important not only to physical and mental health but also for social integration.
Committing resources to prevent people from being made ill by work, or being absent from the work place for health reasons. It also places emphasis

on rehabilitation and how getting people back to work can benefit both the employers and the employees.

To achieve the benefits, employers should create occupational settings where health, safety and well-being of employees are protected and promoted; ensure employees have access to competent Occupational Health counseling, education and support; improve access to preventive services for common health problems as well as enable employees to remain in service while health problems are investigated and treated.

Course Aims

The course aims at:

- providing an understanding and appreciation of the course
- the nature of the health hazards/problems which employees encounter in the work environment and
- implications of hazards/problems on the employees and employers.

Course Objectives

In addition to the above aims, after reading through this course, you should be able to:

- Understand the meaning of Occupational Health (OH)
- Describe the historical development of Occupational Health especially in developing countries including Nigeria.
- State the basic concepts in occupational health.
- Describe the common types of occupational health problems that occur in any occupational setting.

- Describe industrial legislations (Factories Acts, Workmen's Compensation and other laws) enacted for the protection of employees health at work settings.
- Describe the nature of planning and organisation of health practices/services in the work settings.
- Describe the types of Occupational Health services/practices.
- Explain methods of detecting occupational health problems.
- Describe methods of prevention and control of Occupational Health diseases, accidents/emergencies and other hazards.
- Describe the role of each member of Occupational Health team in prevention, control and management of occupational health problems for the benefit of the employees and management.
- Describe the type of rehabilitation services that could be provided to the injured employees and the nature of the remuneration expected of the employers.

Working through the Course

The course has been comprehensively developed. The content is very dense. The course requires you to plan your time and read effectively in order to master the course. This accounts for the efforts made in developing the course in order to make it very simple to understand.

Various interactive training methodologies should be introduced and adopted during tutorials to enable you gain further relevant knowledge and apply the skills gained. These include discussions, field trips to industries to observe and acquire experiences to observe how occupational health

services are being provided. You must seize the opportunity to ask questions where and when in doubt.

The Course Material

You will be provided with the following materials:

- Course Guide
- Study Units
- In addition, the course comes with the list of recommended textbooks which are necessary as supplements to the course material.

Study Units

There are 4 modules divided into 14 study units. These are:

Module 1: Historical development of Occupational Health

Unit 1: Historical Development of Occupational health

Unit 2: Basic Concepts in Occupational Health

Module 2: **Occupational Health Problems**

Unit 3: Occupational Health Problems: An Overview

Unit 4: Occupational Diseases

Unit 5: Occupational Accidents

Unit 6: Occupational Radiation and Cancers

Unit 7: Occupational Poisons

Unit 8: Occupational Skin Diseases

Module 3: Occupational Safety Requirements

Unit 9: Occupational Safety Requirements

Unit 10: Evaluation of Occupational Health Practices/Services

Unit 11: Members of Occupational Health Team

Module 4: Industrial Legislation and Labour Organization

Unit 12: Industrial Legislation

Unit13: Occupational Rehabilitation

Unit 14: International Labour Organization (ILO)

The first unit in this course discusses the historical development of Occupational Health, starting from ancient times to that of developed and developing countries including Nigeria. It also discusses international occupational health, the influence of Agencies of the United Nations e.g. the International Labour Organization and World Health Organization), as well as future trends of occupational health.

The second unit introduces you to the basic information in occupational health. You will learn the concept of occupational health; its objectives and the rationale for Occupational Health programme. You will further learn the benefits of Occupational Health to both the employers and the employees.

In the third unit the overview of Occupational health problems is introduced. In this Unit, you will learn about the meaning of Occupational Health problems, types of Occupational health problems as well as occupational health problems that can occur in different occupations like industries, agriculture, educational institutions, and health institutions. You will be able to learn factors that contribute to health problems and the preventive measures to adopt. In the event of illness, management processes are applied.

In the fourth unit Occupational health diseases are discussed. In this unit you will learn the types of occupational diseases, the predisposing factors and the threat of the diseases to human public health. You will learn how the employees are assessed to detect the disease, the preventive and control measures to apply as well as the treatment of the occupational disease. You will further learn the implications of the occupational disease to both the employer and the employees and how the occupational health diseases are to be reported.

The fifth unit introduces occupational accidents as the main health hazards in occupational settings. It further introduces you to the concept of Occupational accidents, predisposing factors to the accidents, as well as the maintenance of the environment as measure of control and then how the accidents could be prevented to save life and property. Treatment of occupational accident victims and ways of safeguarding tools and machinery in the occupational settings are discussed. Furthermore surveillance of workers in industries and reporting of occupational accidents are explained with the view of information dissemination. Rehabilitation of the injured employees is also discussed.

The sixth unit discusses the occupational poisons, sources and people at risk of getting the poison. You will also learn the clinical manifestation, diagnostic procedures to be utilized in an attempt to find out if occupational poison is the problem. You will further learn the strategies that can be adopted for the prevention of poison, implications of poison to the employer and the employees. Finally, you will learn how the poison incident can be reported for further information and precautionary measures to be applied.

In unit seven, the environmental health hazards resulting from biological

and physical agents are discussed.

In Unit eight, you will study pollution prevention in industries to avert industrial/occupational hazards and accidents.

In Unit nine, you will be exposed to occupational health and safety requirements in different occupations; safety and consumer protection, how to select appropriate safety devices. You will learn how to protect the employees from hazards of safety devices, organization of safety programme, duties and responsibilities of employers and how to select the equipment to avoid injuries.

Unit 10 introduces you to industrial legislation in both developed and third world countries including Nigeria. It further explains the reasons for industrial legislation.

The 11th Unit introduces the evaluation of occupational health practices.

The 12th unit further describes the health professionals involved in occupational health and their roles. These include: safety engineer, industrial hygienist, counsellor, toxicologist, epidemiologist, laboratory technologist, physical therapist, occupational and recreational therapist and even the family members.

In Unit 13, you will study occupational rehabilitation. You will also learn about Occupational rehabilitation, its scope, forms, principles and practices. You will also study the role of occupational team in rehabilitation after recovery from hazards.

In Unit 14, you will be exposed to International Labour Organizations, types, origin, roles and conducts. You will understand that international labour organizations contribute in protecting the health and safety of the workers in Occupational settings.

Text Books

More recent editions of the under listed text books are recommended for further reading:

Achalu, E.I. (2000). Occupational health and safety. Lagos. Simarch Nigeria Limited.

Allender, J.A. & Spradley, B.W. (1996). Community health nursing, concepts and Practices.

Auton, J.T. (1979). Occupational Safety and health management. New York. McGraw-Hill Book Company.

Asogwa, S.E. (2007). A guide to Occupational health. Enugu. Snaap Press Ltd.

Clark, M.J.O. (1977). Nursing in the Community. USA Appleton Comp.

Henderson, V. & Nite, G. (1978, 6th Ed.). Principles and Practice of Nursing. New York. MacMillan Publishing Co; Inc.

Mroz, J.H. (1978). Safety in everyday Living. Lowa. W.M.C. Brown Company Publishers.

Reich, M.R. & Okubo, T. (1992). Protecting workers' Health in the Third world. National and International Strategies. New York. An imprint of Greenwood Publishing Group Inc.

Assessment

There are two components of Assessment for this course.

1. The Tutor Marked Assignment (TMA), and
2. The end of course Examination

Tutor Marked Assignment (TMA)

The TMA is the continuous assessment component of your course. It accounts for 30% of the total score. You will be given 4 TMAs to answer. These must be answered before you are allowed to sit for the end of course examination. The TMAs would be given to you by your facilitator and returned after you have done the assignment.

End of Course Examination

This examination concludes the assessment for the course. It constitutes 70% of the whole course. You will be informed of the time for the examination. It may or may not coincide with the University semester examination.

Summary

This course was designed to provide you with basic and essential facts about occupational health. By the time you complete reading the course, you will be able to answer the following questions.

1. What is Occupational health?
2. Discuss the historical development of occupational health in developing countries.
3. Describe, with example, the common work-related diseases and accidents in occupational setting.
4. a. Name three essential members of the Occupational Health team.
   b. What roles can a community health practitioners play in an Occupational setting to ensure the protection, promotion and maintenance of the health of the employee?

Table 2: Course Organizer: This table indicates the units, the number of

weeks required to complete them and the assignments.

Unit	Title of Work	Week Activity	End of Unit assignment
	Course Guide	Week 1	
1	Historical development of Occupational Health	Week 2	Assignment 1
2	Basics concepts in Occupational Health	Week 3	Assignment 2
3	Occupational Health Problems	Week 4	
4	Occupational Health Diseases	Week 5	
5	Occupational Accidents	Week 6	
6	Occupational Health Poisons	Week 7	
7	Environmental Health Hazards	Week 8	
8	Pollution Prevention in Industries	Week 9	
9	Occupational Health and Safety	Week 10	
10	Industrial Legislation	Week 11	
11	Evaluation of Occupational Health Practices	Week 12	
12	Health Professionals involved in Occupational Health	Week 13	
13	Occupational Rehabilitation	Week 14	
14	International		

	Labour Organization (ILO)		

How to get the most out of this course

In distance learning, the study units replace the university lecturer. This is one of the huge advantages of distance learning mode; you can read and work through specially designed study materials at your own pace and at a time and place that suit you best. Think of it as reading the lecture instead of listening to the lecturer. In the same way that a lecturer might set you some readings to do, the study guide tells you what to read, when to read and the relevant texts to consult. You are provided with exercises at appropriate points, just as a lecturer might give you an in-class exercise/test.

Each of the study units follows a common format. The first item is an introduction to the subject matter of the unit and how a particular unit is integrated with the other units and the course as a whole. Next to this is a set of learning objectives. These learning objectives are meant to guide your studies. The moment a unit is finished, you must go back and check whether you have achieved the objectives. If this is made a habit, then you will significantly improve your chances of passing the course. The main body of the units also guides you through the required readings from other sources. This will usually be either from a set book or from other sources. Self assessment exercises are provided throughout the unit, to aid personal studies and answers are provided at the end of the unit.

Working through these self tests will help you to achieve the objectives of

the unit and also prepare you for tutor marked assignments and examinations. You should attempt each self test as you encounter them in the units.

The following are practical strategies for working through this course

1. Read the course guide thoroughly

2. Organize a study schedule. Refer to the course overview for more details. Note the time you are expected to spend on each unit and how the assignment relates to the units. Important details, e.g. details of your tutorials and the date of the first day of the semester are available. You need to gather together all these information in one place such as a diary, a wall chart calendar or an organizer. Whatever method you choose, you should decide on and write in your own dates for working on each unit.
3. Once you have created your own study schedule, do everything you can to stick to it. The major reason why students fail is that they get behind with their course works. If you get into difficulties with your schedule, please let your tutor know before it is too late for help.
4. Turn to Unit 1 and read the introduction and the objectives for the unit.

5. Assemble the study materials. Information about what you need for a unit is given in the table of content at the beginning of each unit. You will almost always need both the study unit you are working on and one of the materials recommended for further readings, on your desk at the same time.
6 Work through the unit, the content of the unit itself has been arranged to

provide a sequence for you to follow. As you work through the unit, you will be encouraged to read from your set books.

7. Keep in mind that you will learn a lot by doing all your assignments carefully. They have been designed to help you meet the objectives of the course and will help you pass the examination.
8. Review the objectives of each study unit to confirm that you have achieved them. If you are not certain about any of the objectives, review the study material and consult your tutor.
9. When you are confident that you have achieved a unit's objectives, you can start on the next unit. Proceed unit by unit through the course and try to pace your study so that you can keep yourself on schedule.
10. When you have submitted an assignment to your tutor for marking, do not wait for its return before starting on the next unit. Keep to your schedule. When the assignment is returned, pay particular attention to your tutor's comments, both on the tutor marked assignment form and also written on the assignment. Consult you tutor as soon as possible if you have any questions or problems.
11. After completing the last unit, review the course and prepare yourself for the final examination. Check to be sure that you have achieved the unit objectives (listed at the beginning of each unit) and the course objectives (listed in this course guide).

Tutors and Tutorials

There are 15 hours of tutorial provided in support of this course. You will be notified of the dates, time and location together with the name and phone number of your tutor as soon as you are allocated a tutorial group.

Your tutor will mark and comment on your assignments, keep a close

watch on your progress and on any difficulties you might encounter and provide assistance to you during the course. You must mail your tutor marked assignment to your tutor well before the due date. At least two working days are required for this purpose. They will be marked by your tutor and returned to you as soon as possible.

Do not hesitate to contact your tutor by telephone, e-mail or discussion if you need help. The following might be circumstances in which you would find help necessary to contact your tutor if:

- You do not understand any part of the study units or the assigned readings.
- You have difficulty with the self test or exercise
- You have questions or problems with an assignment, with your tutor's comments on an assignment or with the grading of an assignment.
- You should try your best to attend the tutorials. This is the only chance to have face to face contact with your tutor and ask questions which are answered instantly. You can raise any problem encountered in the course of your study. To gain the maximum benefit from the course tutorials, prepare a question list before attending them. You will learn a lot from participating in discussion actively.

Best of Luck

PHS 413

OCCUPATIONAL HEALTH & SAFETY

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Unit 1: Historical Development of Occupational Health (OH)

Table of Content

1.0 Introduction

Occupational health is a course that deals with the study of the health problems employees' face in their work environment and how those health problems are managed to protect the health status of employee and their family. It exposes the different sources through which the employees are

affected. The processes of detecting the health problems are similar to investigative processes obtainable in established health institutions. The unit examines the historical development of occupational health; the role of health team members and the efforts of international organizations to ensure that safety measures are provided and workers get their compensation from employers. The unit looks at the historical development of OH in both developed and developing countries including Nigeria. It also looks at the contributions made by International Labour Organisation (ILO) and the World Health Organisation (WHO) in the protection of health and safety of people at work settings.

2.0 Objectives of the Unit

By the end of this unit you should be able to:

- Describe the historical development of occupational health in the ancient times
- Explain the historical development of Occupational Health in Britain and United States of America as example of developed Countries
- Describe the historical development of Occupational Health in developing countries including Nigeria
- Describe the contributions made by ILO and WHO in the protection of health and safety of employees at work settings.

3.0 Main Content

The history of the industrialized countries shows that social and economic development is closely interdependent. To this day no nation has achieved sustainable economic development by neglecting social programmes, nor has any achieved social well-being without standing on

sound economic ground. The essential link between the social and economic phase is the working population. All wealth is directly or indirectly obtained from the efforts of the working population. (Reich and Okubo, 1992).

A healthy employer is the key factor for sustainable social and economic development. They contribute seriously to the wealth of the industries. As workers became the back bone of industrialization, massive and indiscriminate employment of vulnerable groups, children and women became the order. Most of the employees were inexperienced and unskilled on the type of tasks involved in the occupation. Employees then became special risk group. Poor and unsafe working conditions, rapid introduction of new industries, invention and application of new tools for mass production and other processes brought about serious danger not anticipated to the employees. (Reich and Okubo, 1992). All these resulted in significant dangers to both employees and their families. They became exposed to various occupational diseases and serious accidents aggravated by endemic diseases like malnutrition, worm infestation, malaria and others. Death tool was much. Hence the origin of Occupational Health as means of protecting the health and welfare of employees.

3.1 Occupational Health Development in Ancient Times

The historical development of Occupational Health dates back to the ancient days. During that period, industrialization was in rudimentary form. Unmechanized farming was the main occupation for all nations. Slave labour was extensively used to build many of the wonders of the ancient world in Britain, USA, Egypt, Rome and numerous other countries. For example, in Britain, slaves were used to build underground and surface rail

lines, some architectural buildings and their designs among others. Apart from slaves, prisoners of war were also used. They were subjected to harsh conditions in underground mines and queries. They died in large numbers due to poor health and poor working conditions. The inhuman treatment and poor health care continued till the 16th and 17th centuries when the early medical pioneers in the field of health and safety at work emerged (Asogwa, 2000, p 8-16). Among them were Georgius Agricola and Bernadino Ramazzine.

According to Assogwa (2007), Georgius Agricola (1494 - 1555) wrote an article titled - "De Re Metallica". It was published in 1556 after his death). This article focused on the working conditions in mines and industries especially mining accidents and illnesses. He observed that the major hazards in mining were radiation from radioactive rocks and silicosis. Another medical personnel concerned with the health of workers was an Italian, Bernadino Ramazzine (1633 - 1714). His contributions in the field of workers' health earned him the title, "Father of Occupational Medicine". He stressed that the occupation of the patient must be sort in clinical clerkship in addition to those direct questions about the persons occupation, advocated by the Greek, Hippocrates. When he was 67 years old, he published his first great work "De Morbis Artificum Diatriba" - the first systematic study of trade diseases. Ramazzini wrote as follows (Asogwa, 2000, p. 8 - 9).

> "there are many things a doctor, on his first visit to a patient ought to find out either from the patient or from those present. When a doctor visits a working class's home, he should be content to sit on a three legged stool, if there isn't a guided

> chair, and he should take time for his examination, and to the questions recommended by Hippocrates in his work, "Affections". I may venture to add one more question: What occupation does he follow? ("Quid aitem exerceat?").

In the main, it is only when dealing with the common people that the doctor must think of dangerous trades. Hence, Ramazzines' motto - "Medcina Munus Plebios Curantis est interrogate quas artes exercent" (translated roughly to mean that the doctor treating commoners should enquire about their job). The actions of these pioneer doctors brought some changes in the life of the employees.

3.2 **Occupational Health Development in Britain**

Industrial revolution in Britain marked the origin of occupational health. According to Asogwa (2007) it dates back to the early eighteenth century, with the invention of the seed drill by Jethro Tull and the use of coke to smelt iron by Abraham Darby, both in 1709. This resulted in the employment of women and children in factories. They had to work long hours under very harsh and unhealthy circumstances. Both layman and medical practitioners by their writings and other ways fought against these ills and pressed seriously for reforms. In this regard, many authorities, such as Dr. Charles Turner Thachrah (1795 - 1833) and Lord Anthony Ashley Cooper (1801 - 1885) made serious contributions. Dr. Thachrah was known as "Father of British Industrial Medicine". As reported by Asogwa (2007: p. 2). Thachrach wrote and published a book in 1833 titled

> "The Effects of the Principal Arts; Trade and Professions and of Civic States and Habits of Living on Health and Longevity, with suggestions for the Removal of many of the Agents which

produce Disease and shorten the Duration of Lie".

Lord Cooper, an aristocrat, as a member of the British Parliament helped to promote legislation which reduced the hours of work and improved the conditions of work of women and young persons employed in mines, factories and other workplaces. In order to ensure safety and health protection of workers in Britain, Medical doctors were seriously engaged.

3.2.1 First Direct Medical Involvement in Industry in Britain

The first medical involvement in industry took effect in 1898,. Sir Thomas Morrison Leggee (1863 - 1932) was appointed the first British Medical Factory Inspector (or "Occupational health Consultant as he is known today). He introduced the idea of notifying occupational diseases especially lead poison. He stressed a number of preventive aspects of occupational health practice known as Legge's Aphorisms as follows:

1. "Unless and until the employer has done everything and everything means a good deal - the workman can do next to nothing to protect himself; although he is naturally willing enough to do his share".
2. "If you can bring an influence to bear external to the workman - that is one over which he has no contract - you will be successful and if you cannot or do not, you will never be wholly successful".
3. "Practically, all industrial lead poisoning is due to the inhalation of dust and fume, and if you stop their inhalation you stop the poisoning".
4. "All workmen should be told something of the danger of the material with which they come into contacts, and not be left to find it out for

themselves - sometimes at the
cost of their lives".

Numbers 1, 2 and 4 are sometimes referred to as Legge's Three Aphorisms as they deal with the general methods of prevention of diseases and ailments in industry.

The protection of juveniles in industry resulted in the appointment of Factory Doctors in Britain. The sufferings of these groups of people have attracted the attention of many people. The protection of their health became a major aim of all factory and social legislations in UK following Industrial Revaluation. Consequently, the Factories Act of 1839 was inter alia to regulate the Labour of Children and Young Persons in Mills and Factories. However, it was the 1884 Act that provided for the appointment of a certifying surgeon who had to examine young people and declare them fit for factory employment. This term was applied to the doctors who were officially employed for the purposes to perform the same function. By the factories Act of 1948 the name changed to Appointed Factory Doctor.

3.3.0 Development of Occupational Health in United State of America

According to Allender and Spradley (1996: p. 581 - 599) Modern occupational health in America is an outgrowth of the 19th century industrial revolution in England. Deplorable work conditions and worker exploitation created a growing public concern and spawned the development of many protective laws. This influence was felt in the United States, which was rapidly becoming an industrialized nation. Between 1890 and 1914, more than 16.5 million immigrants from all over the world poured into the United States. As industrial growth escalated, these new

citizens worked in the plants, factories, rail roads and mines, creating a new market for manufactured goods. Workers, children as well as adults, commonly worked 12 to 14-hour shifts, 7 days a week, under unspeakable conditions of grime, dust, physical hazards, smoke, heat, cold and noxious fumes. People accepted work-related illnesses and injuries as part of the job and lived shorter lives, frequently dying in their forties and fifties, with workers in some trades dying in their thirties (Lee, 1978).

No connection was made between work conditions and health. Employers attributed employees' poor health and early deaths to the workers' personal habits on the job or their living conditions at home. Physicians, uneducated in the relationship between work and health, blamed industrial related diseases, such as silicosis, lead poisoning, and tuberculosis, on other causes.

Self Assessment Exercise 1

Highlight issues on the development of occupational health in develop and developing countries

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3.3.1 Early Research in Occupational Health in USA

Public awareness and understanding were necessary before changes could be made to improve working conditions. That understanding was based on continuing research into occupational health.

In 1700, Bernadino Ramazzini, an Italian Physician known as the "father of occupational medicine", appeared on the seen. He conducted the earliest systematic study of occupational disease. His treatise was entitled Discourse on the Disease of Workers. Ramazzini had the foresight, when attempting a diagnosis, to ask about the patient's occupation. He was of the

view that there is relationship between a person's work and his health condition. Despite his influence, interest in information concerning worker's health evolved slowly.

It was not until early 1900s that the Public Health Service conducted one of the first scientific studies on occupational hazards by investigating dust conditions in mining, cement manufacturing, and stone cutting. Other studies were also conducted. The findings revealed that lead poisoning was as high as 22% among the pottery workers studied. A study on garment production using 1914 workers revealed that a high incidence of tuberculosis was related to poor ventilation, overcrowding, and unsatisfactory work conditions. Other investigations revealed phosphorus poisoning among workers in the match industry (1912), and mercury poisoning in those who manufactured felt hats (1930s) (Lee, 1978). The public was awakening to the effect of work conditions on people's health.

The birth of Labour movement increased the demand for healthful and safe working conditions. Worker's compensation laws provided for occupational injury and disease coverage and other efforts were made to protect workers against health hazards in the workplace. Unfortunately, it took such disastrous events as the Triangle Shirtwaist Factory Fire to create the impetus for further legislation. This notorious fire, which occurred in New York City in 1911, took the lives of 154 workers, most of whom were young women. Investigations after the incident revealed non existence fire escapes and locked exit doors. This tragic event resulted in establishment of the first serious safety laws to project working people from danger (Morris, 1976 as cited by Allender and Sopraldley, 1996, p. 589).

3.4 Development of Occupational Health in Developing Countries

The occupational health in most developing countries was as a result of industrialization. Formally, the major occupation in these countries was mainly unmechanized Agriculture. By then the cellular surface of the earth was easily repaired because civilization was based purely on an agricultural society where recycling depended on the natural processes. As more countries in the developing parts of the world started to industrialize, the surface of the earth including the health of the living creatures became seriously affected. The development of occupational health in these countries, many of which were attaining political and economic emancipation, followed the path already laid down by their industrialized colonial masters. Certain features in these newly emergent nations have mirrored the situations in their colonial masters with the result that what one sees is not only a replication of some of the Labour Laws relating to occupational health and safety but also the pattern of occupational Health as it exists in the countries of their former colonial masters with whom they still maintain strong economic ties (Asogwa, 2007, p. 12). The health problems resulting from the industrialization necessitated the services of health personnel to save the life of the employees in industries and other work environments. Chief among the health personnel are the medical doctors, nurses and community health practitioners.

The doctors, (usually, general practitioners), were the earliest health personnel engaged in the services of occupational health. They were employed either as general practitioners on either part time or full time basis. The employment of full-time medical doctor service was only possible with few large scale industries and establishments owned by multi nationals' companies and factories. The doctors employed were mainly

those with special knowledge of occupational hazards. In same way, nurses and community health practitioners with community or public health knowledge and skills were also employed. However, the number was very few. The doctors engaged in industries carried out general medical practice in industry and not industrial medicine (Asogwa, 2007 p. 12). The services provided were mainly curative as against preventive medicine.

The type of services provided depends on the nature of the industry. For small and medium scale firms "Retainership system of Services" was adopted: In this case, the employers utilized the services of the doctor in his clinic while the payment was done by the employer based on the number treated for the period. The services were extended only to the worker's one wife and four children below the age of 18 years. But in larger firms full-time general duty medical officers and in some cases specialist in various fields were engaged.

Some industries that employ more of unskilled labour provided medicare only for their expatriates and senior management staff while unskilled labourers were denied such services. Labour was cheap because many were struggling to be employed and retirement could be done at will.

3.5 Development of Occupational Health in Nigeria

Development of occupational health in Nigeria followed the pattern in other developing countries. Originally, the main occupation was unmechanized agriculture and animal husbandry. The workforces were mainly women and children. Payment for work was not known. Workers were exposed to many types of health hazards. Treatment then was not organized. Later, manufacturing including construction came into being.

Modern occupational health, reported Achalu, (2000, p. 25) started as

a result of colonization and industrialization by Britain. The first occupational health services in Nigeria was introduced by the Medical Examination Board of Liverpool Inferminary in 1789 with the main aim of caring for the health of British slave dealers from Africa to Britain. However, after the abolition of slave trade, the Royal Niger Company of Britain increased its exploration and trading activities in Nigeria. The Company organized its own health services which were later inherited by the United African Company (UAC).

During the British colonial rule, many of their soldiers were dying of malaria. This led Colonel Lugard to establish health services to take care of the health and welfare of soldiers and other colonial administrators. Later, during the Second World War, the Medical Corps was separated to cater for the military alone leading to the creation of Public Health Service which became the nucleus of the National Health Service.

After the world war, many industries started emerging chief among them were construction of rail lines and coal mining. This attracted employment of many Laborers especially young men. These workers commonly worked 12-14 hours shift; 7 days a week under unspeakable conditions of grime, dust, physical hazards, accidents, smoke, heat and noxious fume among others. Feeding was very poor; workers were dying in their forties and fifties. People had no knowledge between work conditions and health. They accepted work related illnesses and injuries as part of the job and lived shorter lives. Employers attributed workers' poor health and early death to workers' personal habits on the job and their living conditions at home. Little or no attention was paid to prevention of the hazards in work places. Payment was very poor and dismissal very common because job seekers were many. Workers' reaction to poor conditions at work

resulted in killing of coal miners in Enugu. That exposed the working conditions of coal miners and the origin of worker's day in Nigeria. These developments and awareness lead to the establishment of some occupational health services in some Nigerian industries and occupational health legislations Act in Nigeria.

The earliest practices that can be regarded as occupational health services in Nigeria were carried out by British Companies like UAC, John Holt. This was followed by establishment of some occupational health services by Nigerian governments in the Railway Corporation and Coal Mines. Such services included pre-employment and periodic medical examination, treatment of minor illnesses and accidents. In some cases, general practitioners were hired on part time basis, especially in urban centres to take care of the sick injured workers. The increased industrialization and its impact on health, safety and welfare of workers lead to the creation of occupational health unit in the Federal Ministry of Health and the Institute of Occupational Health in Oyo State Ministry of Health. These agencies organized courses for managers, safety officers, medical officers, occupational hygienists, and other personnel involved with the protection, maintenance and promotion of health and welfare of workers in Nigeria.

3.6 International Occupational health

As industrialization spread from one country to another, according to Asogwa (2007: p. 4) so also did the diseases and ailments associated with different trades. Gradually, occupational health was being recognized as a distinct area of medicine deserving special attention in those countries that were the pioneers of industrialization in Europe and America. Many

different approaches were followed in these countries but the final goal was essentially the same. The main aim and goal were to safeguard lives and ensure that the well-being of working people are protected, maintained and promoted. The oldest international bodies in modern times concerned with global health and safety of people at work are the International Labour Organisation (ILO) and the World Health Organisation.

3.7 The International Labour Organization (ILO)

The International Labour Organization (ILO) was founded in 1919 in Geneva, Switzerland under the League of Nations to promote international Labour standard and improvement of working conditions. The ILO programmes, as well as international labour Standards in the form of conventions and recommendations, were approved and adopted by the annual international Labour Conference held in Geneva. The Conference consists of two governments, one employer and one worker representative from each member states (Reich and Okubo, 1992, p. 236). Hence ILO is said to be a tripeptide body made up of representatives from governments, employers and employees (Asogwa, 2007, p. 4). The International labour Office with regional offices in Africa, Asia, Europe, Latin America, the Middle East and a number of governing body execute the programmes under supervision of the governing body, half of whose members were elected from governments and a quarter from employer and worker groups (Reich & Okubo 1992). ILO's health work included safety and health of all types of workers especially from chemical and other industrial risks, hygiene of seamen, social and medical insurance systems and workmen's compensation. In compliance with multidisplinary approach, it collaborates with the World Health organisation (WHO) in holding a number of Joint

Expert Committee meetings in the field of occupational health and safety and publishes inter alia International Medicine guide for slips and ship sanitation.

The International Programme for the Improvement of Working Conditions and Environment (known as PTA PIACT) activities, emphasize that the improvement of occupational safety and health and working conditions should be considered as a complex problem in which various factors are interrelated, such as protection against risks in the working environment, adaptation of work processes to the physical and mental capabilities of workers, improvement of work schedules and job content (ILO, 19984, Copper, 1990). A multidisciplinary approach is stressed.

3.8 The World Health Organisation (WHO)

The World Health Organisation (WHO) is the specialized agency of the United Nations founded in 1948 with headquarters in Geneva Switzerland. It has the responsibility for global health. Its major role in the field of occupational health started with the report of the First Joint WHO/ILO Committee on occupational Health in 1950 which stated the purpose of occupational health as follows (Asogwa (2007:p.5).

> "Occupational health should aim at the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations; the prevention among workers of departures frown health caused by their working conditions the protection of the workers in their employment from risks resulting from factors adverse to health, the placing and maintenance of the workers in an occupational environment adapted to his physiological and psychological

equipment and to summaries; the adaptation of work to man and each man to his job".

Occupational health, as in other areas of Public Health, lays emphasis on preventive medicine. Occupational health practice is comprehensive. Some of the preventive measures could only be achieved by safe working environment, other conditions that encourage and promote healthful living; and ergonomics in machine design and operations (Reich and Okubo, 1992).

3.9 Future Trends

The major goal for occupational health is to promote and maintain the highest level of physical, mental, social and emotional health of all workers. In practice, this goal is only beginning to be realized in selected work places. Nevertheless, it is a worthy investment and an essential objective in the realization of a productive working community (Allender and Spradley, 1992).

The rapid and fundamental changes in businesses in the 1990s have added three critical issues that affect the occupational health practice. First, increasing worldwide competition requires business to remain competitive by reducing and/or controlling operating costs at the lowest level possible. Secondly, there has been an increase in technological hazards that require sophisticated approaches as well as knowledge of toxicology, epidemiology, ergonomics and public health principles. Third, health care costs continue to escalate at faster rates than most company profits (Vail, 1997).

Until the late 1800s, agriculture was the main industry in both developed and developing countries. Now, the trend, especially in United States and in Nigeria is towards the service industries. This demands an increase in the

number and proportion of service workers.

The environment - both physical and social, is also changing. Today's worker is exposed to various air and water pollutants over extended period of time; to food additives and preservatives, to complex laundry and cleaning compounds and to many other hazards. Industrial workers came into contact with many new substances utilized in processes. Many workers come to work with all kinds of psychological and physiological tendencies to certain kinds of health problems such as alcohol and drugs. Many workers are emotionally or physiologically dependent on certain drugs and some may combine drugs with alcoholic beverages thereby compounding the original problems. Many come to work with alcohol already in their systems. They drink because of stress from inner conflicts or problems either at home or in their work environment.

Current occupational health nurse and community health practitioners practices will continue to evolve to meet future needs. The focus will shift from one-on-one health services to a new role involving broader business and research skills. Future role will involve:

1. Analysis of trends (health promotion, risk reduction and health expenditures).
2. Developing programmes suited to corporate needs.
3. Recommending more efficient and most effective in-house health services.
4. Determining cost-effective alternatives to health programmes
5. Collaborating with others to identify problems and propose solutions.

4.0 Conclusion

The origin of occupational health in developed and developing countries has been attempted. It furnished you with the ideas and conditions of workers' and their relationship with their employers that led to the development of occupational health services. The overall aim is to prevent and control those occupational hazards that cause high morbidity and mortality among workers and then limit their productivity.

5.0 Summary

In this unit, you have learnt that:

- Occupational health originated in Britain as a result of industrial revolution by the workers.
- The health of workers was seriously affected with hazards from their occupation.
- International organizations contributed to the protection of the health and safety of workers.

6.0 Tutor Marked Assignment

1a) Name 2 International Organizations that featured prominently in development of occupational health.

b) Discuss the role of those international organizations in the protection of health and safety of people in the occupation.

Answer to Exercises

1a. The International Labour Organization and the World Health Organization.

1b. Workers in different occupations were exposed to poor and unsafe

working conditions. Majority of these workers were youths, women and children. Most of them were inexperienced and unskilled in the type of occupation they were employed. Rapid introduction of new industries, invention and application of new tools for mass production exposed the workers to serious health problems. The problems included various occupational diseases, serious accidents and other hazards. The problems were made worse by existence of endemic diseases such as malnutrition, cardiac and respiratory diseases, arthritis and many others. Many workers died in their thirties and forties. The employers paid no attention to all the complaints and safety of workers. This resulted in development/introduction of occupational health to ensure the health status of workers in any occupation is protected, maintained and promoted.

7.0 Further Reading And Other Resources

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Unit 2: Basic concepts in Occupational Health

Table of Content

1.0 Introduction

The unit describes briefly some of the key features of the basic concepts that make up Occupational Health. It discusses the rationale as well as the aims and goals for which Occupational Health was set up. It further examines the effects of Occupational Health on both the employer and the employee. The need for occupation health was also explained

2.0 Objectives of the Unit

By the completion of this unit, you should be able to:

1. Define Occupational health
2. State at least six aims and objectives of Occupational health
3. Explain the rationale for establishing Occupational health
4. Describe generally the benefits of Occupational health
5. Explain the relationship between work and environment.
6. Describe the effects of work on health.
7. Describe factors that affect successful Occupational health
8. State the needs for maintenance of Health in industries.

3.0 Main Content

Occupational health is a means of protecting and maintaining the physical, psychological and social health of workers and their families. It can also be viewed as the study of factors or conditions influencing the health and well being of workers not only in the place of work but also at home with the aim of promoting health, safety and welfare of the workers and their family. The joint International Labour Organization (ILO) and the World Health Organization (WHO) constituted in 1950 and revised in 1995, defined Occupational Health as the "promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupation". ILO further summarized Occupational Health definition as the "prevention of departure from health among workers caused by their working conditions; the promotion of workers in their employment from risks resulting from factors adverse to health, the placing and maintenance

of the worker in occupational environment adapted to their physical and psychological well-being; and the adaptation of work to man and man to his work. Dr. Yakemi describe it as the health investment for workers to help them spend their working lives in a healthy way both mentally and physically and enable them enjoy better health in latter life as well. It is the sum total of all the activities and programmes that are aimed at preventing, protecting and maintaining the highest level of health and safety among workers in any work environment which can be industrial, non-industrial or private or organizational.

3.1 Goals of Occupational Health

The goals of occupational health are to*:*

1. Describe the meaning of Occupational Health.
2. Ensure that the physical and mental demands of the job matches the anatomical, physiological and psychological capabilities of the individual worker meant for the job.
3. Identify work hazards that occur in the work place/environment.
4. Identify potential, physical, chemical, biological, ergonomic and psychosocial stressors in a variety of work environments.
5. Explain the industrial legislations enacted in Nigeria for the protection of health and welfare of workers.
6. Explain ways of protecting the working individuals from any health hazard in their work environment.
7. Describe the role of Occupational Health team members and the role of the nurse and the role of community health practitioners in protecting and promoting the health and safety of workers.
8. Provide health education and rehabilitation services for workers who

have emotional, physical injuries and psychological problem.

9. Provide information on the benefits of occupational health.
10. Promote and maintain the highest degree of physical, mental and social well-being of workers in work environment.
11. Prevent workers from departure from health due to the health and other conditions arising from the type of job they perform.

3.2 Rationale for Occupational Health

Reasons supporting the establishment of Occupational Health are deduced from the sufferings of workers in the process of performing tasks in their respective occupation. Man's working years are mainly spent in work environment which has subjected man to untold pain and suffering.

In developing countries including Nigeria, people were living in the vicious cycle of poverty and disease. This brought about establishment of various industries for economic progress to break the cycle of poverty and disease. As productive instruments, factories of all kinds started emerging in great numbers with increasing diversity of both processes (Reich & Okubo, 1992). The products became more and more obvious. The invention and application of new tools and introduction of new machines for mass production brought about untold pains, and health problems not anticipated. Examples of such problems included respiratory, renal and gastrointestinal problems. As workers were the main survival of industrialization, their health became a priority to the nation especially in developing countries like Nigeria where health implications were felt much. The health risks were aggravated by endemic diseases such as malnutrition, warm infestation, bacteria and parasitic infections along with problems of migration from

rural to urban indiscriminate employment of vulnerable groups and hazards associated with rapid introduction of new processes and products. A part from human and materials loss, working time and economic lost were much.

The increasing use of chemicals in industries and agricultural production created new hazards for the workers. The resultant ugly health problems and their consequences became more and more obvious. Yet, Occupational Health hazards have rarely received priority attention from policy makers.

What made the matter worse was that many employers ignored the problem or even denied the existence of health problems to workers. This was because labour was plentiful; people seeking for job were numerous. A disabled worker could easily be replaced, wages were very low. This seemed to encourage industrial owners and managers to neglect safety (Auton, 1979). Accidents were believed to be inevitable and so were regarded as an "act of God". The outcome of these was enactment of industrial legislation such as Factory Acts and Workmen's Compensation Acts for the survival of workers, prevention and control of industrial health hazards, accidents and other illnesses.

3.3 Benefits of Occupational Health Promotion

Generally, the introduction of Occupational health in industries and other occupations can benefit every body especially the management, the employers and the employees. The workplace is an ideal setting for promoting the health and well being of the employees and the employers. This is because a large number of the population spends greater number of their time and energy at work environment each day. In essence, the work place is the second home for any employer. Also Occupational Health is

meant not only for the worker but is extended to the family members and the entire community directly or indirectly. When the employees are healthy physically, emotionally and psychologically the atmosphere within the occupational setting becomes encouraging, relaxed and inviting. The productivity increases, the company stands better chance of growth.

Introduction of Occupational Health into the companies reduces items of loss and cost reduction due to absenteeism as a result of illness and accidents. Through Occupational Health, conditions that cause illness and accidents are far more reduced if not prevented. The benefits of Occupational Health at work settings could be summarized thus:

- Improvement of worker's health behaviour due to relaxed atmosphere in the work setting.
- Improved worker's health.
- Improved workers moral and job-satisfaction.
- Improved workers efficiency and productivity.
- Lower sickness rates, lower accidents and injury rates.
- Reduced absenteeism, reduced labour turnover.
- Reduced health cost to the employee, the management and the employers.
- Improved corporate image and industrial relations.
- Lower compensation for occupational illnesses and injuries.
- Improved intra-personal and inter-personal relationship within the companies, the family and in the community.

3.4 Occupational Health Benefits to Industries and Other Occupations

The benefits to industries and other occupations are many.

- It brings to light the nature of the occupation, the type of material they produce and benefits of the industry to the general populace.

  There is labour turn over.

- It reduces industrial item production loss due to employee absenteeism due to illness or accidents.

- The chances of liability compensation by employers for occupational illnesses and accident and injuries, including deaths is reduced if not entirely controlled. This is because when employees are healthy, the productivity is high, and cost benefit to the employer is increased. A sick and unhealthy worker is a problem to the employer because: it causes absenteeism; increased cost of treatment; reduction in work force and more importantly it causes damages to the industries/occupations. (Achalu, 2000). For example, a sick employer in the bank can make a mistake of over payment or create poor relationship with customer; or a sick employer in agricultural setting is likely to cause crop destruction while a sick health worker is unlikely to attend to sick clients adequately thereby causing long hospitalization and death.

3.5 Relationship between Work and Health

The knowledge and understanding of the relationships and interactions between work and health is important in the practice of occupational health and safety. Both work and health positively and negatively affect each other. Work is supposed to be a means of economic

survival and source of satisfaction and happiness where properly planned and executed. It also provides for social status and companionship as well as shared responsibility. But on the negative aspect, it can result to stress, dissatisfaction and threat to employee's health and well being and their attendant morbidity and death. It means that work has effect on health and vice versa. The working environment and the working conditions can positively or negatively affect the employees' health protection and health maintenance. Also, the workers health can affect his or her performance and productivity depending on environmental dispositions and the nature of occupational organisation and policies. Poor health reduces productivity and worker's efficiency.

3.6 Effects of Work on Health

There are many benefits that can be obtained. Achalu (2000) listed them as follows:

- Work serves to relieve boredom
- It provides avenue for creativity
- It serves as means of personal/economic gain and means of livelihood
- It contributes to life satisfaction and happiness.
- It serves as source of challenge for human growth and development
- It creates opportunity for socialisation and companionship.
- Good health increases capacity to work
- It increases capacity to enjoy work
- It increases capacity to desire satisfaction at work.

- It promotes productivity and increases worker's performance.
- It encourages emotional and psychological satisfaction
- It reduces stress and promotes intra and interpersonal relationship in

the work setting.

- It increases alertness to danger.

Exercise 1:

1. List and explain five aims and objectives of occupational health
2. Briefly discuss the relationship between work and health.

3.7 Negative Effects of Work on Health

The negative effects of work on health form the basis for OH both in developed and developing countries. The nature, situation and conditions of work determines the type and nature of occupational hazards (diseases and accidents) prevalent in a particular occupation/industry. Even the work processes, products and bye products can constitute a health hazard to the workers, their immediate families and their neighborhoods (Achalu, 2000). The hazards can affect many organs of the body causing some pathological changes that can threaten the health and well-being of workers. The threat can result in physical, mental, social and behavioral changes and even death if prompt treatment is not instituted. This is why it is very necessary for occupational health practitioners to have thorough knowledge of the hazards associated with each occupation for quality care provision and accuracy in diagnosis. The workers should also be well educated on the hazards in their particular occupation. This will enable them take precautionary measures and then comply with the occupational safety measures provided for them.

The specific effects of poor health include the following:

1. Poor health is a hydra that erodes the company growth and productivity.

2. It leads to poor disposition of workers and their capacity to function effectively at work.
3. It leads to poor performance of the employees
4. It reduces productivity due to absenteeism from illness.
5. It contributes to risks for the workers and to other members of entire family.
6. It causes company to pay compensation to the injured worker.
7. It brings about stresses and low moral to both work and the employer.

3.8 Factors Affecting Occupational Health

Many factors have affected the successful outcome of Occupational Health especially in the developing world countries.

1. Lack of geographic accessibility of Occupational Health services adversely affects efforts to improve Occupational Health conditions of workers in majority of cases especially where the occupation is in a remote area.
2. The system of public roads and transport services in most developing countries are inefficiently provided especially in Nigeria. This situation makes it very difficult to reach workers located in rural or small towns far from big urban centers. Many of these workers operate in terrible conditions.
3. The quality and quantity of health services affect Occupational Health conditions.
4. The persistence of poverty in most countries remains a fundamental determinant of Occupational Health conditions. In majority of cases people in developing countries do not have access to essential necessities of food, housing, public services, clothing and safety

required for survival.

5. Income is associated with level of education. The lower the educational level, the lower the wages.
6. Poor nutrition generally affects worker's health. Some workers find it difficult to fulfill their minimum nutritional necessities even if they spend their entire take home pay on food only. For example, some studies carried out in the Province of Colombia by Farcadas (1984), it was found that the caloric requirements for workers in textile industries and metal-working are $3{,}500_{kcal/day}$, for construction workers more than $4{,}500_{kcal/day,}$ and for agriculture and mining workers $5{,}000_{kcal/day}$. Some 30 percent of the study population had caloric intake of less than $2{,}500_{kcal/day}$; 40 to 50 percent had an intake of about $2{,}700_{kcal/day}$; and the rest had an intake between 2,700 and $3{,}100_{kcal/day}$. Very few people had intakes over $3{,}100_{kcal/day}$. This created a vicious cycle; for malnutrition becomes reflected in both health and work output which in turn results in lower wages which make it more difficult to buy food.

3.9 Needs for the Maintenance of Health in Industrial Communities

The following strategies stand (Asogwa, 2007).

1. Treatment and prevention of epidemic and endemic communicable diseases, and provision of adequate housing, environmental sanitation, nutrition and social services, including health education of workers and management.
2. Prevention of occupational injuries and diseases, including the mechanical, chemical and biological risks in modern agriculture.
3. Planning and organisation of medical care; including services for

small or dispersed working groups.

4. Initial and further training for all types of health staff, ensuring an emphasis on preventive and curative services.
5. Introduction and enforcement of statutory minimum standards of health, safety and medical care in industry.

4.0 Conclusion

The unit has described briefly some of the essential concepts that are involved in Occupational Health. It gives you information regarding reasons for introducing Occupational Health in work environments. At least to protect and promote the health of workers. The unit further discussed the effects and benefits of work to the employers and the employees as well as the factors that affect successful introduction of Occupational Health and the needs for Occupational Health maintenance for efficiency in occupational output and growth.

5.0 Summary

In this unit, we have learnt that:

1. Occupational health is the sum total of all the activities and programmes aimed at preventing and protecting the health and safety of workers.
2. Rationale for occupational health is the affliction of workers with numerous health problems in work environment.
3. Everybody, including employers, workers and management stand to benefit from introduction of occupational health in various ways.
4. There are positive and negative effects of work on health.
5. Various factors including inaccessibility of health facilities, persistence of poverty affect occupational health.

6.0 Tutor Marked Assignment

1a. What is occupational health?

1b. State 4 benefits of occupational health promotion in occupational settings.

7.0 Further Reading and Other Resources

Achalu, E.I. (2000). Occupational Health and Safety. Lagos: Simarch Nigeria Limited: Splendid Publishers

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UNIT 3: Occupational Health Problems

Table of Content

1.0 Introduction

The unit exposes you to the nature of occupational health problems workers face in their work environment. It is a fascinating study that informs you of the type of occupational problems that can occur in diverse occupations such as industries/factories agricultural settings, educational institutions, health institution among others. The unit also discusses the

factors that contributed to the problems, the preventive measures and the type of management that could be provided by the health professional to ensure survival of the employees.

2.0 Objectives

At the completion of this unit, you should be able to:

1. Explain the meaning of occupational health problems.
2. List the types of occupational health problems commonly seen in different occupations.
3. Explain how working conditions contribute to employees' increased risk for health problems.
4. Describe the factors that contribute to the health problems.
5. Explain the preventive measures to health problems.
6. Discuss the management of the common health problems in the work environment.

3.0 Main Content

The occupation or the nature of work performed by a person exposes him or her to health hazards associated with that occupation. Diverse occupations exist. They include traditional manufacturing industries (automobile. automotive and appliances); service industries (banking, health care, and restaurant); education, agriculture, construction, mining, and newly high technology firms like computer chips manufacturing companies and many others. Each of these occupations has peculiar health hazards associated with it. These health hazards interact with numerous nutritional, hygienic, microbial and social factors in the worker's environment to

aggravate their effects on health. There is also interaction between work hazards and chronic diseases such as malaria, diabetes, hypertension and cancer. Types of health problems include Labour accident, occupational diseases, chemical hazards and many others. The figures are uncertain due to reporting irregularities. The hazards seriously affected the health of the employees and invariably their productivity. Death tool was much and morbidity very serious. The employers paid no attention to the sufferings of the employees. This brought about the provision of occupational health services to alleviate the sufferings of the employees and to provide preventive and management services for the welfare of employees.

3.1 Definition of Occupational Health Problems

Occupational health problems can be regarded as diseases, accidents and other hazards arising from the work environment or situations that arise in the attempt to perform tasks in any occupation. It is a compensable disease that arises out of and in the course of employment (Henderson and Nite 1978, p. 243). The definition hinges on the condition that entitles the worker to compensation from the employer.

3.2 Types of Common Occupational Health Problems

Types of OH problems being treated in an industrial clinics and hospitals depend on the diseases and health hazards obtainable in a particular industry or occupation because each industry/occupation has its own peculiarities (Asogwa, 2007). Health problems commonly noticed in American but also seen with industrialization in developing countries like Nigeria include

- Occupational lung diseases (including lung cancer,

pneumonoconioses, and occupational asthma)

- Musculoskeletal injuries such as back injuries, neck injuries, arthritis, vibration problems and white finger diseases.
- Occupational cancers (other than lung cancers).
- Traumatic deaths, amputations, fracture and eye loses.
- Cardiovascular diseases (including myocardial nifarction, stroke and hypertension).
- Reproductive health problems such as prematurity, abertica.
- Neurotoxic illnesses
- Noise induced hearing loss
- Dermatologic problems (including dermatoses, burns, and lacerations).
- Psychological disorders.

(Source: National Institute of Occupational Health and Safety quoted by Achalu (2000, p. 31).

The list and figures according to Reich and Okubo are not certain because of reporting irregularities. But they confirm the existence of serious and increasingly diversified problems. For example an estimate proved that the world's acute pesticide poisoning recorded in the third world countries is as a result of chemicalization of agriculture.

3.3 Occupational Health Problems in Industry

Workers in industries do face numerous occupational health problems. Such problems seriously affect their productivity and life span. The main problems include: Problem of social and environmental pollution, air pollution, noise pollution, ergonomic and chemical pollution.

1. Social and environmental health problems. They include increases in migration of both skilled and unskilled workers from rural to urban centers causing overcrowding and environmental pollution. The migration results in unemployment, poverty, lower standard of living delinquent behaviour such as abuse of drugs and alcohol, prostitution, robbery, and psychological problems among others. These outcomes bring about stress, anxiety and their implications. Apart from environmental pollution, there is problem of poor housing, overcrowding, poor working conditions and malnutrition.
2. Traumatic injuries are common especially where protective measures are not taken seriously. Most known injuries include musculo-skeletal injuries, traumatic amputations, bruises, lacerations. These do cause serious set-back in the industries concerned. There could be lost of economy due to absenteeism and poor productivity.
3. Air pollution is a serious health problem of industrialization. Apart from contamination of air and the entire environment through automobile and industrial fumes, it introduces harmful pollutants from the exhaust of internal combustion and diesel engines. The pollutants affect the entire body organs and cells causing such risk conditions as cancer, degenerative and chronic diseases including irritation of respiratory and cardiac problems, loss of visibility leading to accidents (Achalu, 2000). Air pollution also affects the plant growth negatively resulting in poor food production and nutritional problems such as malnutrition and anaemia. The end result being morbidity and mortality.
4. Excessive noise pollution: Noise is a form of energy that is transmitted through the air as waves with varying pressure (Achalu,

2000, p. 28). Noise is measured in decibels. The lowest sound, the human detects is one decibel and the highest is 150 decibel which is damaging to the ear. Example of industries that can produce loud noise include: automobiles, milling/grinding machines, panel beating workshops, stereo equipment workshops, generator producing industries and many others. These industries produce serious health problems which are often neglected. Problems from the noise include poor hearing, loss of concentration, irritation, fatigue, restlessness and in serious cases loss of hearing.

5. Excessive temperature and humidity in industries have their own problems. This occurs in industries where the industrial processes make atmospheric control difficult. Examples of such industries are textile mills, laundries, breweries. The resultant problems include eye inflammations, respiratory and gastro-intestinal problems and even exhaustion resulting from atmospheric extremes.
6. Poisonous - harmful substances other than gases and fumes can be present in industries to cause problems. Chemicals used in industrial plant operations can act as poisons to cause harm to the skin. Chemical chronic poisoning can occur in workers improperly handling materials in routine operations without protective measures.

3.4 Occupational health problems in Health Institutions

Health workers in health institutions (hospitals, clinics, health centres etc) are faced with numerous health problems which impact seriously on their status. The hospital environment by its nature is full of hazardous problems. The problems could be classified into endogenous and exogenous (Asogwa, 2007).

a) Exogenous problems are such that were brought into the hospital environment by the health worker suffering from such a condition such as tuberculosis, Human Immunodeficiency Virus (HIV), chicken pox and other conditions that have long incubation period and can not be diagnosed early for preventive measures to take place.

b) Endogenous problems are those acquired within the hospital from patients, patients' relations or even from workers. Example of such problem include hepatitis B, HIV, other blood sera (that is hazards due to exposure to infected blood and other body fluids), other problems include protozoa infections such as malaria parasites. The hazard could occur through needle stick injuries, lacerations from razor or Lancet or scalpel blades that were infected and other sharp instruments.

c) Hazards resulting from radiation such as x-rays used for radiotherapy. This can result in radiation injuries like cancer. This is seen mostly in workers in x-ray departments where radio-active substances are used for therapeutic purposes.

d) Problems due to exposure to communicable diseases such as tetanus, chickenpox, and other blood borne pathogens. This is a major concern when caring for infected patients. The presence of resistant organisms causes extra concern and makes treatment difficult. Workers who have frequent contact with blood and blood products and those engaged in intravenous therapy have a special risk for exposure to hepatitis B.

e) Problems due to exposure to food and water borne diseases include diarrhea, gastroenteritis, caused by schistosomiasis, salmonella's

organisms. These problems occur due to contamination of food and water within the environment of the health institution.

f) Problems resulting from hazardous chemical agents do occur. Anaesthetic gasses can increase the risk of spontaneous abortion in pregnancy; maternal illness and death in severe cases and the risk of foetal malformation or death in severe cases. Chemotherapeutic agents used in the treatment of cancer are extremely toxic.

Contact with many drugs, especially antibiotics during preparation and administration may cause the health worker to develope sensitivity. This can cause transitory problems such as hand and skin rashes and other undesirable effects. Cleaning agents and disinfectants used in hospitals can cause some hazards if not properly used.

g) Back and joint injuries are common occupational problems among hospital workers. These problems interfere with the working life of people. They occur due to improper body alignment before and after lifting patients and equipment.

h) Other problems include occupational stress which may be due to pressure of work, shortage of personnel, interpersonal relationship with other staff or with supervisor or with patients or patients' relations or even with self. There could be physical attack from violent and emotionally unstable patients; burn outs due to pressure of work or other various psychosocial stresses at work.

Health workers mostly at risk of health problems include doctors, nurses, laboratory staff, radiographers, mortuary attendants, cleaners, physiotherapists community health practitioners and many others. The major sources of the health problem could be hospital wards, hospital

clinics, theatres, laboratory, mortuary and other areas where patients are being treated and blood and other body fluids and specimens are taken for investigation.

3.5 Occupational Health Problems of Agricultural Workers

In developed and developing countries including Nigeria, agricultural work is the main occupation for majority of the people. The type of agricultural work varies and ranges from mechanized to non-mechanized farming. The activities involved included: clearing the ground, planting, weeding, harvesting, and processing, among others. Then for animal husbandry it involves breeding, raising and caring for animals. The health problem can occur from any of the activities and could be grouped into general and specific health problems. The general problems include: cardio-vascular, respiratory, nutritional problems and accidents.

Specific problems are those connected with various agents of diseases such as physical, biological and chemical hazards (Achalu,2000). Biological hazards include zoonosis or diseases transmitted by animals during caring and handling of animal products and wastes. Examples of such health problems include: anthrax, brucellosis, bovine tuberculosis, laser fever, rabies, bird flew and many others. These problems arise during planting, harvesting and primary processing of all types of crops as well as problems arising from breeding, raising and caring for animals, tendering market gardens and nurseries.

Parasitic diseases transmitted due to contact with polluted water in farm lands and poor sanitary conditions of agricultural environment include: hookworm disease (ankylostomiasis), schistosomiasis especially in irritant and riverine farm lands, tetanus, sleeping sickness, malaria, skin rashes and

many others.

Allergic diseases do occur due to inhalation of vegetable pollen dusts, animal dusts, organic chemicals and reaction to certain food substances. Such diseases include asthma, byssinosis from cotton dust, bagassosis from sugar cane bagasse, allergic conjunctivitis from rubber, dermatitis from wood dust, and allergic skin reaction to certain grasses and chemicals.

Physical problems do occur as a result of exposure to prolonged heat and sunlight, noise from farm machinery, dust and fumes, puncture wounds from sharp instruments and woods, cuts, bruises and lacerations. These can cause severe preventable diseases like tetanus, bacteria infections and gangrene of the wound. Other problems include backache resulting from prolonged bending, heavy load and wrong posture. Accidents and other injuries do occur and they can result from liquid or gas splashing, electrocution due to electrical faults, falling from height such as palm trees, mango trees, tractor accidents, and so on.

We also have records of stings and bites such as human bite, snake bite, dog bite, scorpion bite and many others. When the stings and bites occur, the treatment is always an emergency in order to save life and protect the individual. Human bites do occur over ownership of farm, and it is the most dangerous if treatment is not taken at once.

Social problems include: low income, poverty, lack of healthcare and health facilities, water borne diseases like diarrhoea, cholera, schistosomiasis, dysentery, parasitic problems like hook worm, tape worm, and other water borne diseases got from polluted stagnant dirty waters in the farm land as well as sanitary conditions (Achalu, 2000). Food poisons also do occur either as a result of contamination at the harvesting or preparation or servicing or even eating with soiled hand or contaminated plates and

cutleries.

Work place violence is a serious cause of health problems. It may occur over ownership of farm land or economic trees. This can cause interpersonal or even communal violence, body injuries and death in severe cases.

3.6 Health Problems of Education Institutions

Educational institution (primary, secondary and tertiary) is purely a learning institution where teachers and students interact. The proprietor of the school is the employer while teachers and students are regarded as employees. Both teachers and students are exposed to various occupational problems. Teachers face such problems as:

- Accidents - might occur resulting in injuries like falls, chalk board dropping from the wall or knocking the feet against had objects.
- Infections can occur. It could be transmission from infected student or from the school environment through the use of infected animals for practical demonstration or contaminated environment e.g. chickenpox, measles,
- Needle prick injuries occurring during practical demonstrations on how to inject animals or vaccination and immunization of animals.
- Varicose veins in severe cases resulting from long standing and pressure.
- Respiratory problems due to inhalation of chalk particles and particles from dust within the school environment.
- Dehydration due to talking, heat on radiation, convention and conduction of heat.
- Electrocution due to faulty electrical appliances in the school premises and in the offices. It can occur during laboratory demonstrations or

even during teaching process.

- Loss of voice due to strains on the vocal cord during long period of talking in large classes. The teacher has to try to increase the volume of the voice while teaching to carry the class along.
- Anxiety and its implications like hypertension, other cardiac anomalies resulting from strains and stresses in school. The stress can be caused by the pressure of work; from students especially with stubborn students; from, employers, from self due to inner tensions from inability to fulfill one's desires, stresses from work overload; generated by caring for students and their personal problems; poor remuneration and irregular payment of salary.

Other causes of anxiety and stresses include organizational structure of the school, job insecurity facing teachers; students parent intrusions, relationship with school workers and co-teachers as well as relationship with supervisor. Most importantly poor knowledge and skills to teach. Other causes of emotional dissatisfaction include back pain, frequent headache, pains and disabilities, and other illnesses.

The health problems of the teacher can cause absenteeism and decreased productivity, poor learning and poor students' performance. Indirectly this could cause poor academic and administrative growth of the school.

3.7 Factors that Contribute to Health Problems of Workers

The factors that contribute to worker's problems in occupational setting include: biophysical, psychological, social, behavioral and health systems (Clark, 1999).

Biophysical

Human biological factors are those related to maturation and aging,

genetic inheritance, and physiological functions (Clark, 1999). Maturation and aging: The age compositions of workers in occupational settings do affect their health. If the employees are mainly adolescents and young adults, health problems likely to occur with some frequency included: sexually transmitted infections like syphilis, gonorrhea, HIV; pregnancy, hepatitis, drug abuse, alcoholism and other social vices. They may also be at increased risk of injury due to their inability to settle down for work; limited job training, and skills, lack of experience, experimentation, impatience and inability to concentrate.

The health problems that may be noticed among the middle aged employees are: heart problems like hypertension, stroke, palpitations, renal problems and cancers in most cases. They may also be at increased risk of mental depression, anxiety, and other emotional problems due to pressure of work in the families, work environment and in the society.

Health problems that may occur in elderly employees over 65 years of age are reduced capacity to function, problems of muscuoskektal system, sensory impairment, poor coordination, frequent high risk occupational accidents and dementia. Factors that influence their continued desire to remain in the employment may be associated with economic constraints, loneliness and many personal problems. Another contributory problem is a situation where there is shortage of skilled manpower and inability of employers to enforce prohibition on retirement at specific age.

Genetic Inheritance

Genetic inheritance factors likely to be of great importance in the workforce are those related to race, gender and genetic inheritance like sickle cell

disorder. For example, in a large African American Labour force, hypertension may be prevalent. In an Asian population particularly if large numbers are refugees, communicable diseases such as Tuberculosis and parasitic diseases may be common (Clark, 1999).In underdeveloped countries like Nigeria, labour force hypertension and mental stresses may be prevalent.

The sex composition of the employees do determine the types of health problems that may occur: For example, if large numbers of employees are women of child bearing age, there is need to provide pre and post natal services, monitor more closely environmental conditions that may cause genetic changes or damage to unborn child causing malformations and death; monitoring for infertility, spontaneous abortion, low birth weight, pre and postmaturity, birth defects, chromosomal abnormalities, preeclampsia and an increased incidence of childhood cancers (Clark, 1999). If an employee has genetic inheritance like sickle cell disorder, there is need to provide an environment that discourages precipitation of painful crises such as adequate ventilation, assignment of less strenuous jobs and environment free of dust, and fumes and smokes. Monitoring for conditions that can precipitate bone pain crisis and provision of facilities for treatment of crisis before reaching the clinic for management.

Physiological Functions

Conditions prevalent in occupational settings include traumatic injuries, lung diseases, cardiovascular problems, renal problems, neuro-toxic disorders, cancers, skeletal problems, injuries of all kinds, sensory impairments and many others. These health problems are related to the work environment, personal behaviours of employees within and outside the work environment. Other problems that may occur are the out breaks of

dermatologic conditions that indicate the presence of hazards in the work environment that need control measures. They include: variety of rashes, pruritus, chemical burns and desequemation. These dematiologic problems affect seriously the production capacity and loss of income to the company. Psychological problems of anxiety and stress may manifest as a result of stressors associated with work overload, the organizational structure of the company/occupation, job insecurity, interpersonal and intrapersonal relationships with co-workers or employers or supervisors and attitudes of racial or ethnic discrimination in workplace. Other sources of stress most frequently identified by workers include: lack of control over the contents, processes and pace of one's work; unrealistic demands and lack of understanding by supervisors; lack of predictability and security regarding one's job and future; and the cumulative effects of occupational and family stressors. Employers most often perceive employee's lifestyles, and health habits as the primary contributors to stress.

The Physical Dimension

Physical environmental factors contribute to a variety of health problems employees' face in the work settings. The categories of the health problems include: chemical hazards, physical hazards such as radiation, noise, vibration and exposure to extremes of heat and cold; electrical hazards, fire, heavy lifting and uncomfortable working positions, and potential falls (Clark, 1999).

With poor lighting or high noise levels, the employee may face the adverse effects of vision and hearing respectively. Heavy objects that must be moved may cause musculoskeletal injuries, hernia and potential for falls

and exposure to excessive heat or cold in many workplaces.

Other factors related to physical environment is the use of toxic substances in work performance which may be inform of solids, liquids, gasses, vapors, dust, fumes, fibers or mists (Clark 1999 quoting California Occupational Health Programme, 1992). The toxic substances can cause respiratory, dermatologic and other health problems. Heavy metals like lead can cause lead poison. Other metals of concern include mercury, arsenic and cadmium. Areas to be assessed for the presence of heavy metal potentials for toxic exposure in the work settings include substances used in setting and their levels of demonstrated toxicity, portals of entry into human body, established legal exposure limits, extent of exposure, potential for interactive exposures and the presence of existing employee health conditions that put the individual affected at greater risk of exposure-related illnesses.

The use of heavy equipment or sharp tools can cause occupational injuries. It can also cause hand-arm vibration syndrome especially in using tools that vibrate or visual disturbances related to the use of computer display terminals. Another recent hazard discovered generated by widespread computer use is the potential for tendinitis and other similar conditions stemming from the use of word processors. Extreme or awkward postures have been associated with low back problems and repetitive or high force movements with carpal tunnel syndrome.

Social Dimension

The social environment of the work setting can influence employee health status either positively or negatively. The nature of the influence depends on the social interactions among employees, attitudes toward work

and health and the presence or absence of racial, sexual or other tensions can all affect the health status of the employees and their productivity within the occupation.

Four spheres of influence in the workplace social environment do affect the health status of the employees. The first sphere of the influence is concerned with health related behaviours of employees; the second sphere of influence on health status occurs among groups of co-workers. The third sphere of influence is the management sphere such as attitudes toward health and health-related policies and the effects of the policies or their lack on employee's health status. For example, to value wellness and health promotive efforts they must perceive them to be valued by employers. The fourth sphere of influence involves legal, social and political action that influences the health of employees. An example of this is the regulation of conditions in the work environment by agencies such as occupational safety and health administration. Through legislations society can mandate that business and industry create specific conditions that enhance the health of employees; companies over a certain size should offer employees a health maintenance organisation as one option for health insurance coverage. The final social dimension factor in the work setting that is not currently compensable but is drawing increasing attention is workplace violence (Clark, 1999).

Behavioral Dimension

Life style factors to be considered include; the type of work performed, consumption patterns, patterns of test and exercise and use of safety devices. The type of work an employee performs within the work setting can significantly influence the employee's health; determines the risk of exposure to various physical hazards and level of stress experienced; it

influences the extent of the exercise employees obtain.

The consumption patterns of interest include those related to food and nutrition, smoking and drugs and alcohol use. The nutrition influence on the health status is well known. Smoking is harmful to health and may increase the adverse effects of other environmental problems particularly those that affect respiration. Over indulgence in substance abuses such as caffeine, may pose health problems to employees.

Rest and Exercise: occupational places do place many physical and psychological demands on the employees. These demands result to inadequate rest and recreation. Same problem is faced by employees who work constantly to ensure progress and those who keep other jobs in an attempt to make ends meet. Many occupations are recognizing that exercise provides physical and psychological relaxation, alertness and relieve muscle tension making it ready to work again. It reduces heart attack and injury and even sleep at work and accident. It causes better coordination, reduces hazards, accidents and better work output. These benefits have made employers of labour to promote physical exercises by providing activities for recreation in work settings.

3.8 Preventive Measures

Preventive measures to occupational health problems include:

- Pre-employment medical examination of all employees to rule out presence of any health problems and potential for hazard in the job.
- Immunization of employees at risk of infections such as tuberculosis, hepatitis B and HIV, where applicable.
- Periodic monitoring of all employees in all occupations especially those in high risk areas e.g. periodic x-ray examination of staff

working in x-ray units, or those working in lead producing industries, heavy metal industries.

- Regular inspection, of food preparation, servicing and storage facilities as well as inspection of food preparation environment.
- Ensuring the use of wholesome water for drinking and food preparation (pathogen free chlorinated water) to avoid water borne infections and making sure that water containers are free from contamination.
- General hygiene of the work environment especially that of the hospitals, schools and many others to avoid accidents and infection dissemination.
- Provision of safety devices such as eye gurgle, booth, helmet, lead apron and many others.

Exercise 1: Enumerate the factors that contribute to health problems of workers

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3.9 Management of the Health Problems

- All workers should be screened on employment and those found sick should be screened and treated properly. All those at risk of tuberculosis (TB), hepatitis B and HIV should be immunized and post immunization antibody response estimated after a stipulated interval to ensure positive result. Then such employee should be assigned to a unit in the workplace that is safe for him or her.
- All employees working in x-ray department or where there is risk of

radiation hazards should be posted to another section of the unit. Special precautions should be taken by all employees working in radiation areas or handling radioactive materials to avoid exposure above the threshold limit for a specific period. The standard required for safety must never be compromised and the use of dangerous and unsafe equipment should be avoided.

- All food handlers should be examined periodically and those sick should be treated and then allowed sick off to ensure quick recovery before handling food substances.
- Any incident of food or water poisoning should be properly investigated and precautionary measures taken to avoid further spread and occurrence. Those already affected should be screened and properly treated before resuming duty.
- The health worker should identify the presence of any health hazards in the physical environment that contribute to health problems and then ensure that such health hazard is removed by encouraging the employers.
- Nurses and community health practitioners who work in settings where such agents are prepared and administered should seek additional education regarding their administration, not only in relation to the client's safety but also in relation to personal safety (Asogwa, 2007). The hospital employer is responsible for providing the equipment to maintain safety when handling the agents.

The effects of known health hazards on the employee should be determined or lessened and treatment provided based on findings.

All employees with emotional and psychological problems or those experiencing uncomfortableness due to stresses in the work

environment should be monitored, counselled and guided on ways to solve the identified cause of stresses and effort made to remove the stressors. Health education on prevention of stressors and their management should be intensified. Those seriously affected should be allowed off sick and then followed up for proper treatment and rehabilitation.

4.0 Conclusion

Occupational health problems are limiting factors to the employee work output. It affects their productivity and reduces their life span if not protected on time.

5.0 Summary

- In this unit we have learnt that occupational health problem can be regarded as diseases, accidents, hazards arising from the work environment or health problems that employers face in performing tasks in occupational settings.
- Types of Occupational health Problems Commonly seen in different occupations; such as industries, health institutions, schools, agriculture and other occupations include accidents, infections, stresses, physical and mental instability. The factors that contribute to the health problems include biophysical, physical, and physiological among others. The preventive measures included monitoring to identify those at risk; immunization of those at risk of communicable diseases like tuberculosis, chickenpox, hepatitis B, HIV and others. Management of the affected employees included proper treatment of the sick ones; those working at x-ray department should be provided

with film bandages to ensure radiation free and then posted to another section where radiation is free. Employees suffering from food and water borne diseases should be screened and treated adequately.

- Employers suffering from stresses should be counselled and guided. The stressor should be identified and removed and health education provided on how to come off the stresses.

6.0 Tutor Marked Assignment

Define the term occupational health problem.

List the common general health problems in work setting.

Answer to Exercises

Biophysical

Psychological

Social

Behavioral

Health systems

7.0 References and other resources

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Unit 4: Occupational Health Diseases

Table of Content

1.0 Introduction

The unit introduces the learner to the nature of occupational diseases that could be contacted by the worker in the process of task performance within the occupational environment. The diseases could compromise the workers' health status as well as limit their life span. The magnitude of morbidity and mortality associated with such diseases is high especially if they become chronic and proper treatment not provided. According to

Stanhope and Lancaster (2001) each day an average of 137 individual workers die from work related diseases. The problem is that some of the diseases do not manifest early enough for treatment to be started. It could manifest when the worker must have retired, thus making it difficult to find the actual cause. For example, Silicosis can take up to 15 years to develop while some cases of Mesothelioma can only became evident 25 years after the worker was last exposed to asbestos. Lung diseases in workers occur gradually over time, continued Stanhope and Lancaster. All these made it impossible for early diagnosis and life saving measures to be instituted. The Unit also discusses the classification, causative agents, prevention and control of occupational diseases, reportable diseases, as well as the implications to both the employers and the employees.

2.0 Objectives of the Unit

At the completion of this unit you should be able to

1. Explain the meaning of occupational health diseases
2. Describe the types of occupational diseases
3. Explain the predisposing factors to occupational diseases
4. Describe the methods that can be used in detecting occupational health
5. Describe the prevention and control of occupational diseases
6. Describe the implication of occupational health to both the employer and the employees.

3.0 Main Content

Occupational health disease can be defined as a compensable disease contacted by the worker due to exposure to hazards in the work places. Adobe (1996) defined it as any condition arising from work place exposures

which compromises worker's physical, mental and social well-being. Asogwa (2007) defined it as diseases associated with particular processes or agents which the worker is exposed to in the course of his work. Osanyigbemi as quoted by Achlu (2000) defined occupational disease as those diseases which occur with characteristic frequency and regularity in occupations where there are specific hazards. It can also be explained as any chronic ailment that occurs as a result of occupational activities. By the definitions, it means that there must be interaction of the worker with the environment before the disease can occur.

3.1 Classification of Occupational Diseases

Occupational diseases can be classified in different forms. Classification put forward by Asogwa (2007) and Park (2002) is according to the target organ systems of the body and they include:

1. Occupational diseases of the respiratory system
2. Occupational diseases of the liver
3. Occupational diseases of the cardiovascular system
4. Occupational diseases of the Gastro-intestinal system
5. Occupational diseases of the Genito-urinary system
6. Occupational diseases of the skin or dermatologic system
7. Occupational diseases of the musculo skeletal system
8. Occupational diseases of the haemopioetic system
9. Occupational diseases of the physical agent.

3.3 Types of Occupational Diseases

The types are hereby presented according to the systems of the body being affected.

1. **Respiratory Diseases**

They are diseases that can affect the organs of the respiratory system such as the nose, nasal cavity, the trachea, the bronchus, and the Lungs. Such diseases include: acute inflammatory diseases, Rhinitis, pneumonia, asthma, pneumoconiosis, dyspnoea, cough which can be dry and productive, pleural plague diseases, cancers, farmers lung disease, anthracosis, silicosis, asbestosis, bagassosis, byssinosis, tabacosis and others. The diseases can cause impairment of air entry into the lungs by either narrowing the airways or producing ventilatory failures. Some of the respiratory diseases can causes permanent damage to the respiratory systems especially the lungs. They can gradually affect the worker by gradually reducing the working capacity thereby causing serious setback in industrial production.

2. **Occupational Diseases of the Liver**

Industrial or occupational diseases that affect the liver gain access into the body through the skin abrasions and alimentary track to the liver cells to cause the following disease hepatitis, cancer, hepatomegaly, multilobular cirrhosis of the liver, fatty degeneration of the liver, uraemia and so on.

3. **Occupational Diseases of the Cardio-vascular System**

They are diseases conditions that affect the heart and the blood vessels. Such diseases include: hypertension, anaemia, heart failure, angina pectoris, myocardial infection, stroke, leukaemia, arrhythmias, coronary heart diseases, other cardiac anomalies and many others. Most of these diseases incapacitate the workers especially the chronic ones.

4. **Occupational Diseases of the Gastro-intestinal System**

   Common diseases of gastro-intestinal track reported by workers included: diarrhoea, vomiting, typhoid, gastritis, gastric ulcer, constipation, cancer, gastro enteritis, oesophageal fistulae and many others. The diseases mostly occur through ingestion of substances, chemicals and through starvation or wrong timing of feeding.

5. **Occupational Diseases of the Genito-Urinary System**

   Common diseases affecting the system included: Cancers, diabetes mellitus, renal stone, renal failure, haematuria, kidney failure, typhoid fever, acute nephrosis, nephrotic syndrome and many others.

6. **Occupational Diseases of the Skin (dermatologic)**

   The diseases include: irritant contact dermatitis, allergic diseases, skin cancers, acne, skin pigmentation, and thickening of the skin, skin manifestation, thickening of the skin, skin manifestation of systemic toxicity, heat and cold damages, parasitic diseases such as mites. These are common diseases experience by workers in different occupations and they can be quite incapacitating.

7. Occupational Diseases of the Musculo Skeletal System

   They include: osteoporosis, muscular pains, and rickettsiae

8. Occupational Diseases of the haemopoetic system include leukaemia, anaemia, lymphopenia, thrombocytopenia and many others.

9. Occupational Diseases of the Physical Agent include dermatitis, e.g. allergic hypersensitivity, and non allergic irritants; inflammatory conditions, boils; Rhinitis,

3.3 Occupations that can Predispose Workers to Diseases.

Occupational groups from which workers can contact diseases are: industries, factories, service industries like health institutions, banks, educational institutions, agriculture, construction industries like road construction, and mining, catering and processing, hair dressing. Electrical industries, building and construction, leather manufacturing and many others.

3.4 Causes of Occupational Diseases

Pre-disposing Factors to Occupational Diseases

1. Lack of provision of protective (safety) devices by the employers of labour.
2. Inadequate or non use of safety devices by the respective worker. The non compliance to company rules can predispose the worker to various illnesses.
3. The health status of the worker. A worker who is ill and stressed up is likely to be affected. A worker who is anaemic due to ill-health like malaria or due to poor nutrition is likely to develop further complications.
4. Poor personal and environmental hygiene.
5. Lack of periodic medical investigation or examinations of the workers to identify those likely or already developing ill-health so that treatment can be started early. Types of medical examination should include x - ray and laboratory investigations.
6. Lack of practice of most containment and preventive measures.
7. Exposure to defective equipment and instruments.
8. Exposure to dermatologic agents which could be endogenic. Such substances include absorption of gold, mercury arsenic biological

agents like Bacillus anthraces and mechanical agents.

9. Ingestion of toxic substances and dangerous agents such as contaminated food substances, vegetables and fruits.
10. Exposure to hazards like lead, toxic materials, fumes, dust and other substances.
11. Inhalation of gases, fumes, organic substances like silica sulphate, iron dusts, coal dusts and others.
12. Carelessness of workers and hazardous life styles like excessive smoking, alcohol intake and ingestion of non prescribed and adulterated and fake drug. Inability of the worker to go for medical check-up as preventive measure.

3.5 Methods of Detection of Occupational Diseases

Since some health hazards responsible for occupational health diseases are known and documented while some are largely unknown, there is need to attempt to identify the unfamiliar and unknown hazards in the work places in order to control them. The methods of detection put forward by Asogwa (2007) included: biological monitoring, epidemiological methods, and environmental measurements.

1. **Biological Methods**

   This takes the form of pre-employment medical examination for basic data, and periodic medical examinations and laboratory tests to detect diseases if any. Laboratory tests can take the form of hematological studies, urine tests, and stool analysis while medical examination can be chest-x-ray. Those with suspected cases of dermatitis should be kept away. The tests do help to detect early the presence of diseases and to plan appropriate preventive and curative intervention programmes to curtail the spread and damage to the health status of

the individual.

2. **Epidemiological Methods**

Epidemiology in an industrial setting aims at studying the determinants, distribution and deterrents of diseases among workers. Epidemiological studies therefore help to detect both the occupational and non-occupational work related diseases among workers. For effective preventive measures to be planned. Example of work-related association between stressful occupations and diseases can be peptic ulcer, hypertension, gastric upset and others. The assessment aims at prevention of spread of the disease.

3. **Environmental Measurement**

These are used to detect agents of known hazards in the work place before the diseases occur. This helps to identify the hazards early enough in order to prevent or reduce the adverse effects of such hazards. Example, dust sampling and measurement in a coal mine or cement industry can reduce the incidence of coal workers. pneumoconiosis, Noise measurement with meters in manufacturing industries would help reduce the incidence of deafness and use of gas detectors to measure the level of various gases like carbon monoxide can help reduce carbon monoxide poisoning. Other methods of detection that could be employed include: history taken from the worker.

3.6 Prevention and control of Occupational Diseases

The practice of making prevention a priority in different occupations is of primary importance in occupational practice. This is because work-related illnesses are frequently irreversible (Allender and Spradley 2001). For example development of a mesothelioma from asbestos exposure is a

condition for which there is no cure. Same applies to other conditions. Some can even lead to morbidity and mortality. Prevention is the only answer.

The preventive and control measures put forward by Achalu (2000) and Asogwa (2007).

1. **Complete elimination of hazardous agents**. This can be achieved through the following methods.
   a) Substitution of the Process

      This means replacing the harmful substances by the less harmful ones which are equally effective or nearly so. Example, the use of fiber glass instead of asbestos in the production of roofing sheets or the substitution of noisy machinery with less noisy ones.

   b) Change of Work Process

      Example, the use of scanning technique instead of x-ray in carrying out investigations.

2. **Containment Measures**

   This involves containment at the source of the hazards. It is a method of getting rid of dusts, vapors and fumes from a point source. Example, the use of exhaust ventilation in chemical laboratory, wet drilling in mixers or wet mining in coal mines.

3. **Total Enclosure of Hazards**

   This involves preventive measures when the work process is enclosed to avoid exposure. It is relevant to work groups like radiation workers such as x-ray and transformer station workers. The radioactive material is enclosed in a lead shield, thereby preventing the associated hazards to the worker.

4. The use of partial enclosure of hazards of dangerous machine process section. That is, isolation of such machines.

5. **Limitation of Time of Exposure**

   This is usually the practice in situations where radiation or noise is the hazard. According to Asogwa (2007), the maximum tolerance daily dose should be known and the hours of work arranged so that no worker stays longer than the prescribed period of time.

6. **Segregation of Hazardous Processes**

   By this method, those not concerned with its operation are protected thereby reducing the number of those at risks. In operations involving emission of irritant gases, workers should be made to use breathing apparatus like protective mask and respirators for prevention.

7. **Adequate Ventilation in the Work Environment**

   This reduces high temperature by air movement, maintains adequate dilution of atmospheric contaminants and reduces the nuisance or harmful effects of such contaminants in the air. Ceiling fans fixed at appropriate places in sufficient numbers will be of help in maintaining adequate ventilation.

8. **Cleanliness of the Workplace also called Good Housekeeping**

   This is very essential especially in hospital environments, as it eliminates the accumulation of dangerous materials in the workplace. Sweeping and washing of the floor with disinfectant should be carried out at regular times daily, preferably at the end of the days work or before the start of business in the mornings. This should be arranged in such a way as to allow the workers go home with others. This also improves the workers morale and productivity. It can be achieved by

establishing and maintaining rules of conduct in the workplace. Such protective devices should include face masks, hand gloves, goggles, boots, helmets, apparels and many others.

9. **Personal Cleanliness**

Personal hygiene contributes in avoiding accidental consumption of dangerous substances. Preferably, workers employed in inherently dirty jobs should come to work in their clean clothes while their working apparels should be kept and laundered in the work environment. The employers should contribute by providing facilities for changing and washing of the working apparels. Workers should also be provided with specific places for eating and smoking during recreation periods.

There is need for massive health education and campaign on the need for how to use those devices, followed by adequate supervision to see that such workers put on those protective devices, if much success is to be recorded. There is also the need for the industries especially manufacturing and service industries like hospitals to provide all the needed protective devices to avoid things like the individual workers buying inferior protective devices himself because of cost.

10. **Legislation**

This can be used to eliminate or reduce exposure of workers to occupational hazards. This is because, if the industrialists are not legally compelled to protect the workers, they may not do anything to help prevent workers' exposure to hazards, especially when they still make their profits and workers are always there to be hired and dismissed at will with the slightest flimsy excuses. According to workplace safety and Insurance Bureau (WSIB, 2007), occupational

diseases can be prevented by:

a) Finding out what materials and substances were being used in their workplace with the aim of ensuring safety provisions.

b) Finding out how to work safely around materials and equipment in their workplace.

c) Use protective equipment provided by their employer. Make sure that they know how to use the facilities if not ask questions.

d) Be alert to the symptoms of change in your health status and be able to report on time.

e) Always tell the company doctor where they work, what they do and what substances they work with because this information will help in making accurate diagnosis.

f) Keep records of all jobs and industries that they worked with in order to find the cause of the illness.

11. Periodic health education of all the workers to provide them with adequate knowledge of all the hazards that can cause diseased associated with their occupation and the preventive measures to adopt, as well as the importance of keeping safety rules of the occupation.

12. All the workers should be trained and retrained periodically on how to use the protective devices provided by the management in the language familiar to them; regular supervision and monitoring to ensure compliance to the proper use of the devices; information on safety provisions and their importance should be displayed on the posters and notice boards and the sign posts mounted at strategic positions in the company. At times hand bills should be provided for personal keeps for constant consultation and reminder. Managers

should show good example by using the devices always.

Implication of Occupational Health Diseases.

Occupational health diseases have implication(s) to both the employers and the employees.

To the Employees

1. The disease condition can seriously affect them physically, mentally, socially and psychologically and that of their family well being.
2. Such disease conditions like hypertension and stroke can lead to permanent disability to the employee thereby making him or her non productive. This will further affect the employee generally as well as reduce his life span.
3. There could be increased morbidity and mortality among workers.
4. The ill-health can lead to low productivity with decreased income
5. It could lead to reduced work force.
6. Respiratory diseases can cause permanent damage to the respiratory systems especially the lungs. These can gradually affect the worker and by gradually reducing the working capacity thereby causing serious industrial set back.
7. The diseases can create physical and emotional problems that can affect the general behaviour of the worker.

Threat of Occupational Diseases

The treat differs according to the causative agent. Some of them are:

1. Silicosis causes fibrosis of the lungs leading to emphysema. This can result to permanent disability and death among the workers.
2. There could be physical deformity resulting from diseases such as stroke, hypertension or even diabetes. This can incapacitate the worker making him/her non productive especially if treatment is not

started on time.

3. Cardiac diseases such as angina pectoris, heart failure.

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Exercise 2: Highlight four implications of Occupational Health Diseases to employees

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Reporting of Occupational Diseases.

In Nigeria, according to Asogwa (2007) the following diseases occurring in occupational settings are reportable by Law by the factory owners:

1. Lead poisoning, including poisoning by any preparation or compound of lead or their squeal.
2. Phosphorus poisoning by phosphorus or its compounds or their sequelae
3. Mercury poisoning, by mercury, its amalgams and compounds and their sequelae.
4. Manganese poisoning by arsenic or its compounds and their sequelae
6. Aniline poisoning
7. Carbon bisulphide (disulphide) poisoning
8. Benzene poisoning, including poisoning by any of its homologies, their nitro and amido derivatives or their sequelae.
9. Chrome ulceration due to chronic acid or bichromate of potassium, sodium or ammonium, or any preparation of these substances.
10. Anthrax

11. Silicosis
12. Pathological manifestations due to:
    a) radium or other radio-active substances
    b) X-rays
13. Toxic jaundice due to tetrachlorethane or amido derivatives of benzene or other poisonous substances
14. Toxic anaemia
15. Primary epitheliomatous ulceration of the skin due to the handling or use of tar, pitch, bitumen, mineral oil, paraffin or the compounds, products or residues of these substances.
16. Poisoning by halogen derivatives of hydrocarbons of the aliphatic series.
17. Compressed air illness (cassion disease)
18. Asbestos.

4.0 Conclusion

The type of disease a worker suffers is associated with the type of occupation he engages in order to earn a living. Some of such occupations like mining and cement industries are found to cause respiratory diseases because of the dust particles. Those working in asbestos industries suffer from asbestosis. Those working in health institutions are likely to suffer blood illness and so on. The only way out is strict compliance to preventive measures which could be the proper use of safety devices, avoidance of unsafe practices and frequent medical assessment, early treatment of identified health problem is the answer.

5.0 Summary

In this unit we have discussed the following:

1. The meaning of occupational diseases for awareness creation
2. Types of diseases a worker can contract in the process of job performance in any occupation he/she engages himself.
3. The pre-disposing factors to those diseases and also
4. The precautionary and preventive measures a worker can adopt in order to avoid the occurrence of the disease as well as the type of treatment that can be applied for better cure.

6.0 Tutor Marked Assignment

1. Name some of the chronic diseases a worker can contract in any work environment?

2. Discuss the preventive and control measures to occupational diseases.

Answer to Exercises

The ill-health can lead to low productivity with decreased income

It could lead to reduced work force.

Respiratory diseases can cause permanent damage to the respiratory systems especially the lungs. These can gradually affect the worker and by gradually reducing the working capacity thereby causing serious industrial set back.

The diseases can create physical and emotional problems that can affect the general behaviour of the worker.

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Unit 5: Occupational Accidents.

Table of contents

1.0 Introduction

The success of any occupation is measured by the progress made and the safety of its workers. The need for the employees' safety from the occupational hazards is highly commendable. Every worker expects to live longer and so needs to be free from all hazards including accidents that can limit or threaten their survival and that of their families. The most common of such hazards is accident. They need to be safe and secure in

relation to himself, his family and his work so that their health will be prolonged and work output increased thereby promoting the growth of the industry. Nevertheless, accidents occur and constitute the most important threat to survival of workers. Occupational injuries do create serious health problems for the working population. They are costly, not only in terms of health and personal loss but also in loss of productivity. They also increase the work load of caring professions like nursing. There is need to discuss the meaning, types of accidents, causes, preventive measures and how those affected can be effectively managed and then rehabilitated back to their occupation.

2.0 Objectives

At the completion of this Unit, learners should be able to:

Define Occupational Accidents.

State the types of accidents in work environment.

Describe the predisposing factors to Occupational accidents.

Explain the methods of prevention and control of Occupational accidents.

Describe the management of accident cases in occupational settings.

Describe ways of protecting employees from occupational accidents.

3.0 Main Content

Concept of Occupational Accidents

Accident is one of the major occupational health problems of the employees. It is an unexpected and serious sudden event that can occur anywhere and then result in both bodily and property damages.

Accident, according to Mroz, 1978 occupational accident is a sequence of sudden, unplanned events which have the potential for producing personal

injury or property damage. It is an unplanned event usually associated with unpleasant outcome, Asogwa, 2007.

It is an unexpected, unanticipated and sudden event that results in bodily injury, property damage and death. It causes both human and economic and material losses to both paid and non-paid occupations such as industries, health institutions, agricultural, educational, banking and numerous other occupations.

3.1 Types of Occupational Accidents.

There are different types and each occupation has its peculiar types of accidents. The types of accidents can generally be grouped into:

Main types arising from all types of occupations. Specific accidents occurring in specific occupations.

General types include: puncture wounds, bruises, scalds, sprains, contusions, fractures, dislocations, crush injuries, amputations, enucleation, asphyxiation, unspecified injuries among others.

Injuries arising from industries include: Amputation, lacerations, puncture wounds, electrocution, fractures, head injuries and sprains etc.

Accidents arising from health institutions include: needle prick injuries, sprains, cuts from sharp instruments, slip disc, falls, fractures, anesthetics accidents, eye injuries, burns from acids and other chemicals.

Accidents arising from Agricultural occupation include: cuts from hoe, knives, gunshot wound especially in land disputes, scorpion, human and animal bites like snake bite, drowning, falls, contusions,

Accident in banks include: back injuries, syncope, falls and others

The Causes or Precipitating Factors of Accidents.

The causes of accidents to workers are varied. Some of the causes are

known while others are unknown. The known causes can happen without signs. The main causes can be attributed to the following:

The type of occupation where the person is employed. It could be manufacturing industries such as those cited by Reich and Okubo like machinery and equipment, wood and furniture, Hide, Clothing and Textiles; Chemicals, Tobacco, non-metal minerals, minerals and paper and printing industries. It could result from agricultural or health institutions among others.

The causes continued Reich and Okubo could also be as a result of:

Unsafe human behaviors/human failure.

Environmental factors.

Defective machinery.

Work characteristics.

Unsafe human behaviors according to Mroz, 1978 are the principal cause of up to 80% of accidents. Causes include: Psychological and attitudinal factors like anger, hatred, fear, anxiety and joy. The relations to these factors can push the worker to ignore safety precautions and then act carelessly and recklessly thereby acting out what he/she could not in normal self.

Unsafe personality traits such as attitudes, exaggerated opinion of self importance; over confidence, abnormal needs for excitement.

Undesirable attitudes resulting in erratic and unpredictable behaviors.

Complex personality traits such as exaggerated opinion of self importance; over confidence in self, abnormal need for excitement. Employees with these traits tend to focus all their attention on themselves and act irresponsibly against themselves and others. They over estimate their abilities, exercise and therefore display in attention and disregard safety

precautions, subject themselves and even others to accident.

Unhealthy habit formation such as intake of self prescribed medical drugs like sedatives, tranquillizers, antihistamines etc. these may produce alteration in normal physical abilities causing drowsiness, confusion, sleepiness, blurred vision, perceptual problems that can lead to accident. Excessive alcohol intake interferes with the body's psychological processes, alter the person's mood, attention, judgment etc. all these unsafe behaviors can hinder judgment and other mental processes, body fatigue leading to reduced efficiency of the individual.

Unnecessary risk-taking behaviours and competition commonly seen among adolescents, young drivers overtaking at bends, over speeding rushing to over take other vehicles etc. these can lead to fatal accidents. In an attempt to protect self ,company property and family members from armed robbers people have built miniature prisons in their homes and work places with the result of being trapped in the event of accidents such as fire outbreaks; unnecessary risks include: keeping loaded pistols under the pillow, keeping drugs at reach of children, keeping bottle of fluids like kerosene, bleach, fuel and other dangerous fluids and substances without label carelessly in the work sites and in the house at reach of children, swimming when you don't know how to do so, riding motor-cycle in a very busy road and other unnecessary careless acts etc.

Other personality factors include age, lack of knowledge, experience, skills, ill-health and physical unsuitability of the worker such as visual or hearing impairment, epilepsy, unfriendliness with co-workers or employers, emotional problem like fear, inability to follow instructions and concentration (Achalu,2000).

Environmental Factors.

These are conditions of the work environment that can precipitate accident to workers. They include nature and man made factors.

a. Nature factors include those factors that can obscure visibility such as: rain, dust, smoke, wind, sunlight, foreign body in the eyes, others include floods, tornados, earthquakes, land slide, extreme temperatures, and inadequate ventilation. Man made factors that cause accidents include: filthy environment, slippery floors, improper storage of items, use of generators, candles, insecticides pesticides etc.

b. locality of the work environment, physical hazards, working arrangement like time of the day, day of the week, attitude of supervisors towards work and safety in the environment where the industry is sited.

Defective Agents – it could be due to poor design, manufacturers fault, mechanical or structural failures, rusted connections, poor handling of machines, shovels, knife.

Other predisposing factors to accident include; bad lifting technique causing spinal injuries; assaults in work site, direct explosion on the unit, carbon monoxide from combusting fuel, wood oil, vehicles, generators, faulty electrical appliances.

Principles of Accident Prevention.

The general principles of accident prevention applicable to all occupations irrespective of size proposed by Asogwa (2007, p 187-188) include:

- The prevention of accidents is an essential part of good management.
- Both workers and management must cooperate to reduce accidents.
- The organization of safety in the plant is the responsibility of the management.

- Each plant should have a definitive and well known policy on safety.
- There must be available organization and resources to carry out the policy.
- The best known method which can be introduced must be applied at the work place.

Prevention and Control of Occupational Accidents.

The understanding of the causes of accidents and how the employee is affected within the environment is beneficial in prevention and control of accidents. Literature abounds on the preventive measures. The following measures could be applied as suggested by Achalu (2000):

- Provision of safe premises, safe procedures, safe machines for workers by the employers.
- Provide workers with adequate training on the importance and proper use of safety devices such as eye goggle, booths, ear plugs, hoes, cutlasses, hand gloves, face mask as the case may be according to factory rules.
- Pre-employment and periodic examination of all employees should be ensured. This is to evaluate the health and fitness status of the employees before employment as a baseline data and also to determine what becomes of the workers' health with time due to the nature of work done.
- Provide workers with information regarding the inherent risks of any occupation before he/she is allowed to work alone on the job.
- Protective clothing should be properly designed according to the anthropometric measurement of the workers to avoid discomfort while performing tasks. This, according to Asogwa (2007) will

discourage unwillingness of the workers to use the clothing properly or even do without it claiming that it is uncomfortable and makes him clumsy. Workers should also be motivated to use the clothing for safety measures. Hazards and consequences of negligence, according to Asogwa, should be made as concrete as possible through real life case studies and factual material drawn from work situations in which the people are employed.

- Effective training and encouragement of workers on proper use of safety knowledge, skill and various work procedures.
- There should be well defined policy guidelines on safety precautions in each plant.
- All aspects of the factory should be adequately ventilated to avoid excessive heat or humidity.
- Avoid pouring water, oil or other chemicals that can make the work environment slippery to cause accident.
- Prepare and display at strategic positions within the work environment bill boards, posters, sign posters indicating danger zones, safety measures, unsafe danger zones, safety measures, unsafe acts in work place, the need for compliance and disciplinary measures.
- Inculcation of personal hygiene and provision of facilities for conveniences.
- All defective machines and equipment should be repaired or replaced to avoid accidents. Modification in the use of dangerous machinery and hazardous operations should be adhered to.
- The use of worn-out hand tools, e.g., hammers, Chisel should be discouraged. Proper design and shielding of all machinery with

efficient interlocks may eliminate completely the risk of damage to the worker from splashing chemicals or damage from flying objects thereby avoiding accidents.

- Studying the biomechanics of human gait to determine forces and torques acting at the interface between the floor and the sole of the shoe can assist to improve friction characteristics of floor surfaces and shoe soles to reduce accident risks as a result of falls.
- All staff in health institutions should adopt the stringent measures in the use and disposal of needles and sharp objects.
- Workers' metabolic demands for a job done in hot and humid environments should be evaluated to recommend a work-rest regime that will prevent heat stress. Recreational facilities and canteen for feeding should be provided.

Prevention of musculoskeletal accidents should be avoided by:

- Evaluating lifting tasks to determine biomechanical stresses acting at the lower back and designing lifting tasks to ensure that the stresses do not cause back injuries;
- Evaluating work station layout to discover potential causes of postural stress and recommending changes to eliminate or reduce non-natural work postures that could cause cumulative trauma disorders.

Eliminating awkward postures can also reduce fatigue (Federal Ministry of Health, 2001). The Ministry also stated that:

Work space minimum space should be allowed between body and body components or worker and the point of friction. The work table, control

boards, stacking racks etc should be designed either in sitting or standing position. This will enable easy reach and grip strength. Also, all had-controlled operations should be at the elbow level.

Treatment of Occupational Accidents.

The survival of an employee after an accident depends on effective management. The type of management to be provided should depend on the type of injury sustained. Some injuries could be minor while some could be serious enough to affect life. In all cases, in order to provide prompt and effective management, the following should be provided in work settings:

Establishment of an occupational health service at workplace to ensure a healthy workforce.

Effective first aid services. There should be groups of workers selected from each work section to be trained as first-aiders for early treatment accident cases. First aid boxes should be placed at strategic positions within the work environment.

Prompt referral of serious cases to appropriate hospitals.

Rehabilitation of injured and reabsorption into the occupation.

Training of a rescue team in high risk places. coal mining.

Keeping accidents records to determine trends of accidents and for comparison. This should be analyzed periodically to discern trends and evaluate the efficacy of the counter measures.

Treatment proper:

Reassurance of the victim. The first line of management is to encourage the victim and reassurance that there is still hope.

Attend to the following:

If there is lack of breathing movements or events affecting breathing, first

ensure that the victim is still alive.

Arrest bleeding if any with any available material.

Accompany victim to the factory clinic where available, otherwise refer to hospital.

Provide management as prescribed or as deemed necessary.

Rehabilitate the victim

Include relations of the victim in the management.

Keep record of the treatments given as well as the type of accident.

Reporting of Accident cases.

Reportable accident cases are those accidents required to be reported; are those that can result in disability lasting up to five days of absenteeism from work. They include such cases as: Amputation of a body part, head injury, fractures, and burns especially up to second degree burns. Apart from recording the serious cases, minor injuries should also be recorded immediately they occurred. The following should be indicated.

Name of the victim, sex, age, and marital status, type of duty, cause of accident, location where the accident happened and location of the factory where the victim works. These data are essential for future reference and comparison.

The accident form should be in triplicate and should be filled out by the first-aid provider specialist or by the foreman where a specialist is not available. A copy should be kept with the occupational health service, another one with the foreman while the third one remains in the register or file. Both the foreman and occupational health service should transfer the information in the accident report form into their accident report register. The victim's case should be reported by the doctor treating him or her indicating

Minor injuries: First aid treatment lost working time of less than one shift.

Major injuries: Hospital admission for at least one working shift.

Fatalities: Where one or more persons were killed.

Before the worker resumes duty, he should report to the health service where he will be certified fit and given written confirmation for the foreman for records and determination of any benefits.

3.2 Transportation of Accidents Victims

Transportation of the victim should always be limited to situations in which an immediate danger to life of the victims exists or to situations in which professional ambulance or rescue personnel are not available. Under these circumstances, the first-aid provider should observe the following:

Unless the victim's life would be in further danger, never move him until his breathing has become adequate, his bleeding has been controlled, and his wounds, which could be fracture or dislocations have been splinted. If for his immediate safety, the victim must be moved, before such measures can be taken, always protect and support the injured parts during the movement.

Where possible, bring the transportation device (vehicle or stretcher) to the victim rather than carrying him to it.

When lifting and carrying the victim, gently support the head, neck, back and extremities, keeping the body aligned all the times.

When transporting a victim, never force him or her to travel in a sitting position instead, always place the victim in a reclining or semi reclining position, the necessary space best afforded by a station wagon.

Since the few minutes saved by a high-speed ride is almost always unimportant for the victim's recovery, drive within the posted speed limits

and reduce the speed especially at bends.

3.3 Rehabilitation of Accident Victims

The aim of rehabilitation is to restore the victim to his fullest physical, mental and social capacity. Recognition of the victim's physical, social and economic roles is very essential. Rehabilitation should aim at solving the problems and it should start from the moment of injury sustenance thus: at the scene of the accident, the victim should be reassured and encourage. This gives him courage and hope.

At the initial time of hospitalization, the following should be done: Prevention of complications arising from long period of bed rest, urinary tract infections, venous thrombosis, muscle wasting, joint stiffness, contracture etc by good nursing and physiotherapy.

During hospitalization, there should be continued provision of all planned care such as medication, personal hygiene, feeding, psychological and emotional care etc. these should be continued until discharge from the hospital. Involve the relations in the care of the victim. Remedial exercises should be encouraged. Provision of aids and other appliances to make up for lost functions particularly with mobility in the form of artificial limbs is necessary.

Resettlement at work: this is started when the victim has gained physical recovery and has been certified fit to be engaged as before the injury. He can be re-instated in his former position where his condition permits or be retrained and assigned another responsibility his condition allows.

4.0 Conclusion

Occupational accident is an unforeseen circumstance. It is a wind that blows nobody good because both the employer and the employee are affected when an accident occurs in any occupation. Unless people are safety and environmentally conscious and build into their psyches the fact that accidents are arising from carelessness could lead to permanent disability or even death. Generally, employee's negligence or failures to rectify unsafe conditions makes industrial accidents imminent. However, compensations are available under Workmen's Compensation Act or Product Liability from manufacturers of equipment and products.

5.0 Summary

In this unit, we learnt that occupational accident is an unexpected, unwanted, unplanned sudden event. It is an occurrence arising from unsafe acts or unsafe conditions, unsafe practices etc. Common injuries include: fractures, sprains, amputations, head injuries etc.

Implications to workers include pains, injuries, disabilities, emotional and psychological implication and even death.

Implications to employers include human, financial and material loss.

6.0 Tutor Marked Assignment.

What are the predisposing factors to occupational accidents? How can Occupational Accidents be prevented and controlled.

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Unit 6: Occupational Health Poison

1.0 Introduction

The increasing hazards faced daily by many workers at their jobs call for concern. The employees may not suffer the consequences of the hidden hazards (chemical, radiations) directly or indirectly until years later. These chemicals or radiations are poisonous to the body.

Occupational poisons are serious injury that is job-related. It usually happens on worksite such as a factory or construction site. This can occur as a result of leakage, failure of chemical plant or as a major accident (Usman 2001). Achalu (2000) defined occupational poisons as those

substances, elements, compounds or mixtures used in industries that interferes with the metabolic processes of the body and produces acute or chronic ill health. These poisons can enter the body by inhalation, ingestion or absorbed through the skin contact. They include heavy metals, chemicals and solvents fumes, gases, and vapor. This write up focuses on occupational poisons.

2.0 Objectives of the Topic

After reading through this unit you should be able to:

- Define occupational poisons
- Describe occupational poisons and their sources
- Enumerate people at risk
- Describe clinical manifestation of some occupational poisons
- Discuss diagnostic procedures of detecting occupational poisons
- State strategies for prevention
- Describe how the poison incident can be reported
- Discuss the implications on the employees
- Discuss precautionary measures to be taken.

3.0 Main Content

Definition: Poison is any substance that can impair function of body system or injure the body; something that destroys body organs or body systems, given something with intent to kill

3.1 Sources of Industrial Poisons

Sources include:

1. Heavy metals like all lead compounds. Example lead oxides, lead carbonate, lead sulphide. Among these lead compounds the most dangerous is lead carbonate while lead sulphide is the least toxic (Park 2005). Metallic mercury, one can get this from industries that manufacture batteries, lead smelting, lead ores, pipes, paints, solder, rubbers, and shoe makers. Health workers are likely to come contact with such.
2. Chemicals: Strong acids, concentrated alkalis in the work environment
3. Chemical in form of dust, gases, fumes.

   Dusts causing poison include:

   a) Inorganic dusts - asbestos, coal mining dust, silica dust, arsenic dust. One can get these from mine, textile, construction, acetaldehyde, butyl alcohol, paint, rope and string in thermal insulation, floor tile, cement, removal of sludge from tank that held sulphuric acid.

   b) Organic dusts-examples include: vegetable dust, cotton dust, sugar cane dust. It is found in striping, grinding of card machines.

   Gases: arsine, aniline, carbon tetrachloride, carbon monoxide, hydrogen cyanide, hydrogen sulphide. One can get these from insecticides, leather, smelter, dyes, perfumes, pharmaceutical products, dry cleaning agents.

   Fumes - arsine
4. Organic compounds are: phosphorus, ammonia. One can get these

from fertilizers, pesticides used in agriculture, organic phosphorus insecticides.

5. Other compounds include benzene, carbon tetrachloride, manganese toluene, and xylene.

3.2 People at Risk of Occupational Poisons

According to Marie (1991) the following people are at risk of occupational poisons.

- D Health workers - Nurses, Community Health Practitioners, laboratory scientist, radiographers, doctors, anesthetists etc.
- D Employees in mining industries, coal miners, quarry
- D Employees at cosmetic industries due to dye, spray, perfumes.
- D Employees in laundries and dry cleaning establishments
- D Carpenters, welders, bankers
- D Farmers, veterinary workers
- D Workers in textile, construction companies
- D Employees in cement, asbestos industries
- D Employees in oil refineries
- D Aerospace workers
- D Employees in ceramics, glass producing industries
- D Shoemakers

3.3. Clinical Manifestations

This depends on the types of poison and the parts of the body affected clinical manifestations of some of the occupational poisons are mentioned.

1. Clinical features of lead poisoning:

Abdominal colic, loss of appetite obstinate constipation, blue line on

the gum, anemia, wrist drop. Organic lead poisoning affects most central nervous system causing insomnia, headache, mental confusion, delirium. Encephalopathy following exposure to organic lead compounds is characterized by mental dullness, loss of ability to concentrate, loss of memory, tremor, deafness, convulsion, *aphasia*, coma etc.

3.3.1 Clinical features of Asbestosis

- Progressive breathlessness
- Initially unproductive cough which becomes mucoid or mucopurulent at late stage.
- Listlessness
- Loss of weight suggestive of malignant changes
- Cyanosis in advance cases.
- Dull on percussion in advanced stage.
- Dullness is suggestive of pleural effusion (Asogwa 2007)

3.3.2 Clinical Manifestation of Arsine Poison

If the haemopoietic system is involved it presents the following signs and symptoms. Their effects when mild are sudden and are characterized by malaise, nausea, and vomiting, shivering, giddiness and epigastric pain. Haemoglobinuria, anaemia due to powerful haemolytic nature of arsine. Pot wine urine and jaundice are present. In severe case blockage of renal tubules with anuria and hepatic damage are observed.

Clinical features when mucocutaneous tissues are affected. In sub acute poisoning there is catarrhal inflammation of mucous membranes, conjunctivitis, laryngitis, tracheitis, eczema, tons skin lesions at skin folds

and other moist areas. Arsine dust produces perforation of nasal septum, chronic poisoning produces dermatitis, ulcer, trophic changes in the nails and loss of hair and bronzing. In mild cases the bronzing is best seen in the eyelids, temples, neck and nipples in fair-coloured individuals. In people with dark skin it may be difficult to see even in severe cases.

3.3.3 Mercury and Mercury Compounds

Poisoning due to metallic or organic mercury compounds include headache, intention tremor that affects the following structures: fingers, eyelids, lips, and tongue. Movement may be more exaggerated as the condition progresses. Complete personality changes may occur with intellectual impairment, memory loss, insomnia, anxiety. Poisoning from organic compounds affect nervous system more than inorganic mercury.

Clinical Features of Organo and Phosphorus Compounds Include the following by (Asogwa 2007): Initial symptom may be mild or non specific. There may be headache, nausea, unusual fatigue. Taking food or smoking makes symptom worse. Diarrhea, vomiting, pinpoint pupils, convulsion are signs of pulmonary congestion. It occurs in a matter of 2 - 8 hours. Death may result shortly after appearance of symptoms.

Self Activity

Highlight five occupational poisons a health worker can be exposed to

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_____

_____

3.4 Diagnostic Procedures for Detecting Occupational Poisons

Some occupational poisons are known and documented while some

are not known. It therefore becomes important to detect the unfamiliar and unknown in order to control them. This can be achieved by the following:

1. **Biological Monitoring**

   This takes the form of pre-employment health assessment, pre-placement assessment, and periodic health assessment. Basic health data are collected through history and laboratory tests. Chest X-rays are also utilized. The hallmark of biological monitoring is for early detection of poisoning and to plan appropriate preventive and curative measures to curb the spread and damage.

2. **Epidemiological Methods**

   This aims at studying the distribution, determinants and deterrents of disease and ailment among segments of work force. It detects both occupational poisons and non occupational ones among workers through association between condition and certain diseases.

3. **Environmental Measurements**

   It is used to detect agents of known hazards in the work site before the risks occur. it is particularly very relevant in disabling and irreversible diseases. for example dust measurements in coal mine would help reduce the incidence of pneumoconiosis (Asogwa 2007).

3.5 Strategies for Prevention

- Conduct pre-employment and pre placement health assessment. This is to determine exclude individual's fitness for particular work or the susceptility to the effect of work process or the environment in which the work is to be done.
- Monitor health status of employees from time to time. the frequency of examination depend on the work process individual undertakes.
- Conduct inspection of industries to ensure compliance and research to

establish the hazardous level of various chemicals.

- Integration of safety training into the actual work situation.
- The occupational health officers, health inspectors and medical advisers and trade unions should inform, educate employees on hazards associated with each work process and safety measures recommended.
- Monitor the use of protective devices among the employees.

3.6 How Poisoning Incident can be reported

According to Asogwa (2007), when any disablement occurs in an industry. The first aid specialist or foremen fills the poison form. The forms are filled in triplicates. The accidents registered are as well filled. After the victim has been attended by doctor, the diagnosis, disposal and duration of incapacity are equally entered in triplicate forms as well as oeisonais registered. A written notice in a prescribed form with the prescribed particulars is sent through the factory occupier. Where the occupier is not the employer of the victim the employer will send the particular to the district inspector.

The report is made if there is a loss of life or disablement for more than three days. It can equally be reported when there is suspected or proven disease.

3.7 Implications of Occupational Poisoning on the Employees

The implications of occupational poisoning on the employees are enormous and are discussed under the following headings; deformity, psychological depression/trauma, economic loss, health social implications.

a) **Disabilities**

An employee affiliated with occupational poisoning may come down with minor or permanent disablement. Example, contact with corrosive acids.

They may leave contracture, and physiological dysfunction of organs and systems, the employee may be left with permanent disability even after recovery.

The disability sustained may be so severe that life of such employee is at jeopardy, the employee may be falling sick often and on, which may throw him/her out of job completely, loss of job will compound his health problems, hasten death.

Psychological Trauma/Depression

Distortion in the body image or appearance carries a lot of emotional depression, as the employee thinks on how to cope with alternated body image. Where the employee is single He/she thinks of these, can I still get wife/suitor of my choice, can I bear children, how to carry on family responsibilities among other things;. All these constitute psychological trauma.

Social isolation

Disability depending on the nature and site may hinder the employee from attending social functions or withdrawal from other people, this result in loss of acquaintances thus social isolation with its resultant affects the worker.

Economic Implications

Financial losses occur following occupational poisoning. Even though the employer pays compensation but the employee may have some other things he does outside factory work. In that case he can no longer attend to that resulting in economic loss. Recovery from such hazard may result in shift from former trade of the employee to a less skilled one with low remuneration. Again the employee may be to take care of him/her and this amounts to heavy financial involvement to the family. Thus economic loss

is seriously felt by the employee.

3.8 Precautionary Measures to be taken

Asogwa (2007) and Akintola (2005) highlighted on the precautionary measures to be adopted thus:

D Health assessment

This includes pre-employment, pre-placement health assessment as well as periodic medical examinations to exclude any underlying health problems that may predispose an employee to hazards in the work process or environment. Again for early detection of pathological changes and institute measures to avert such.

D Work environment must be inspected from time to time. This aims at ensuring safe work environment and promotes and protects health of employees.

D Employers must ensure that his plant is well designed and meet the safety requirement specifications and his work process.

D Inherent risks of any process must be explained to the workers before he is left alone on a job.

D Double standards of safety should not be condoned.

D Design of protective clothing should be in line with the anthropometric measurements of the workers

D Well planned and executed education of workers should be carried out in a language the workers understand.

D Vague concepts of safety and accidents prevention should be avoided.

D Hazards and consequences of negligence should be made as concrete as possible through life case studies and factual material drawn from work situations in which the people are employed.

D Safety training should be integrated into the actual situation so that

the worker is constantly reminded of the need to practice safety measures.

D Guard for dangerous parts of machinery

D Regular inspection and repair of machines should be documented in a book when such has been done and found in order.

4.0 Conclusion

Occupational poisoning is one of the hazards employees are exposed to. These poisons gain entry into the body via inhalation, ingestion and/ or absorbed through the body skin contact. The effects of some take years to manifest. It therefore becomes imperative that workers abide to all the safe measures provided to avail themselves from these hazards.

5.0 Summary

D The unit has discussed the sources through which occupational poison could result as strong alkalis, chemicals, vegetable dusts, cotton dusts etc.

D People at risk of occupational poison include health workers like nurses, doctors, laboratory workers, agricultural workers; Employees at cosmetic industries; cement industries etc.

Diagnostic procedures include biological monitoring, epidemiological methods and environmental measurements

D Preventive measures to adopt in order to be free of poison include:

- Strict compliance to safety measures;
- Strict personal and environmental hygiene

D Avoidance of risky health behaviour.

D Being watchful and careful in action.

6.0 Tutor marked Assignment

What is occupational poison?

How can it be caused?

Explain Methods you can employ to avoid occupational poison.

7.0 Reference:

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Unit 7: Environmental Health Hazards

Content

1.0 Introduction

Examples of human activities presented in module 1 indicate that, man's ability to tinker with or dominate his or her environment has obvious consequences. One of such is the creation of environmental agents capable of impacting on human and the environment. In this unit, we will look at environmental hazards, it definitions, types and classifications.

2.0 Objectives

At the end of this unit, you should be able to:

Define environmental hazard

Ascertain the misconceptions about the meaning of hazards

Describe environmental media

Illustrate different classifications of environmental health hazard

3.0 Main Content

3.1 Environmental Hazards: Definition

'Environmental hazard' is a generic term for any situation or state of events which poses a threat to the surrounding environment. This term incorporates topics like pollution and natural hazards such as storms and earthquakes.

An environmental hazard is also any substance, agent, equipment, object, human behaviour or factor that is capable of causing injury, disability, disease or death in humans or has the potential for polluting or degrading the environment (Olaniran et al, 1995).

3.2 Misconception about the meaning of Hazard

Some misconceptions about the meaning of ‘hazard’ should be cleared. The word ‘hazard’ is not synonymous with injury or disease. A hazard is only capable of causing injury if and only if certain environmental conditions exist. Few examples are given to illustrate this point.

A parked vehicle is a hazard but will not cause harm until it is recklessly driven by a drunk driver or there is a break failure.

Injury from a sharp, pointed object (a knife) can only occur of there is an accident through misuse or carelessness.

A big polythene bag appears harmless but very hazardous to children if they are left unchecked. It can lead to suffocation and death.

Human faeces (excreta) a very hazardous waste, cannot cause ill-health unless a person ingest water and food contaminated with faeces.

It must therefore be emphasized that hazard is not an injury or a disease although the terms are usually erroneously used interchangeably (Olaniran, et al, 1995).

Self Assessment Exercise

Complete the following:

A needle is a hazard but will not cause harm until ----------

A stone is a hazard but will not cause harm until ----------

A fuel is a hazard but will not cause harm until ----------

Try to come up with other examples.

3.3 Environmental Media

Exposure by individuals to environmental health hazards is normally through a medium. Exposure can be by inhalation through the nose, ingestion by mouth or absorption through the skin. Thus, the pathway in the environment through which hazards must pass before impacting on human health are collectively known as environmental media (Olaniran, et al, 1995).The environmental media are:

The air we breath

The food we eat

The water we drink

The soil which we cultivate

Inanimate objects in our environment

Occupation and Socio-cultural events

3.4 Classifications of Environmental Health Hazards

Environmental health hazards can be classified into 4 broad groups depending on nature and type. The groups are:

Physical

Biological

Chemical

Socio-cultural/Psychosocial

Most of the physical hazards are easily observable, detectable and measurable and are found in our immediate surroundings, but mainly in the occupational and home environment.

Some of the biological hazards cannot be seen by the naked eyes, but most are present in all components of environment. Biological hazards are detectable and measurable using microbiological or biological techniques.

Chemical hazards are the most numerous and complex. Most are found in the workplace and are measurable using sophisticated labouratory techniques.

Socio-cultural hazards are the most difficult to detect and measure because they are usually ill-defined attributes of man. Examples of hazards in each of the 4 groups are thus presented below:

Table 1

Classification of Environmental Health Hazards

Physical	Biological	Chemical	Socio-Cultural/Psychosocial
1 Noise	1 Pathogens(bacteria, Virus, protozoa)	1 Pesticides Fungicide Herbicides and Inorganic fertilizer	1 Poverty
2 Dust	2 Sewage	2 Heavy metals (lead,	2 Cultural beliefs and Practices Religious beliefs and
3 Heat			

		mercury)	Practices
4 Cold	3 Disease Vectors (Mosquitoes,tsetsefly blackfly)	3 Acids	3 Education
5 Vibration	4 Vemon snakes	4 Bases	4 Occupation
6 Pressure	5 Bees	5 Asbestors	5 Lifestyle
7 Ionizing Radiation	6 Scorpions	6 Gases carbon monoxide, sulphur dioxide, ammonia)	6 Unhealthy habits (smoking, sexual promiscuity,
8 Open Refuse Dump	7 man		7 Drug abuse
9 Motor Vehicle			8Stress,marital problems

4.0 Conclusion

This unit looked at environmental health hazards and associated variables. In this unit, we conceived hazard as is a 'generic term for any situation or state of events which poses a threat to the surrounding environment'. We also illustrated that a hazard is only capable of causing injury if and only if certain environmental conditions exist. This unit also identified various environmental media which is generally perceived as the pathway in the environment through which hazards must pass before impacting on human health. Finally, environmental health hazards were further classified into: physical, biological, chemical and socio-cultural/psychosocial.

5.0 Summary

Hope you enjoyed reading through this unit. This unit took a broad look at the meaning and misconceptions of environmental hazard, as well as environmental media and classifications of environmental health hazards. Now let us attempt the questions below.

6.0 Tutor Marked Assignment

Identify the four main classes of environmental health hazard and give examples of each.

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Unit 8: Pollution Prevention in Industries

Content

1.0 Introduction

This is a general introduction to an overview of pollution prevention concepts. Here we will look at source reduction, good operating practices, technology change, product change and most importantly, recycling. Observations indicates that most countries now argue for recycling practices because it is very cost effect and environmentally friendly. Happy reading!

2.0 Objectives

At the end of this unit, you should be able to:

Determine an overview of pollution prevention concepts

Determine source reduction in industries Identify good operating practices in industries Illustrate technology changes and pollution prevention

3.0 Main Content

3.1 Overview of Pollution Prevention Concepts

Pollution prevention encompasses both source reduction and in-process recycling. Source reduction is thus defined as any practice that reduces the amount of any hazardous substance, pollutant, or contaminant entering any waste stream prior to recycling, treatment, or disposal, and that reduces the hazards to public health and the environment associated with the release of such substances, pollutants, or contaminants. Thus governments, businesses and industries, and individuals should prevent or reduce pollution at its source wherever feasible. Where source reduction cannot be achieved, it is advocated that responsible parties reuse and recycle to reduce the quantity of hazardous waste requiring treatment. If there are no feasible pollution prevention alternatives, environmentally sound treatment should be applied with disposal used only as a last resort. Techniques that merely transfer contaminants from one medium to another without a net reduction in the quantity and toxicity of hazardous constituents do not meet the definition of pollution prevention. This unit describes and gives examples of the various pollution prevention measures encompassed in source reduction and recycling.

3.2 Source Reduction in Industries

Source reduction lessens or eliminates the quantity of hazardous and toxic wastes generated and the expense and environmental impacts associated with managing these wastes. In addition, source reduction usually results in significant cost savings realized from raw material conservation. Source reduction encompasses good operating practices, technology changes, input material substitutions, and product changes (Sherry, 1988).

3.2.1 Good Operating Practices in Industries

In general, industries can realize a high return from a minimal investment by implementing good operating practices. Good operating practices are procedural, administrative, and institutional measures, which include improving inventory control, preventing accidental spills, segregating waste streams, and scheduling production runs that maximize production and minimize waste. Getting management to commit to pollution prevention is a first step toward instituting an effective source reduction program. This commitment might be demonstrated by a written policy statement circulated to company employees and posted in visible locations and by encouraging employees to adopt the principles of pollution prevention. Demonstrating management's dedication to pollution prevention and its importance to company operations can galvanize the work force and help employees view pollution prevention as a priority in their everyday work activities. Other management and personnel practices, such as employee training, incentives, and bonuses, also can encourage employees to reduce waste. Maintaining an orderly inventory system and proper storage conditions can greatly reduce material waste from deterioration, inefficient use, and spills. For example, an inventory system that employs a "first-in/first-out" management method and keeps a 1- or 2-

month supply of materials is less likely to result in material disposal because of product expiration. Implementing a material tracking system that tracks material use by individual employees or work groups allows managers to identify individuals or production teams with above-average materials use. Using tight-fitting lids and spill-proof containers with spigots, minimizing traffic, and employing proper environmental controls in storage areas also will extend material supplies and prevent spills. Frequent inventory inspections will result in early detection of leaks and spills. Other good housekeeping practices include containing and reusing materials dripped from parts as they are transferred during a process and providing funnels or other equipment that avoids spills when transferring materials. Regularly scheduled preventative maintenance reduces the occurrence of malfunctions and leaks, which will reduce the volume of wastes discharged to the sewers. Modifying production schedules to minimize required equipment changeovers will reduce the quantity of wastes generated by equipment cleaning. Segregating hazardous and non-hazardous waste streams avoids making the entire waste stream hazardous and reduces the volume of waste requiring treatment or costly disposal. Also, maintaining separate waste streams can enhance the industry's ability to reuse or reclaim waste materials. For example, by not mixing two different spent solvents, the purity of the waste materials is maintained, making recycling easier.

Another action, often overlooked, is examining the cleaning products (e.g., cleaners, degreasers, and floor finishes) used by a company to determine whether they are contributing to the toxic loadings in wastewater when discharged through sink and floor drains. Cleaning products with toxic constituents can be replaced with substitutes that do not contain harmful

elements. A good housekeeping program should include a review of the cleaning products used in house. Many companies use good operating practices as a first step toward reducing toxic materials use (Greiner and Ishard, 1992; Sherry, 1989).

Self Assessment Exercise

Pollution prevention encompasses both ---------- and ----------

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Make a list of wastes you are likely to generate from your home and think of an effective source reduction technique to tackle the waste.

3.2.2 Technology Changes

Technology changes can range from minor modifications to existing processes, to major investments in new manufacturing equipment. Technology changes involve changes in any of the following areas:

Production processes.

Equipment, layout, or piping.

Use of automation.

Process operating conditions, such as flow rates, temperatures, pressures, and residence times.

Production processes can be modified to eliminate the need to change over equipment if a unit can be dedicated to one process. Mechanical methods can be used in lieu of solvent use for cleaning and stripping parts. Various process changes can be implemented to reduce drag-out of process solutions, including adjusting the speed of withdrawal of the part from the process solution, allowing more time for the part to drip, and positioning the part to maximize runoff of the solution. Many companies have

experimented with technology changes to prevent pollution.

3.2.3 Input Material Substitutions

This technique involves replacing the input material that contains a problem pollutant with a different material that performs the same function without generating a toxic or hazardous waste. Input material substitutions reduce or eliminate the problem pollutants that enter the production process. Input modifications that avoid the generation of problem wastes during production also fall under this source reduction category. Process changes might sometimes be required to accommodate input material changes. Examples of input material substitution include:

United Piece Dye Works of Edenton, North Carolina, met stringent effluent discharge limits on phosphorous by making chemical substitutions in the production process rather than building expensive treatment systems. The company conducted a detailed evaluation of production processes, process chemistry and the chemicals used to identify sources of phosphorus. It then made process modifications to reduce use of phosphate chemicals by substituting chemicals not containing phosphate. For example, the use of hexametaphosphate was reduced and the use of phosphoric acid was eliminated. These chemical substitutions reduced the level of phosphorus in the company's wastewater from 7.7 mg/l to less than 1 mg/l. This reduction was achieved without any capital expenditures for phosphorus removal (Griener et al, 1992).

Self Assessment Exercise

Technology changes to aid pollution prevention, involve changes in any of the following areas ----------

3.2.4 Product Changes

A final source reduction technique consists of product modifications. By altering the product in such a way that the problem pollutant is no longer required in the production process, businesses can eliminate generating the problem waste. Product modifications also can reduce environmental releases of problem pollutants related to the use of a particular product. Product change generally falls into one of three categories: product substitution (e.g., an entirely new product); changes in product composition (e.g., minor modification to an existing product); and product conservation (e.g., increasing the working life of an existing product). Examples of product changes include:

The paint manufacturing industry has taken steps to reformulate its products to reduce hazardous constituents. Paint manufacturers have continued to improve water-based paints and find applications for them that were previously dominated by solvent-based paints. Water-based paints do not contain toxic or flammable solvents that contribute to the potential hazards of solvent-based paints. The use of water-based paints eliminates discharge to sewers of volatile organics in rinse water from production-line cleaning operations. In addition, volatile organics are not released to the atmosphere by water-based paints (Griener et al, 1992).

3.3 Recycling

Recycling options involve the reuse and reclamation of spent input materials, such as solvents, detergents, inks, and other chemicals. Reuse substitutes spent input materials for new input materials in the manufacturing process.

Reclamation, on the other hand, recovers valuable material from spent input materials for incorporation in some other process or product. Recycling can be integrated within the process through a closed loop system or can be conducted separately, using centralized onsite waste recycling systems or commercial materials recyclers. Waste reprocessed or reclaimed can be used on site or sold or given to other businesses for use in their operations. Some states maintain networks to facilitate waste exchanges. The following examples illustrate recycling initiatives:

Mao/a Milk and Ice Cream Company in New Bern, North Carolina, recover ice cream and milk products for reuse in ice cream products and animal feed. Initial re-use activities in 1986 prevented the loss of over 17,000 pounds of milk and decreased 5-day biochemical oxygen demand (BODJ by 17,000 pounds over a 4-month period. Soon after Mao/a began recovering milk and ice cream wastes, the City of New Bern's treatment plant showed a 14.7 percent reduction in B0D5 and a 22.8 percent decrease in suspended solids. The recovery and reuse program also has translated into reduced chemical usage, less sludge accumulation, and reduced power requirements for the New Bern treatment plant. In 1988, Mao/an estimated it saved $24,000 per month in wastewater treatment costs and recovered product. Upon full implementation of the reuse and recovery program, Maola hopes to recover as much as 2,410 gallons per day of ice cream ingredient valued at $480,000 annually (Greiner, et al., 1992)

4.0 Conclusion

This unit describes several pollution prevention approaches and presents the experiences of several industrial and commercial facilities that have successfully applied pollution prevention methods. By communicating the

benefits of pollution prevention to owners and operators of industrial and commercial facilities personnel can motivate facility personnel to seek pollution prevention technical information and assistance.

5.0 Summary

In this unit, we looked at several pollution-prevention techniques, especially those obtainable in industries. Hope you enjoyed your studies. Let us attempt the following questions.

6.0 Tutor marked Assignment

Identify the need for good operating practices in pollution prevention

Answer to Self Assessment Exercise

Production processes.
Equipment, layout, or piping.
Use of automation.
Process operating conditions, such as flow rates, temperatures, pressures, and residence times.

7.0 References and Further Readings

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Unit 9: Occupational Health and Safety

1.0 Introduction

This unit provides trainees with general background information on occupational health and safety, and on the magnitude and variety of health and safety problems worldwide, and explains the role of the health and safety representative.

2.0 Objectives

At the end of this unit, learners will be able to:

Explain that occupational health and safety is more than accident prevention

Explain why management's commitment to health and safety is crucial;

Explain why training is a critical component of any health and safety programme;

Recognize a number of occupational hazards and some of the types of work generally associated with those hazards;

Discuss the range of hazards in their own workplaces

3.0 Main Content

3.1 Occupational health and safety

Occupational health and safety is a discipline with a broad scope involving many specialized fields. In its broadest sense, it should aim at:

The promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations;

The prevention among workers of adverse effects on health caused by their working conditions;

The protection of workers in their employment from risks resulting from factors adverse to health;

The placing and maintenance of workers in an occupational environment adapted to physical and mental needs;

The adaptation of work to humans.

In other words, occupational health and safety encompasses the social, mental and physical well-being of workers, which is the “whole person”.

Successful occupational health and safety practice requires the collaboration and participation of both employers and workers in health and safety programmes, and involves the consideration of issues relating to occupational medicine, industrial hygiene, toxicology, education, engineering safety, ergonomics, psychology etc.

Occupational health issues are often given less attention than occupational safety issues because the former are generally more difficult to confront. However, when health is addressed, so is safety, because a healthy

workplace is by definition also a safe workplace. The converse, though, may not be true - a so-called safe workplace is not necessarily also a healthy workplace. The important point is that issues of both health and safety must be addressed in every workplace. By and large, the definition of occupational health and safety given above encompasses both health and safety in their broadest contexts.

Poor working conditions affect worker health and safety

Poor working conditions of any type have the potential to affect a worker's health and safety.

Unhealthy or unsafe working conditions are not limited to factories — they can be found anywhere, whether the workplace is indoors or outdoors. For many workers, such as agricultural workers or miners, the workplace is “outdoors” and can pose many health and safety hazards.

Poor working conditions can also affect the environment workers live in, since the working and living environments are the same for many workers. This means that occupational hazards can have harmful effects on workers, their families, and other people in the community, as well as on the physical environment around the workplace. A classic example is the use of pesticides in agricultural work. Workers can be exposed to toxic chemicals in a number of ways when spraying pesticides: they can inhale the chemicals during and after spraying, the chemicals can be absorbed through the skin, and the workers can ingest the chemicals if they eat, drink, or smoke without first washing their hands, or if drinking water has become contaminated with the chemicals. The workers' families can also be

exposed in a number of ways: they can inhale the pesticides which may linger in the air, they can drink contaminated water, or they can be exposed to residues which may be on the worker's clothes. Other people in the community can all be exposed in the same ways as well. When the chemicals get absorbed into the soil or leach into groundwater supplies, the adverse effects on the natural environment can be permanent.

Overall, efforts in occupational health and safety must aim to prevent industrial accidents and diseases, and at the same time recognize the connection between worker health and safety, the workplace, and the environment outside the workplace.

3.2 Importance of occupational health and safety

Work plays a central role in people's lives, since most workers spend at least eight hours a day in the workplace, whether it is on plantation, in an office, factory, etc. Therefore, work environments should be safe and healthy. Yet this is not the case for many workers. Every day workers all over the world are faced with a multitude of health hazards, such as: dusts, gases, noise, vibration and extreme temperatures.

Unfortunately some employers assume little responsibility for the protection of workers' health and safety. In fact, some employers do not even know that they have the moral and often legal responsibility to protect workers. As a result of the hazards and a lack of attention given to health and safety, work-related accidents and diseases are common in all parts of the world.

3.3 Costs of occupational injury/disease

Work-related accidents or diseases are very costly and can have many serious direct and indirect effects on the lives of workers and their families. For workers some of the direct costs of an injury or illness are:

The pain and suffering of the injury or illness;

The loss of income;

The possible loss of a job;

Health-care costs.

It has been estimated that the indirect costs of an accident or illness can be four to ten times greater than the direct costs, or even more. An occupational illness or accident can have so many indirect costs to workers that it is often difficult to measure them. One of the most obvious indirect costs is the human suffering caused to workers' families, which cannot be compensated with money.

The costs to employers of occupational accidents or illnesses are also estimated to be enormous. For a small business, the cost of even one accident can be a financial disaster. For employers, some of the direct costs are:

Payment for work not performed;

Medical and compensation payments;

Repair or replacement of damaged machinery and equipment;

Reduction or a temporary halt in production;

Increased training expenses and administration costs;

Possible reduction in the quality of work;

Negative effect on morale in other workers.

Some of the indirect costs for employers are:

The injured/ill worker has to be replaced;

A new worker has to be trained and given time to adjust;

It takes time before the new worker is producing at the rate of the original worker;

Time must be devoted to obligatory investigations, to the writing of reports and filling out of forms;

Accidents often arouse the concern of fellow workers and influence labour relations in a negative way;

Poor health and safety conditions in the workplace can also result in poor public relations.

Overall, the costs of most work-related accidents or illnesses to workers and their families and to employers are very high.

On a national scale, the estimated costs of occupational accidents and illnesses can be as high as three to four per cent of a country's gross national product. In reality, no one really knows the total costs of work-related accidents or diseases because there are a multitude of indirect costs which are difficult to measure besides the more obvious direct costs.

3.4 Health and safety programme

I. **The scope**

For all of the reasons given above, it is crucial that employers, workers and unions are committed to health and safety and that:

Workplace hazards are controlled - at the source whenever possible;

Records of any exposure are maintained for many years;

Both workers and employers are informed about health and safety risks in the workplace;

There is an active and effective health and safety committee that includes both workers and management;

Worker health and safety efforts are ongoing.

Effective workplace health and safety programmes can help to save the lives of workers by reducing hazards and their consequences. Health and safety programmes also have positive effects on both worker morale and productivity, which are important benefits. At the same time, effective programmes can save employers a great deal of money.

II. Extent of the problem worldwide

A. Accidents

In general, health and safety in the workplace has improved in most industrialized countries over the past 20 to 30 years. However, the situation in developing countries is relatively unclear largely because of inadequate accident and disease recognition, record-keeping and reporting mechanisms.

It is estimated that at least 250 million occupational accidents occur every year worldwide. 335,000 of these accidents are fatal (result in death). (Since many countries do not have accurate record-keeping and reporting mechanisms, it can be assumed that the real figures are much higher than this.) The number of fatal accidents is much higher in developing countries than in industrialized ones. This difference is primarily due to better health and safety programmes, improved first-aid and medical facilities in the industrialized countries, and to active participation of workers in the decision-making process on health and safety issues. Some of the industries with the highest risk of accidents worldwide are: mining, agriculture, including forestry and logging, and construction.

Identifying the cause of an accident

In some cases, the cause of an industrial injury is easy to identify. However, very often there is a hidden chain of events behind the accident which led up to the injury. For example, accidents are often indirectly caused by negligence on the part of the employer who may not have provided adequate worker training, or a supplier who gave the wrong information about a product, etc. The consistently high fatal accident rates in developing countries emphasize the need for occupational health and safety education programmes that focus on prevention. It is equally important to promote the development of occupational health services, including the training of doctors to recognize work-related diseases in the early stages.

B. Diseases

Some occupational diseases have been recognized for many years, and affect workers in different ways depending on the nature of the hazard, the route of exposure, the dose, etc. Some well known occupational diseases include:

Asbestosis (caused by asbestos, which is common in insulation, automobile brake linings, etc.);

Silicosis (caused by silica, which is common in mining, sandblasting, etc.)

Lead poisoning (caused by lead, which is common in battery plants, paint factories, etc.);

And noise-induced hearing loss (caused by noise, which is common in many workplaces, including airports, and workplaces where noisy machines, such as presses or drills, etc. are used).

There are also a number of potentially crippling health problems that can be associated with poor working conditions, including:

Heart disease;

Musculoskeletal disorders such as permanent back injuries or muscle disorders;

Allergies;

Reproductive problems;

Stress-related disorders.

Many developing countries report only a small number of workers affected by work-related diseases. These numbers look small for a variety of reasons that include:

Inadequate or non-existent reporting mechanisms;

A lack of occupational health facilities;

A lack of health care practitioners who are trained to recognize work-related diseases.

Because of these reasons and others, it is fair to assume that in reality, the numbers of workers afflicted with occupational diseases are much higher. In fact, overall, the number of cases and types of occupational diseases are increasing, not decreasing, in both developing and industrialized countries.

Identifying the cause of occupational disease

The cause of work-related diseases is very often difficult to determine. One factor is the latency period (the fact that it may take years before the disease produces an obvious effect on the worker's health). By the time the disease is identified, it may be too late to do anything about it or to find out what hazards the worker was exposed to in the past. Other factors such as changing jobs or personal behaviours (such as smoking tobacco or

drinking alcohol) further increase the difficulty of linking workplace exposures to a disease outcome.

Although more is understood now about some occupational hazards than in the past, every year new chemicals and new technologies are being introduced which present new and often unknown hazards to both workers and the community. These new and unknown hazards present great challenges to workers, employers, educators, and scientists that are to everyone concerned about workers' health and the effects that hazardous agents have on the environment.

III. The range of hazards

There are an unlimited number of hazards that can be found in almost any workplace. There are obvious unsafe working conditions, such as unguarded machinery, slippery floors or inadequate fire precautions, but there are also a number of categories of insidious hazards (that is, those hazards that are dangerous but which may not be obvious) including:

Chemical hazards, arising from liquids, solids, dusts, fumes, vapors and gases;

Physical hazards, such as noise, vibration, unsatisfactory lighting, radiation and extreme temperatures;

Biological hazards, such as bacteria, viruses, infectious waste and infestations;

Psychological hazards resulting from stress and strain;

Hazards associated with the non-application of ergonomic principles, for example badly designed machinery, mechanical devices and tools used by workers, improper seating and workstation design, or poorly designed work practices.

Most workers are faced with a combination of these hazards at work. For example, it is not difficult to imagine a workplace where you are exposed to chemicals, unguarded and noisy machines, hot temperatures, slippery floors, etc. all at the same time. Think about your own workplace. Are there various hazards there that you can think of?

Workers do not create hazards - in many cases the hazards are built into the workplace. The trade union position on occupational health and safety is to ensure that work is made safer by modifying the workplace and any unsafe work processes. This means that the solution is to remove the hazards, not to try to get workers to adapt to unsafe conditions. Requiring workers to wear protective clothing which may not be suited or designed for the climate of your region is an example of forcing workers to try to adapt themselves to unsafe conditions, which is also shifting the responsibility from management to the worker.

It is important for unions to maintain this position because many employers blame workers when there is an accident, claiming that the workers were careless. This attitude implies that work can be made safer if workers change their behaviour or if employers only hire workers who never make mistakes. Everyone makes mistakes — it is human nature, but workers should not pay for mistakes with their lives. Accidents do not stop simply by making workers more safety conscious. Safety awareness may help but it does not remove unsafe work processes or conditions. The most effective accident and disease prevention begins when work processes are still in the design stage, when safe conditions can be built into the work process.

IV. Importance of management commitment

In order to develop a successful health and safety programme, it is essential that there be strong management commitment and strong worker participation in the effort to create and maintain a safe and healthy workplace. An effective management addresses all work-related hazards, not only those covered by government standards.

All levels of management must make health and safety a priority. They must communicate this by going out into the worksite to talk with workers about their concerns and to observe work procedures and equipment. In each workplace, the lines of responsibility from top to bottom need to be clear, and workers should know who is responsible for different health and safety issues.

V. The importance of training

Workers often experience work-related health problems and do not realize that the problems are related to their work, particularly when an occupational disease, for example, is in the early stages. Besides the other more obvious benefits of training, such as skills development, hazard recognition, etc., a comprehensive training programme in each workplace will help workers to:

Recognize early signs/symptoms of any potential occupational diseases before they become permanent conditions;

Assess their work environment;

Insist that management make changes before hazardous conditions can develop.

VI. Role of the health and safety representative

As health and safety representative your role is to work proactively (this means taking action before hazards become a problem) to prevent workers from being exposed to occupational hazards. You can do this by making sure management eliminates hazards or keeps them under control when they cannot be eliminated.

Steps to help you reach your goals are:

1. Be well informed about the various hazards in your workplace and the possible solutions for controlling those hazards.
2. Work together with your union and the employer to identify and control hazards.
3. Although these Modules have been developed for the protection of workers, you may occasionally need to share some of this information with your supervisors and employer in the process of working towards a safe and healthy workplace.

Being a health and safety representative is not always easy, but helping to protect the lives of your fellow workers is worth all the time and effort you put into the job.

Identifying hazards in the workplace

1. Welder — A welder can be burnt from the sparks and there is always the danger of the work process starting a fire. There is the problem of the intense light which can cause permanent eye damage as well as the fumes given off by the process which can damage the lungs.

2. Mechanic - Depending on the precise nature of a mechanic's duties, there may be safety problems from cuts and falls, etc., and exposure to chemical hazards: oils, solvents, asbestos and exhaust fumes. Mechanics

can also have back and other musculoskeletal problems from lifting heavy parts or bending for long periods.

3. Textile worker - The textile worker faces a variety of problems. First there is the problem of safety with many machines around that are often unguarded, as well as the risk of fire with so much combustible material in the workplace. Then there are the hazards of noise and vibration. There is also exposure to dust from the material which can seriously affect the lungs. Exposure to cotton dust can lead to the occupational disease known as byssinosis.

4. Tractor driver - One of the most serious problems with tractors is that they often overturn and, if they have no safety cab, the driver can easily be crushed. Other problems include noise, vibration and exposure to chemical herbicides and pesticides when being sprayed by tractor.

5. Electronics assembly worker - An electronics assembly worker can suffer eye problems from doing close work, often in poor light. Because such workers sit still for long periods with inadequate seating, they can also suffer from back and other musculoskeletal problems. For some workers there are the dangers of solder fumes or solder “flecks” in the eye when the excess solder is cut off with pliers.

4.0 Conclusion

Workers in every occupation can be faced with a multitude of hazards in the workplace. Occupational health and safety addresses the broad range of workplace hazards from accident prevention to the more insidious hazards including toxic fumes, dust, noise, heat, stress, etc. Preventing work-related diseases and accidents must be the goal of occupational

health and safety programme, rather than attempting to solve problems after they have already developed.

5.0 Summary

Hazards in the workplace can be found in a variety of forms, including chemical, physical, biological, psychological, non-application of ergonomic principles, etc. Because of the multitude of hazards in most workplaces and the overall lack of attention given to health and safety by many employers, work-related accidents and diseases continue to be serious problems in all parts of the world. Therefore, trade unions must insist that employers control hazards at the source and not force workers to adapt to unsafe conditions.

Management commitment to health and safety and strong worker participation are two essential elements of any successful workplace health and safety programme. The most effective accident and disease prevention begins when work processes are still in the design stage.

6.0 Tutor Marked Assignment

Discuss the hazards that may be associated with 4 of the following jobs: Welder, Mechanic, Textile Worker, Tractor, and Electronic assembly worker

7.0 Reference

Santa Clara Valley Nonpoint Source Pollution Control Program. (1991). Best management practices for automotive-related industries. San Jose, CA.

Sherry, S. (1988a). Minimizing hazardous wastes: regulatory options for local governments. Sacramento, CA: Local Government Commission.

Sherry, S. (1988b). Reducing industrial toxic wastes and discharges: the

role of POTWS. Sacramento, CA: Local Government Co

Unit 10: Industrial Legislation:

Table of Content

1.0 Introduction

The safety of a worker's life in any paid occupation has been a major concern to all governments. The advent of industrialization made people to

diver their attention for survival away from agriculture. The essential means of survival could not be achieved without careful technology as a new productive economic approach (Reich and Okubo 1992). Industrialization brought about a change in survival order caused by environmental pollution, industrial accidents and diseases, and unhealthy working conditions. Morbidity and mortality especially among the young and women became a serious issue. Employers of labour were insensitive to the sufferings of workers. This brought about enactment of policies as legislation by both governments implemented by regulatory bodies to save the life of workers. This unit discusses the meaning of industrial legislation, historical development with particular reference to Nigeria; types and purposes of legislation. It also discusses the provisions of factory Act and Workmen's compensation Laws as they apply to Nigeria. Summary of the pertinent Legislation is also included.

2.0 Objectives

By the completion of this unit, you should be able to:

Explain the meaning of industrial legislation.

Trace the historical development of industrial legislation especially in Nigeria.

Describe the types of industrial legislation.

Discuss the provisions of Factory Acts and Workmen's Compensation Laws.

State the pertinent Legislations.

3.0 Main Content:

Definition of Industrial Legislation:

According to Advanced Learner's Dictionary (2001), "legislation is a set of laws passed by parliament. Legislation is a policy that guides actions".

It is accepted that the extra encouragement of potential regulatory action or litigation many organizations would not act upon their implied moral obligations (Ladon, 2006). It means that legislation is a law set up to ensure that employers comply with the rules established to ensure safety of workers in any occupation.

3.1 Historical Development of Industrial Legislation:

Industrial legislation developed as a burning desire to have full emancipation of workers in industries that were used as slaves before the advent of industrial legislation. In the olden days, slaves were used to build the many wonders of the world like in Egypt, Rome and other parts of the world. War prisoners wee not left out who were subjected to may harsh conditions in underground mines and quaries. There was no change until Georgius (1494 – 1555) wrote an article "De Re Metallica" which was published a year after his death. He wrote on the working condition in mines and industries basically on the mining accidents and illnesses, radiation and silicosis. Bernardino Ramazzini, a physician and professor of Medicine in Universities of Mordena and Padua also wrote and published his great work, De morbis Artificum Diatriba" the first systemic study of trade diseases. His contributions earned him the title "father of Occupational Medicine." (Asogwa 2007). He stressed that occupation of patient must sort for while carrying out treatment of patients. Industrial Revolution in Britain started early in the eighteenth century with the invention of Seed drill by Jethro Tull and the use of Coke to smelt iron by Abraham Darby in 1709. This led to the employment of women and children in factories who had to work long hours under unhealthy conditions and harsh circumstances. Medical practioners and laymen wrote and fought against the ills and pressed for reforms.

Doctor Charles turner Thachrah (1795 – 1833) and Lord Anthony Haley Cooper (1801 – 1885) made significant contributions. Dr Thchrah was known as the "Father of British Industrial Medicine." He published a book titled "the Effects of the Principal Arts, Trade and Profession and Civic State and Habits of living on Health and Longevity, with suggestions for the Removal of many Agents which produce Disease and shortens the Duration of lie."

Lord Cooper, an aristocrat when as a member of the British parliament helped to promote legislation that reduced the hours of work and improved conditions for workwomen and children working in mines, factories and other work places, (Asogwa, 2007). The first direct medical involvement was the appointment of Sir Thomas Morrison (1863-1932) in 1898 as the first medical factory inspector (occupational health consultant). He introduced the idea of notifying occupational health diseases causatives like lead. He emphasized a number of preventive aspects of occupational health practice known as: Ledge's Aphorisms. "Unless and until the employer has done everything means a good deal the work man can do next to nothing to protect himself, although he is naturally willing to do his share."

"If you can bring an influence to bear externally to the workman, that is one over which he has no control – you will be successful and if you cannot or do not, you will never be wholly successful."

"Practically all industrial lead poisoning is due to inhalation of dust and fume and if you stop their inhalation, you stop the poisoning."

"All workmen should be told something of the danger of the material with which they come in contact and not be left to find it out for themselves

sometime at the cost of their lives.

Numbers 1, 2 and 4 are sometimes referred to as Legged Three Aphorism as they deal with general methods of prevention of diseases and ailment in industry (Asogwa, 2007). Following industrial revolution, the protection of juveniles in the industries has been a major aim of all factory and social legislations in the United Kingdom. Factories Ac of 1883 was inter alai to regulate the labour of children and young persons in mills and factories. 1884 Act provided for the appointment of a certifying surgeon who had to examine you people to declare them fit for factory employment. Harry Mcshane, aged 16, in 1906, pulled into machinery in Cincinnati. His arm was ripped off at the shoulder and his leg broken. No compensation was paid. In 1948 Factory Act, certifying surgeon was changed to Factory Doctor. As industrialization spread from country to country so also did the diseases and ailments associated with different trades, so occupational health was recognized as district areas of medicine

The oldest international body in modern times concerned with global health and safety of people at work is the international labour organization (ILO). The organization was founded in 1919 under the League of Nations. ILO is a tripartite organization made up of representation of government, employers and workers especially from chemical and industrial risks, hygiene of seamen, social and medical insurance systems and workmen compensation. In collaboration with the world health organization (WHO), it holds a number of joint expert committee meetings in the field of occupational health and safety and publishers inter alia "international medicine Guide for ship' and Guide to ship sanitation."

In the United States between 1890 and 1914 more than 16.5 million migrated from all over the world into the States as industrial growth

escalated. These new citizens worked in factories plants, rail roads and mines, creating a new market for manufactured goods. Children and women worked under harsh conditions twelve to fourteen hours shifts, seven days a week under unspeakable conditions of grime dust and physical hazards, smoke, heats cold and noxious fumes. (Ezenduka, 2007). Workers accepted work related illness and injuries as part of the job. The life expectancy was low, people dying at their forties and fifties with workers in some trade dying in their thirties (Allender and Spadlly 1996). Most of the work related diseases like silicosis, lead poisoning and tuberculosis were attributed to other causes.

The first research carried out in 1900 and other studies the followed after proved that diseases like tuberculosis were related to the work environment, poor ventilation, overcrowding and unsatisfactory working conditions. Other investigations revealed phosphorous poisoning, radium poisoning watch making and mercury poisoning in those who manufactures felt hats. There was public awakening to the effect of work conditions. The birth of labour movement increased the demand for healthful and safe working conditions.

Different states took different approaches to legislation. In European Union, in 1996, the European Agency for safety and Health at work was founded and this starts with elimination of hazard and ends with personal protective equipment. In the United Kingdom, legislation is drawn and enforced by health and Safety executives and local authorities under the health and Safety at Work Act of 1947. This embraces the concept of risk Assessment.

Types of Industrial Legislations

There are three types of industrial legislations.

- Protective Industrial Legislation.
- Labour relations legislation.
- Collective agreements between unions and employers.

Protective Legislation- this law deals with regulation of maximum hours of work and minimum wages for women and minors. It regulates hazardous practices affecting workers (employees). There are other legislation under protective legislation in which industrial employee is entitled to benefits. It also guarantees workers compensation for industrial accidents and social security legislation such as unemployment insurance and disability insurance. (Encarta Encyclopedia 2005).

3.2 Labour Relations Law

Both federal and state labour relations laws guarantee a worker free association in Union. It establishes procedures for bargaining units and selecting Unions as bargaining agents and out law unfair practices of employees. National labour Relation of 1935 and labour management Relation Act of 1947 amends the former by requiring employers and Union to bargain in good faith and list practices prohibited by each group. The National labour management reporting and disclosure Act of 1959 includes series of measures protecting employees from unfair practices on the part of employer, or Union and extending the rights of Union members in decision making of the Union. Labour relations legislation requires that employers and Union bargain with each other but does not fix terms as in protective legislation (Kramer 2005). Collective agreement between Unions and employers are developed to remedy abuses and preserve peace.

3.3 Legislation Related to Occupational Health

The occupational health and safety services provided by the employer are influence by influenced by specific legislation at Federal and State know since the second century (Remazzim 1713), public policy that effectively controlled occupational hazards was not enacted until the 1960s. The mine safety and Health Act of 1968 was the first legislation that specifically required certain prevention programs for workers. This was followed by the Occupational Safety and Health Act of 1970, which established two agencies to carry out the Act's purpose of ensuring "safe and healthful working conditions for working men and women".

Within the context of the occupational Safety and Health Act, the Occupational Safety and Health Administration (OSHA), a federal agency within the U.S Department of Labour was created to develop and enforce work place safety and health regulations. OSHA sets the standards that regulate workers exposure to potentially toxic substances, enforcing these at the federal, about compliance can be obtained from federal, regional and state OSHA offices.

The National Institute for Occupational Safety and Health (NIOSH) was established by the Occupational Safety and Health Act of 1970 and is part of the centers for Disease Control and Prevention (CDC). In 1996, NIOSH and its partner agencies (the National Institute of Arthritics and Musculo Skeletal and Skin Disease, the National Institute of Environmental Health Sciences and the National Heart, Lung and Blood institute) unveiled the National Institute for Occupational Research Agenda- (NORA), a frame work to guide occupational safety and health research into the next decade.

The NIOSH agency identifies monitors and educates about the incidence, prevalence and prevention of work related illness and injuries and examines potential hazards of new work technologies and practices. NORA, with its research-priority agenda, is responsible for providing targeted research in areas with the highest likelihood of reducing the still-significant toll of workplace illness and injury.

Even though the National Institute for Occupational Health Administration (OSHA) was created by the same act of congress, they have different functions. The functions of OSHA are:-

To determine and set standards for hazardous exposures in the workplace.

To enforce the occupational health standards this includes the right of entry for inspection.

To educate employers about occupational health and safety.

To develop and maintain a database of work related injuries, illness and deaths.

To monitor compliance with occupational health and safety standards.

The functions of NIOSH are -

To conduct research and review findings and to recommend permissible exposure levels for occupational hazards to OSHA.

To identify and research into occupational health and safety hazards.

To educate about occupational health and safety.

To distribute research findings relevant to occupational health and safety.

3.4 Purpose of Legislation

One may ask the purpose of legislation or rule. The purpose of the rule is

to reduce the number of job-related fatalities, illness and injuries. The legislation or rule will accomplish this by requiring employers to establish a workplace safety and health program to ensure compliance with set standards by Occupational Safety and Health Administration Act. This act covers all employers except those engaged in construction and Agriculture. This is the situation in U.S.A.

3.5 Basic Obligations

The basic obligation under this rule is that each employer must set up a safety and health program to manage workplace safety and health to reduce injuries, illness and fatalities by systematically achieving compliance with Occupational safety and Health Act (OSHA) standards and the General Duty Clause. The set programme must be appropriate to conditions of workplace such as the hazards to which employees are exposed and the number of employees there. The rule applies to hazards covered by the General Duty Clause and by OSHA standards.

The programme must have the following elements:

Management leadership and employee participation.

Hazard identification and assessment.

Hazard prevention and control.

Information and training, and,

Evaluation of program effectiveness.

It is important to note that the employees who have been operating this programme before now should continue. The employer should demonstrate the effectiveness of the employer's programme that differs from these requirements included under the core elements of this rule.

Management Leadership and Employee Participation. It is basic obligation

that the employer must demonstrate management leadership of he safety and health program.

The employer can demonstrate this by:-

Establishing the program responsibilities of managers, supervisors and employers for safety and health in the work place and hold them accountable for carrying out those responsibilities.

Providing managers, supervisors and employers with the authority, access to relevant information, training and resources they need to carry out their safety and health responsibilities and

Identifying at least one manager, supervisor or employee to receive and respond to reports about work place safety and health conditions and where appropriate, to initiate corrective action.

3.6 Employee Participation

The employer's basic obligation here is that the employees must be provided with opportunities for participation in establishing implementing and evaluating the program.

What must the employer do to ensure that employees have opportunities for participation? The employer must:-

Regularly communicate with employees about work place safety and health matters.

Provide employees with access to information relevant to the program.

Provide ways for employees to become involved in hazard's identification and assessment, prioritizing hazards, training and program evaluation.

Establish a way employee to report job-related facilities, injuries, illnesses, incidents and hazards promptly and to make recommendations about appropriate ways to control those hazards and provide prompt responses to such reports and recommendations.

What must the employer do to safeguard employee participation in the programme? The employer must discourage employees from making reports and recommendations about fatalities, injuries, illnesses, incidents or hazards in the workplace, or from otherwise participating in the workplace safety and health programme.

In order to carry out this portion of the rule, the employer must comply with the National Labour relations Act.

Hazard Identification

The basic obligation of the employer is that he must systematically identify and assess hazards to which employees are exposed and assess compliance with the General Duty Clause and Occupational and Safety Health Act (OSHA).

What must the employer do to systematically identify and assess hazards and asses compliance?

The employer must:

Conduct inspections of the workplace.

Review safety and health information.

Evaluate new equipment, materials, and processes for hazards before they are introduced into the workplace.

Asses the severity of identified hazards and rank those that cannot be corrected immediately according to their severity.

It should be noted that some OSHA standards impose additional more specific requirements for hazards identification and assessment. This rule does not displace those requirements.

How often must the employer carry out the hazards identification and assessment process? The employer must carry it out:

Initially as often thereafter as necessary to ensure compliance with the

General Duty Clause and OSHA standards and at least two years, and when safety and health information or a change in workplace conditions indicates that a new or increased hazard may be present.

When must the employer investigate safety and health events in the workplace? The employer must investigate each work related death, serious injury or illness or incident (near-miss) having the potential to case death or serious physical harm.

What records of safety and health programme activities must the employer keep? The employer must keep records of hazards identified and their assessment and the actions the employer has taken or plans to take to control those hazards.

Exemption – Employers with fewer than ten employees are exempted from the record keeping requirements of this rule.

The basic employer's obligation is to systematically comply with the hazard prevention and control requirements of the General Duty Clause and OSHA standards.

If it is not possible for the employer to comply immediately, the employer must develop a plan for coming into compliance as promptly as possible. This includes setting priorities and deadlines and tracking progress in controlling hazards.

Note: Any hazard identified by the employer's hazard identification and assessment process that is covered by an OSHA standard or the General Duty Clause must be controlled as required by that standard or that Clause as appropriate.

Information and training:

(A) What is the employer's basic obligation? The employer must ensure that:

Each employer is provided with information and training in the safety and health programme; and

Each employee exposed to a hazard is provided with information and training in that hazard.

Note: Some OSHA standards impose additional, more specific requirements for information and training. This rule does not displace those requirements.

(B) What information and training must the employer provide to exposed employees? The employer must provide information and training in the following subjects:

1. The nature of hazards to which the employee is exposed and how to recognize them.
2. What is being done to control these hazards?
3. What protective measure the employee must follow to prevent or minimize exposure to these hazards and
4. The provision of applicable standards.

(C) When must the employer provide the information and training required by this rule?

The employer must provide initial information and training as follows:

For current employees, before the compliance date specified in point (i)

For new employees, before initial assignment to a job involving exposure to a hazard.

Note: The employer is not required to provide initial information and training in any subject in paragraph 3.6.3 (B) for which the employer can demonstrate that the employee has already been adequately trained.

The employer must provide periodic information and training:

As often as necessary to ensure that employees are adequately informed and trained; and

When safety and health information or a change in workplace conditions indicates that a new or increased hazard exits.

(D) What training must the employer provide to employees who have programme responsibilities? The employer must provide all employees who have programme responsibilities with information and training necessary for them to carry out their safety and health responsibilities.

3.7 Industrial legislation in Nigeria.

Industrial legislation in Nigeria has taken place in two periods; pre-independence era under colonial administration and the second was after independence.

Before independence, industrial legislation in Nigeria was Workmen's Ordinance of 1941, Labour Code Ordinance of 1945 and Factories Act of 1955 revised in 1958 were modeled to all intents and purposes in the same pattern as in Britain since independence; the situation has not changed but the basic document has changed minimally from colonial days. From time to time, there had been amendment of one section of the act after another (Asogwa, 2007).

The most significant change was the coming into law of the Factory Act 1990 on account of the deficiencies of the Factories Act of 1958 that the new law was enacted to replace The Factories Act 1990.

The following areas are covered:

Cleanliness: This deal with daily cleanliness of factories washing and painting should be done at regular intervals.

Overcrowding: Factor building must be 9 feet from the floor and the space available for each work should be 40 cubic feet.

Light: Lighting of factories must be adequate.

Drainage of floors: Floors construction must be with a slope to aid drainage into gutters.

Sanitary accommodation: One suitable sanitary convenience should be provided for every 20 females. One for every 25 males.

Safety

Safety of prime move.

Safety of transmission machinery.

Safety of powered machinery.

Safety of other machinery not covered above.

Provision to unfenced machinery.

Construction and maintenance of fencing.

Safety provisions for vessels containing dangerous liquids.

Safety of self-acting machine.

Training and supervision of inexperienced workers.

Safety keeping and maintenance of hoist and lifts.

Safety rules for chains, ropes and lifting tackle.

Safety rules for crane and other lifting machines.

Keeping registers for chain and other lifting machines. Safety means of access and safe places of employment. Precautions in places where dangerous fumes are likely to be.

Precautions in respect of explosives or inflammable dust, gas and vapor.

Construction of steam containers and receivers with sound materials and their maintenance.

Safety of air receivers.

Exceptions as to steam containers and receivers with sound material and their maintenance.

Safety of air receivers.

Exceptions as to steam boilers, steam receivers, steam containers and air receivers.

Prevention of fire.

Power of air inspector to issue improvement notice it any part of work machinery or plant is in a condition likely to cause injury.

Power of an inspector to issue prohibition notice as to as factory in a condition to cause injury.

Right to appeal against prohibitions notice.

First aid that is readily accessible.

3.8 Welfare

According to Asogwa (2000), the general provisions covered the following areas.

Supply of drinking water,Washing facilities,Accommodation for clothing.

First aid: There should be a readily accessible first aid box where more than 150 persons are employed and an additional box or cupboard for every additional 150 persons.

Exemption for first aid if ambulance room is provided.

3.9 Health Safety and Welfare

Special provisions and regulations are made which include:

Removal of dust or fumes, meals in certain dangerous trades.

Protective clothing and appliances, protection of eyes in certain processes, collection of samples of a substance suspected to likely cause bodily injury

3.10 Industrial Health and Welfare Center (IHWC)

Every industry, irrespective of it size should provide as a contiguous unit, if possible an Industrial Health and Welfare center. This should embody: Occupational Health Service Unit, Toilet facilities, a restaurant, canteen or snack bar and a resting room.

Workmen's Compensation Law of 1990.

Workmen's compensation, according to Decree1990, a person shall be deemed a workman if either before or after the commencement of this Decree he has entered into or is working under a contact of service or apprenticeship with an employer whether by way of manual labour, clerical work or otherwise, implied, in oral or in writing.

Under listed are the provisions made:

Employer's liability for compensation for death or incapacity resulting from accident (not deliberate), which incapacitates the worker for a period of three consecutive days.

Compensation in fatal cases – this will be equal to the sum of 42 (forty-two) months' earnings.

Compensation in cases of permanent total incapacity shall be equal to 44 (forty-four) months' earnings.

Additional compensation of ¼ of 44 months earnings where an injury results in permanent total incapacity of such a nature that the injured workman must the constant help of another person.

Compensation for permanent partial incapacity.

Medical assessors to be appointed for estimation of degree of disability.

Compensation in case of temporary incapacity

Full salary	First 6 months.
½ salary	First 3 months

¼ salary First 15 months

It should be noted that any salary so paid shall be deducted from payable compensation

Method of calculating earnings according to Asogwa (2000, p102) a person entitled to compensation is the victim in the case of death his partial of complete dependants.

Distribution of compensation: it is through the court in case of death of a workman. Among the requirements are notice of accident and application for compensation to be made within six months of illness or death.

Employer should report the death of a workman to a labour officer with seven days stating the circumstances of death if known to him.

Medical examination and treatment: The employer once notified shall arrange for the injured workman to have medical examination and treatment free to the workman.

Agreement as to compensation: This should not be less than amount payable according to the law.

Determination of claims: To be made in a law court in case of disagreement between workman and employer.

Review of compensation paid: This can be made (in case the injury gets worse) with medical advice.

Medical expenses to be defrayed by the employer include.

Medical, surgical and hospital treatment, shill nursing services and supply of medicines and surgical dressings.

The supply, maintenance, repair and renewal of non-articulated artificial limbs and apparatus,

Traveling expenses incurred in the course of receiving medical treatment

Compensating to include disability caused by occupational diseases.

Compulsory insurance of workman against death or injury arising in the course of his employment.

3.11 Highlights of Pertinent Regulations

The following legislation is available on line in government Health and Safety executive website at HYPERLINK"http://www.hse.go.uk/legislation hswa.htm" www.hse.go.uk/legislation hswa.htm

The Health and Safety at work etc. Act 1974

Health and safety (first Aid) Regulations 1981

Social Security (industrial injuries) (prescribed diseases) Regulations 1985/2005

The Health and Safety Information for Employees Regulations 1989

The Air Quality Standards Regulations 1989

The Control of Noise at Work Regulations 2005

The Electricity at Work Regulations 1989. The Control of Explosives Regulations 1991. The workplace (health, safety and welfare Regulation 1992.

The Health and Safety (display screen equipment) Regulations 1992

The Personal protective equipment (PPE) Regulation 1992

The Provision and Use of Work Equipment Regulations (PUWER) 1992/1998

The Manual Handling Operations Regulations 1992

The Genetically Modified Organisms (contained use) Regulations 1992

The control of Substances Hazardous to Health (COSHH) Regulation 2002

The construction (Design and Management) Regulation 1994

The Gas Safety (installation and Use) Regulation 1994/1998

Railways (Safety Critical Work) Regulation (SCWR) 1994

The Reporting of Injuries, Diseases and Dangerous Occurrence (RIDDOR) Regulation 1997

The Health and Safety (Consultation with Employees) Regulation 1996

Confined Space Regulation 1997

Diving at Space Regulation 1997

The Working Time Regulation 1998

The employers' Liability (Compulsory Insurance) Regulation 1998

The Control of Lead at Work Regulation 1998

Lifting Operations and Lifting Equipment (LOLER) 1998

The Management of Health and Safety at Work Regulation 1999

Quarries Regulation 1999

The Miners (control of ground movement) Regulation 1999

Railway Safety Regulation 1999 (PDF)

The Food Standards Act 1999

The Ionizing radiation (medical Exposure) Regulation 2000

The Chemicals (Hazard Information and Packaging for Supply) Regulation 2002

Control of asbestos at work Regulation 1987/2002

Control of Lead at Work Regulations 2002

Employment Act 2002

The Control of Substances Hazardous to Health Regulation 2002

Gender Recognition Act 2004

Employment Act 2002 (Dispute Resolution) Regulation 2005

The control of Vibration at Work Regulation 2005

Disability Discrimination Act 2005

Control of Major Accident Hazards (COMAH) Regulation 2005

The chemicals (Hazards Information and Packaging for Supply) Regulation 2005

Restriction of the Use of certain hazards substance in electrical and electronic Equipment Regulation 2005

Employment Equality (Sex Discrimination) Regulation 2005

Workplace Exposure Limits 2005

Work at Height Regulations 2005

Control of Noise at Work Regulation 2005

Offshore Installation (Safety Case) Regulation 2005

The Railway and Other Guided Transport System (Safety) Regulation (ROGS) 2006

Coal Miners (Inhaled Dust) Regulation 2006

Employment Equality (Age) Regulation.

4.0 Conclusion

The unit has described some of the legislation enacted to protect the health and safety of workers in occupational settings. It exposed the learner to the types of provisions the Factory Acts and Workmen's Compensation laws. Regulations relating to Occupational Health are necessary considering the fact that the goal of occupational health is to increase the span of the healthy life of working population by promotion of the highest degree of physical, mental and social wellbeing of workers. Regulations require legislation to ensure their implementation and must be enforced in all industries. The workers should be aware of the provisions to make legitimate demands when necessary.

5.0 Summary

In this unit, we have learnt that industrial legislations were enacted to protect the health and safety of workers from unhealthy conditions of work environment of industrial legislation especially in Nigeria was discussed. The provisions of the factories Act and Workmen's compensation were discussed. Industrial legislation and governments inability to enforce the laws was discussed but they should provide necessary modalities to enhance productivity and a strong labour force that is free from diseases related to occupations. Industries employing workers sustain costs in the events of accident at work such as legal fees, fines, compensatory damages, time lost of production. Loss of customers good wills etc.

6.0 Tutor Marked Assignment

1. Trace the historical development of industrial legislation in Nigeria.
2. List and explain 10 provisions of factory acts in Nigeria.

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Unit 11: Evaluation of Occupational Health Practices

Table of Content

1.0 Introduction

This unit discusses evaluation of occupational health practices with a view to correct areas of deficiency or neglect or areas that will have implication(s) on the health of the people and provide solution. It looks at the meaning of evaluation, types what should be evaluated and conclusions were drawn.

2.0 Objectives

By the completion of this unit you should be able to:

- Explain the meaning of occupational health evaluation
- State the types of evaluation
- Explain the aims for evaluating occupational health practices
- State areas of occupational health that should be evaluated.

3.0 Main Content

3.1 Evaluation

Evaluation refers to the process by which we can measure the extent to which our objectives have been met. For evaluation to be effective, the broad and specific objectives of the programme to be evaluated must have been clearly stated or defined right from planning stage. Evaluation entails measuring the extent to which these objectives have been met (Akinsola 1993).

Types of Evaluation

There are two different types of evaluation namely: process evaluation and outcome evaluation.

Process Evaluation

Refers to an evaluation of the process by which the programme is being implemented. This is an examination of the procedures and methods, their merits and demerits.

Outcome Evaluation

It refers to detailed examination or assessment of the achievements of the programme. Example, what changes have taken place in the rate at which injuries occur in the factory or industry? Evaluation would be also be categorized as continuous and terminal evaluation.

In occupational health practice, one can carry out evaluation at the end of a programme or during the programme; that is, process evaluation. There have been records of several deaths and injuries in various working environments as a result of failure to either assess the health of the workers, their environment or the work process. Evaluation of occupational health practices is concerned with ensuring that both health of the workers and the working environments are in good conditions in order to avoid recording casualties at the places of work, and to ensure greater productivity.

Aims of Occupational Health Programme/Practices

The main aims of the occupational health programme include:

i. To protect the workers against any health hazards that may arise out of their work or the condition in which it is carried out.

ii. To contribute positively towards the workers physical, and mental adjustment and particularly the adaptation of the work to workers and their assignments to job for which they are suited.

iii. To contribute to the establishment of jobs to the highest possible degree of physical and mental wellbeing of workers.

3.2 What and When to evaluate

Things to evaluate are those that can promote the health of workers. They include:

Working Environment

It is the responsibilities of the safety engineer or occupational hygienist where available to evaluate the working environment. Where these two categories are not available, the doctor or nurse does it. Treatment services in the industry can be used as an indicator of problem areas. If many people come with pneumoniocosis, it means something has to be done about the

level of dust to that environment. The dust measurement has to be taken to know how much of it in the air. Also if workers in the plants with a high intensity of noise who show by audiometry, evidence of hearing loss, sound level measurement will be taken to determine their intensities. The doctor must advise the engineers for reduction of such hazardous elements in the working environment. In order to be able to give the advice to reduce the level of sound, the doctor must keep records of annual incidence of the diseases in question in order to discern trends. If in an industry, accidents rate is high, provision of guard for dangerous machinery and education of workers result in reduction in the accidents rates (Asogwa, 2007). Aside from the level of hazards in the environment, the structures are evaluated. How many employees are in the employment of the factory or industry? It has to be determined whether the structure available is alright, and if they are enough, consider the number of employees it has.

The general condition of the factory has to be evaluated as good or bad. How is the house keeping on the factory which will include light, heating, ventilation, disposal of waste and garbage, kitchen facilities for washing, available portable drinking water, space, cloak room, safety methods organized example machine guard, protective clothing, masks precaution against fire disasters, hazard encountered example notice of faulty machines, dust, toxic wastes, health services available. measurement of acid mist in electroplating work or the use of gas detector tubes for carbon monoxide, hydrogen sulphide of methane level. As this evaluation or assessment is going on, actions are planned and taken to take care of each problem accordingly (Alakija, 2000).

3.3.1 Supervision on Correct use of Protective Clothing and Equipment

Ideally, every work process should be designed as to ensure the wearing of protective equipments such goggles, respirators, gloves. The employee must ensure that the plant is well designed and meet the safety requirements, specification and makes the work process safe. In realizing that it is not possible, to make all work process fully safe, insurance and proper wearing of safety equipment/clothing by the workers is essential.

The Community Health Practitioners will also work in co-operation with other professionals whose function includes safety in the work place. The nurse may come to realize that some experienced operators tend to cut corners or may leave out or avoid the use of protective clothing and equipment during a process thereby exposing themselves and other workers to avoidable risks. The design of most protective clothing and equipment are meant for the temperate climates and are some times cumbersome for use in the tropical climate. However, the community health practitioners must encourage the use until more suitable and equally effective alternative equipment is made. (Akinlolu, 2004)

3.3.2 Personal Health of the Workers

The medical information needed is recorded in a pre-employment examination form. The design of the form varies with different occupations and depends on whether the workers are literate or not, the form is completed. The result of the medical examination is communicated to the management in terms of whether the work is fit or unfit. Divulging details of medical finding to management or any body for that matter is against medical professional code of conduct. The form of the medical examination should be stored in a confidential file. If any detailed information is needed by management about the employee, this should only be provided with prior

consent of the workers.

3.4 Types of Medical Examination

Pre-Employment Health Assessment

The examination is carried out before employment. A successful medical examination should be a pre-requisite for employment. The information obtained enables the doctor (and management also) to know the state of health of the employee. It provided base-line data, which are invaluable for follow up in subsequent years. However, it has been found that the majority of people who submit themselves for medical examinations are sufficiently in good health to be passed as "normal" and consequently, can be first screened by the community health practitioners. Only those cases requiring more detailed examination should be left for the doctor. The nurse is therefore, permitted to pass somebody as "fit" but not "unfit". It is the doctor's responsibility to declare somebody unfit for any particular job in the organization. The use of the community health practitioners and nurse in this way saves doctors valuable time to attend to more serious problems (Asogwa, 2007).

3.5 Characteristics of Pre-Employment Health Assessment

It must give the indices of health states such as name, age, sex, temperature and blood pressure, urine analysis, blood profile, chest x-ray results, state of the skin, visual acuity, and history of previous ill health or surgical intervention. In women the menstrual history must be taken and recorded for future references.

3.6 Advantages of Pre-Employment Health Assessment

i. It provides a base-line data with which the employees' subsequent health record can be compared.

ii. It is a valuable means for diagnosing and treatment of physical defects

as revealed during the pre-employment evaluation.

The basic purpose of this test is in two folds: to ensure that the employee will not suffer ill health as a result of the work to be engaged in. Secondly, it helps to ensue that other workers will not be endangered as a result of any defect in the employment.

3.7 Pre-Placement Health Assessment

This type of examination can take the form of the initial pre-employment health assessment or a special medial examination where the job may require some specific attributes as regards the mental and physical demand of the job to be performed. If a person is found during a pre-employment medial examination to be unfit for a particular job within the organisation but fit for another job, the doctor should advise that he be employed and placed in the job he is best suited for. For example, if during the pre-employment medical examination of unskilled workers seeking employment in the catering services, one is found to be malnourished he could still be employed, but instead of doing general duties, he could be kitchen porter.

Pre-placement medical examination could be a special medical examination following illness or injury when management requests that work men be reassessed for suitability to return to his previous job. This is often called "request medical". After a worker has been medically examined, the doctor will be able to advice management on the best employment for him according to his present state of health vis-à-vis the various jobs available in the plant.

The problem that may arise from pre-placement medical examination is failure of either the worker or management or both to accept the position recommended. The worker may reject the position on the grounds that he did not initially apply for the position or because the salary is too low or the

working conditions unacceptable. Management may not have the type of job best suited to the person at the particular time. The issue may have to be resolved by a discussion between the parties (workers), management and the doctor to arrive at a mutually accepted solution. Occasionally, inspite of all efforts, suitable employment cannot be offered to the worker by the organization and he is therefore, rejected on medical grounds.

3.8 Periodic Health Assessment

The period medical examination should be carried out at regular intervals after the initial medical examination. It is not always necessary to conduct a full-scale medical examination of workers during these routine periodic tests, especially if there are no overt signs of illness. The nature of this selective medial examination should depend on special risks involved and to what extent the worker has been disabled. This examination is to ensure that the employees working in certain occupation environment example quarries, mines, oil rigs, those employed in lead industries etc. continue to be in good health. This is in line with the ILO recommendations of improving the quality of life by advising on preventive measures to people exposed through their occupation to physical and psychological risks.

In some occupations or trades, it is mandatory that periodic health assessment is carried out. The period between each will depend on the type of health risks involved, example, constant exposure of radiographers to radiation, cement workers to dust and laundry workers to higher level of noise. People who are exposed to radiation should be examined every six (6) months or every three months depending on the degree of radiation hazards to which the worker is exposed. Similarly, those who work in noise environment such as the engineer's rooms of a ship, require audiometry as the most important test. Coal miners and others working in organic and

inorganic environments need radiological examination of the chest and lung function test to detect various forms of obstructive and restrictive lung diseases. They also need special emphasis on the respiratory system during clinical examination.

If the worker is found to be ill during the period of medical examination, he should be referred to the doctor for thorough medical examination including laboratory investigations. A special form needs to be designed with emphasis on the most relevant aspects. If after the medical examination, the doctor discovers that the worker is no longer fit for that particular job or should be placed on "light duty", the management should be informed and they discuss on what should be done to safe the life of the employee.

After the medical examination and the appropriate action, the record should be filed in the workers confidential file which should be only accessible to the doctor or nurse if so delegated. Details of the worker's health condition can only be communicated to the management on written consent by the worker. High degree of confidence on the side of both doctor and nurse is very necessary.

Return to Work for Injury or Illness Assessment or Request Medical Examination

From time to time, management requests the doctor to conduct a medical examination on a worker so as to recommend the best job he is able to do following illness or injury. This examination has to be conducted by the doctor and not to be delegated to the nurse. The medical examination should consist of the usual history and physical examination, laboratory and other investigations including radiography if indicated, may be carried out. After, the doctor should interview the worker with regards to his job before illness or injury and what job he would like to do, giving his present

limitations.

The doctor has to weigh the possibilities of the workers continuing in his former job by retaining him against fresh training for a new job. Request medical examination is also carried out to be certain that a man who has applied to be retired on health grounds should go. The evaluation will aid the health unit to update its records and will also help the employee who may be required to be placed in a job that will not endanger or precipitate other problems. It also helps in planning the rehabilitation of the employee.

Pre-Retirement Health Assessment/Outcome Valuation

Though very desirable, not all employers of labour subscribe to the assessment. The assessment is undertaken to measure the health status of a staff that is about to retire. This information obtained during the pre-retirement assessment will offer the health car provider opportunity to counsel the client on maintenance in retirement. The advice given should include education on adequate diet, exercise in moderation and the importance of taking prescribed medication. Ailment or disease may be discovered during the exercise, that client should be referred for expert management.

4.0 Conclusion

Evaluation of occupation health practices involves knowing the extent to which the aims and objectives of occupational health practice have been achieved considering the health of the workers vis-à-vis the working environment. The focus is on the assessment of the working environment, the health of the workers before, during and at the end of working (that is retirement assessment).

5.0 Summary

In this unit, we have discussed various types of evaluation and how each can be used in ensuring effective means of ensuring and protecting the health and safety of workers.

6.0 Tutor Marked Exercises

1. Explain the term evaluation as it relates to occupational health practice.

7.0 Further readings

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Unit 12: Health Professionals Involved in Evaluation

1.0 Introduction

The evaluation of occupational health programme would not be completed if the functions of some professionals apart from doctors and nurses are not mentioned. These are professionals who should evaluate at one point or the other.

2.0 Objectives

At the end of this unit, the learner is expected to:

Identify the professionals involved in evaluation of occupational health

Describe the function(s) of professionals involved in evaluation of occupational health.

3.0 Main Content

3.1 Safety Engineer

A safety engineer usually heads safety departments and is specially trained in safety. He ensures that safety of the work, making the worker to be in job best suited to him and the work environment suitable for the worker. If there is any thing that will constitute a hazard, he is the one that takes care of it. He over-sees general safety in a plant. He is also a member of the safety committee in any organization. The safety engineers take record of injuries and investigate accidents which have already occurred. They use the statistics to advise management on how to avoid the occurrence of such accidents. They are always available to advice on accident prevention in the plant.

Functions of Safety Engineers

The safety engineer works in the area relating to protection of people, property and environment.

- Analyses, identify and evaluate hazardous conditions and practices.
- Develops hazard control designs, method, procedures and programmes.
- Implements, administer and advise others on hazard control programmes.
- measures, audits and evaluates the effectiveness of hazards control programmes.
- Measures, audits and evaluates the effectiveness of hazards control programmes.
- Drafts a future safety plan and statement based on real time

experiences and facts.

The safety engineers must be personally pleasant and intelligent with himself and his organisation.

3.2 Counsellor

A counselor is one who assists another in making an informed decision concerning a career. In occupational health, an occupational rehabilitation counsellor helps people or workers with physical disabilities such as cardiac weakness tuberculosis or structural defects produced by any disease condition that are in greater need of counseling because of greatly restricted range of career open to them. The process of choosing a career calls for such extensive knowledge about job on the one hand and the extent of ability of the worker on the other hand in relation to his health.

An occupational rehabilitation counsellor provides five principal types of services following medical restoration of physical functions:

- Diagnosis of vocational and educational aptitudes and interest by means of psychological test and other devices.
- Personal assistance and information necessary to the choice of occupational goals and the making of plans for training and retaining.
- it necessarily helps the securing of financial assistance for training and retaining.
- Continued counselling and assistance while training is being secured.

Special assistance in finding a job which utilizes the training secured and in which physical disabilities are minimized with respect to requirements for the job and for the individual's success and satisfaction. The above description is made in terms of people/workers who find it necessary to seek counselling again because diseases or accidents have disqualified them for their former work or job.

In a real sense, all clients handled by counselors are handicapped in one way or the other (Williamson and Bordin 1995).

3.3 Toxicologist

Toxicology is the science of adverse effects of chemical substance on living organisms. Living organisms include the algae in the sea, animal and people.

A toxicologist is one who specialized in toxicology. Toxicological studies aim to assess the adverse effects related to different drug doses in order to find the "acceptable safe" level of chemicals or chemical substances. The work is carried out in two phases, first, by collecting data on the properties of chemicals, results of studies and accidental misuse of chemicals, second by predicting the effects of chemicals in different situations. To make relevant predictions there must be information available on:

- The substance and its chemical and physical properties.
- The biological system affected
- The effects or response caused by the substance.
- The exposure (dose, time, situation)

This information is obtained from laboratory test with cells bacteria, animals and accidents involving the substance. Routes through which toxic substances may enter the body under normal working condition are: Inhalation, through the skin and ingestion.

3.4 Recreational and Occupational Therapists

Recreational therapy is a planned, organized, and therapeutic recreation programme designed to help workers develop social skills and learn to participate in leisure group activities. The focus of recreational rehabilitative programmes for people with disabilities involves the following,

- Involving the worker in leisure activities
- Developing or restore social functions
- preventing loss of physical capacities.

A recreational therapist is the person that specializes on recreational therapy. Functions of recreational therapist(s) are many. Recreational therapists have learned that play can heal. They share with occupational therapists view that seemingly ordinary activities can put a disabled person on the road to recover or lead to improvement, at any rate. It is also known as therapeutic recreation specialist, a job title that draws attention to the fact that theirs is a health profession. They use recreational and leisure activities as a form of treatment, much as other professionals use surgery, drugs, nutrition, exercise, or psychotherapy. The primary goal of the recreation therapist to enhance the workers' ability to function in every day life. Apart from sheer enjoyment, the activities they devise provide opportunities for exercise and social participation. Other goals of recreational therapist include relieving of anxiety, building confidence, and promoting independence. The programmes are designed to meet the patients' capabilities, needs, and interest. The creational therapist may guide or instruct patients in several areas such as:

- Relaxation technique such as deep breathing, to help reduce stress or tension.
- Stretching and limbering exercises.
- Individual and group sport activities.
- Leisure activities such as arts and crafts, games or dramatics.
- Special outings such as ball games, sight seeing or picnics.

In general, recreational therapists assess the patients' ability to function,

develop a treatment plan, lead activities, and monitor progress as plan is carried out. During the initial session with a patient, the recreation therapist might chat for a while with a worker and family, trying to put them at ease before directing the conversation towards the worker hobbies or other interests. By discovering what kind of things the patient likes to do, the therapist will be able to increase voluntary involvement and participation. The therapist also needs information about the patient's worker mental and emotional status in order to set realistic goals and recommend suitable activities. To gather this information, the therapist goes over medical records, talks with other members of the staff, and observes the patient's behaviour. Having learned what the patient both can do and like to do, the therapist prepares a list of activities that capitalize on the patient's strengths and interests.

- While patients engage in activities, recreational therapists carefully observe their reactions. Observation such as these provides the basis for the therapist's period review and modification of each patient's activity programme.
- Another important function of recreational therapist is keeping records. Among them are the initial evaluation, memoranda of periodic reviews, reports of the initial evaluation, memoranda of periodic reviews, reports to the physician, internal staff notes Medicare records, and discharge evaluations. These records are used to keep track of the patient's condition, document treatment and monitor progress (Gamliel, 1985).
- The recreational therapist conducts therapeutic recreational programmes for clients' families and groups, including but not limited to out door adventure/wilderness programme (ropes course, rock

climbing etc), physical activities programme (sports, group games, dancing), creative expressive programmes (dramatics, music, arts and crafts), and special events and programmes.

- Works intensively with groups and individual clients as part of their treatment programme, coughing and supervising them in active sports, grouping games, dancing, dramatics, and related activities, and participates, if necessary, to encourages participation.

The specifics of the recreational therapist's job vary with the populations served and the work settling, such as a hospital, nursing, home, in patients rehabilitation centres, factories and industries

- Long term are facilities.
- Facilities or company choice
- Residential Facilities
- Schools (U.S. Dept. of Labour 2006).

Occupational Therapist

Occupational therapy is skilled treatment that helps individuals achieve independence in all facets of their lives. Occupational therapist gives people the "skills for the job of living" that are needed for independence and satisfying lives. Service typically includes:

- Customized treatment programmes aimed at improving abilities to carry out the activities of daily living.
- Comprehensive evaluation of home and job environments and recommendations on necessary adaptation.
- Assessment and treatment for performance skills.
- Recommendation and training in the use of adaptive equipment example wheelchairs etc.

- Guidance to family members and care givers as well as employees and co-workers.

Occupational therapy practitioners are skilled professionals whose education includes the study of human growth and development with specific emphasis on the social, emotional and physiological effects of illness and injury.

Functions of Occupational Therapists

- Occupational therapists (OTS) work with individuals who have conditions that are mentally, physically, developmentally, or emotionally disabling. Occupational therapists assist individual to develop, recover or maintain daily living and work skills.
- They help people improve their ability to perform tasks in their daily living and work environments.
- They also help clients not only to improve their basic motor functions and reasoning abilities, but also to compensate for permanent loss of function. Their goals are to help clients have independent, productive and satisfying lives.
- Occupational therapists assist clients in performing activities of all types, ranging from using a computer to caring for daily needs such as dressing, cooking and eating. Physical exercises may be chosen to improve visual acuity and ability to discern patterns.
- Occupational therapists also use computer programs to help clients improve decision-making, abstract reasoning, problem - solving, and perceptual skills, as well as memory, sequencing and coordination - all of which are important for independent living.
- Therapists instruct those with permanent disabilities, such as spinal

cord injuries, cerebral palsy, or muscular dystrophy, in the use of adaptive equipment, including wheel chairs, orthotics, and aids for eating and dressing.

- They also design or make special equipment needed at home or at work.
- Therapists develop computer-aided adaptive equipment and teach clients with severe limitations how to use that equipment in order to communicate better and control various aspects of their environment.
- Some occupational therapists treat individuals whose ability to function in a work environment has been impaired. These practitioners arranged, evaluate the work environment, plan work activities, and assess the client's progress.
- Therapists also may collaborate with the client and the employer to modify the work environment so that he works can be successfully completed.
- Occupational therapists may work exclusively with individuals in a particular age group or with particular disabilities. In schools, for example, they evaluate children's abilities, recommend and provide therapy, modify classroom equipment, and help children participate as fully as possible in school programs and activities.
- A therapist may work with children individually, lead small groups in the classroom, consult with a teacher, or serve on a curriculum or other administrative committee.
- Early intervention therapy services are provided to infants and toddlers who have, or at the risk of having developmental delays. Specific therapies may include facilitating the use of the hand, promoting skills for listening and following directions, fostering

social play skills, or teaching dressing and grooming skills.

- Occupational therapy also is beneficial to the elderly population. Therapists help the elderly lead more productive, active, and independence, lives through a variety of methods, including the use of adaptive equipment.
- Therapists with specialized training in driver rehabilitation assess an individual's ability to drive using both clinical and on-the-road tests. The evaluations allow the therapist to make recommendations from adaptive equipment, training to prolong driving independence, and alternative transportation options.
- Occupational therapists also work with the clients to assess the home and work site hazards and to identify environmental factors that contribute to falls.
- Occupational therapists in mental settings treat individuals who are mentally ill, mentally retarded, or emotionally disturbed. To treat these problems, therapists choose activities that help people learn to engage in and cope with daily life. Activities include time management skills, budgeting, shopping, home making, and the use of public transportation.
- Occupational therapists also may work with individuals who are dealing with alcoholism, drug abuse, depression, eating disorders, or stress - related disorders.
- Assessing and recording a client's activities and progress is an important part of an occupational therapist's job. Accurate recording is essential for evaluating clients, for billing, and for reporting to physicians and other health care providers.

3.5 Occupational Epidemiologist

Epidemiology is the study of the effects of workplace exposures on the frequency and distribution of diseases and injuries in the population and thus falls into a category of exposure-oriented sub-discipline. It is the study of factors affecting health and illness of populations and serves as the foundation and logic and intervention made in the interest of public health and preventive medicine. An occupational epidemiologist studies the occurrence of disease symptoms among factory workers.

3.6 Medial Laboratory Scientists

Medical laboratory technologists or clinical laboratory scientists play important role in the clinical laboratory. They are responsible for performing routine as well as highly specialized tests to diagnose diseases, troubleshooting (preventing and solving problems with results, specimens, or instruments); and communicating technical information, including test results to the pathologists or treating physician. They may also train other personnel (Asaduate Prospects, 2007).

3.7 Laboratory Technicians

- Scientific laboratory technicians are responsible for laboratory - based tasks, which include sampling, testing, measuring, recording and analyzing results in biological, chemical, physical and life sciences. They also provide all the required technical support to enable the laboratory to function effectively, while adhering to correct procedures and health and safety guidelines.
- Scientific laboratory technicians carry out fundamental tests and part of a scientific team. These tests assist in the advancement and development of modern medicine and science.

Typical Work Activities

The main function of a scientific laboratory technician is to perform the specific procedure that allows scientist to perform more complex analytical processes of the laboratory.

Task Typically Involve

- Carrying out routine tasks accurately
- Performing a limited number of repetitive laboratory tests in order to produce reliable and precise data to support scientific investigations.
- Following strict methodology to carry out analysis.
- Preparing specimen and samples.
- Constructing, maintaining and operating standard laboratory equipment, for example centrifuges, tetrapterous, pipeting machines and pH meters.
- Recording and sometimes interpreting results to present to senior colleagues.
- Using computers and performing mathematical calculations for the preparation of graphs.
- Keeping up to health with technical developments, especially those which can save time and improve reliability.
- Demonstrating procedures if working in education.
- Conducting searches on identified topics relevant to the research.
- Following strict safety procedures and safety checks. the actual nature of the work will depend on the organization. For example:
- With a local authority environmental health development, the work may involve analyzing food samples to consider prosecution and to protect public health.
- Within the water industry, the work will mainly focus on the

collection and analysis of water samples.

3.8 Physical Therapists

Physical therapy is the planning organizing and implementing programmes for individuals whose ability to function is impaired or threatened by disease or injury.

- Physical therapy focuses primarily on neuromuscular, skeletal, pulmonary and cardiovascular systems and includes evaluation of the system and selection and application of appropriate therapeutic procedures to maintain improve or restore functions.

Physical therapists are persons who are specialized in physical therapy.

- They prepare patient, treatment area, and/or equipment, implementing the treatment program and modifying the treatment program as outlined in the plan of care.
- They perform therapeutic exercise for individual muscles or muscle groups, including postural exercise, manual muscle testing and gait analysis, training and balance.
- They select exercise for specific results i.e. increasing strength, coordination, endurance, flexibility and balance. (Wabash Valley College, 2007).
- Physical therapists provide treatment to relieve pain, limit or prevent permanent physical disability, and improve the morbidity of people who have injury, disease, or disability. These professionals use the properties of heat, cold, exercise, electricity, ultrasound, massage, and education to relieve pain, promote healing, and improve function.

Settings for Physical Therapy

- Schools
- Homes

- Factories/Industries/companies etc.

Physical therapists who work in the schools, work with other members of the special education team and the family to identify the problems interfering with a students' education programme. During an assessment of the student, the physical therapist might measure walking and other mobility skills, daily activities such as dressing and toileting, and positioning and posture during classroom learning, play, and on the school bus. The physical therapist will also measure joint range of motion and mobility, muscle strength, limb length and circumference, and sensor motor performance.

In school settings, physical therapists usually work as a team with occupational therapists, speech-language pathologists, special education teachers, and other professionals. In addition to this collaboration treatment, the physical therapist also serves as a resource to the school faculty. A physiotherapist is a physical therapist.

3.9 Industrial Hygienists

Industrial hygienist recognizes evaluates and controls health hazards in the work place from biological, chemical and physical sources. Industrial hygienists' expertise can be a vital resource for government agencies, private response organization and local emergency planning committee when preparing for or responding to emergency situations. Qualified industrial hygienists can provide effective guidance on methods to identify, manage, and ultimately control risks associated with natural disasters, hazardous materials, accidents and terrorist attacks. To help emergency planners, incident commanders and community leaders take full advantages of the experience, training are education of industrial hygiene professionals. Industrial hygienists are qualified and able to perform a number of

incidence command functions, such as:

- Participating in pre-planning for a major incident.
- Developing and implementing exposure assessment method to identify and prioritize hazards during the incident response and consequences management.
- Interpret data from sampling activities and direct reading instrumentation appropriately.
- Advising on, developing, and implementing the appropriate controls for elimination of chemical, biological and physical hazards.
- Advising on, developing, and implementing appropriate personal protective equipment (PPE) to minimize exposures.
- Advising on, developing, and implementing personal decontamination procedures.
- Effectively communication risks based on complex scientific and field data (UNA, 2007.

4.0 Conclusion

The function of some related professionals are also discussed in relation to the evaluation of occupational health practice. They include, environmental hygienists, toxicologists, laboratory scientist among others. Evaluation of occupational health practices is an invaluable avenue to know when negative changes begin to take place in the workers which would be promptly handled for enhancement of productivity.

5.0 Summary

The functions of each professional likely to contribute in evaluation of the practice are highlighted.

6.0 Tutor Marked Assignment

1. Enumerate the roles of four professionals involved in programme evaluation

7.0 References

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Unit 13: Occupational Rehabilitation

1.0 Introduction

Rehabilitation is an integral part of the duties of community health practitioners because every major illness or injury carries the threat of disability or impairment, which involves a loss of function or an abnormality. The principles of rehabilitation are basic to the care of all patients, and rehabilitation efforts should begin during the initial contact with a patient. The goal of rehabilitation is to restore the patient's ability to function independently or at a preillness or preinjury level of functioning as quickly as possible. If this is not possible, the aims of rehabilitation are maximal independence and a quality of life acceptable to

the patient. Realistic goals based on individual patient assessment are established with the patient to guide the rehabilitation programme.

2.0 Objectives

At the end of this unit, the learner will be able to:

- Describe the concept and process of rehabilitation
- Identify those involve in rehabilitation
- Identify the principles of rehabilitation

3.0 Main Content

3.1 The Concept of rehabilitation

Rehabilitation is a dynamic, health – oriented process that assists an ill person or a person with disability (restriction in performance or function in everyday activities to achieve the greatest possible level of physical, mental, spiritual, social, and economic functioning. The rehabilitation process helps the patient achieve an acceptable quality of life with dignity, self respect, and independence is designed for people with physical, mental or emotional disabilities. During rehabilitation – sometimes called habilitation – the patient adjusts to the disability by learning how to use resources and to focus on existing abilities. In habilitation, abilities, not disabilities, are emphasized.

Rehabilitation services are required by more people than ever before because of advances in technology that save or prolong the lives of seriously ill, injured, and disabled patients. Increasing numbers of patients who are recovering from serious illnesses or injuries are returning to their homes and communities with ongoing needs. Every patient, regardless of age, gender, ethnic group, socioeconomic status, or diagnosis, has a right to rehabilitation services.

A person is considered to have a disability, such as a restriction in

performance or function in everyday activities. If he or she has difficulty talking, hearing, seeing, walking, climbing stairs, lifting or carrying objects, performing activities of daily living, doing school work, or working at a job. A severe disability is present if a person is unable to perform one or more activities, uses an assistive device for mobility, or needs help from another person to accomplish basic activities. Individuals are also considered severely disabled if they receive federal benefits based on an inability to work.

3.2 Access to Health Care and Health Promotion

For years, people with disabilities have been discriminated against in employment, public accommodations, public and private services including health care. The needs of the disabled in health care settings produce many challenges to health care providers: how to communicate effectively if there are communication deficits, the additional physical demands for mobility, and time required to provide assistance with self-care routines during hospitalization. Physicians and nurses may not know the specific needs of individuals with disability and may fail to provide services for them. For example, an obstetrician may advise a woman spinal cord injury not to become pregnant because the physician and nurses caring for an expectant woman with disability may not know specific transfer techniques to help her unto an examining table or how to advise her on bowel, bladder, and skin care issues during pregnancy. Before labour and delivery, the medical team needs to be educated about the special needs of a woman with a cervical spinal cord injury in regards to management of autonomic hyperreflexia. Often, the person with disability must educate the health care professionals.

Because of unfavorable interactions with health care providers, including negative attitudes, insensitivity and lack of knowledge, people with disability may avoid seeking medical interventions or health promotion programme and activities. For this reason, and because the number of individuals with disability is increasing, nurses must acquire knowledge and skills and be accessible to assist these individuals in maintaining a high level of wellness.

Community Health Workers are therefore positioned to influence the architectural design of health care settings and the selection of equipment that promotes ease of access and health. Padded examination tables that can be raised or lowered make transfers easier for the disabled. Birthing chairs benefit women with disability during yearly pelvic examinations and pap smears and for urologic evaluations. Ramps, grab bars, raised and padded toilet seats benefit many persons who have orthopedic disabilities and need routine physical examination and monitoring (e.g. bone density measurements). Just as people without disability should have regular screening tests, such as mammography or testicular and prostate examinations, so should people with disability. The health care professionals who provide these screening and monitoring procedures are in a position to influence decisions about how equipment and procedures can be adapted to meet the special needs of their patients, whether these needs are cognitive, motor or communicative.

Community Health Practitioners Expectations

Community health practitioners are expected to provide health promotion education classes that are targeted to the disabled. Classes on nutrition and weight management are extremely important to individuals who are wheelchair dependent by adolescents and young adults with spinal cord or

traumatic brain injury, because the threats of acquired immunodeficiency syndrome (AIDS) and unplanned pregnancy exist for these populations just as they do for the population in general. Other healthy behaviors about which neurologically disabled persons need education include avoiding alcohol and non-prescription medications while taking antispasmodic and anti-seizure medications. Nurses should teach all stroke survivors and patients with diabetes how to monitor their own blood pressure or glucose levels. The warning signs and symptoms of stroke, heart attack and cancer as well as how to access help, should also be taught to all disabled persons.

As active members of the society, people with disabilities are no longer an invisible minority. An increased awareness of the needs of people with disabilities will bring about changes to improve their access and accommodate their needs. Modification of the physical environment permits access to public and private facilities and services, including health care, and community health practitioners can serve as advocates for the disabled to eliminate discriminatory practices.

Focus of rehabilitation

Disability can occur at any age and may result from an acute incident, such as stroke or trauma or from the progression of a chronic condition, such as arthritis or multiple sclerosis. A person with disability experiences many losses, including loss of function, independence, social role, status and income. A patient and his or her family members experience a range of emotional reactions to these losses. The reactions may progress from disorganization and confusion to denial of the disability, grief over the lost function or body part, depression, anger, and finally acceptance of the disability. The reactions may subtle over time and may recur at a later

time, especially if chronic illness is progressive and results in increasing losses. Not all patients experience all of the stages, although most do exhibit grief. Patients who exhibit grief should not be blithely encouraged to "cheer up."

The community health practitioners should show a willingness to listen to the patient talk about the disability and should understand that grief, anger, regret and resentment are all part of the healing process.

The patient's preexisting coping abilities play an important role in the adaptation process: one patient may be particularly independent and determined, while another may be dependent and seem to lack personal power.

The Rehabilitation team

Rehabilitation is a creative, dynamic process that requires a team of professionals working together with the patient and the family. The team members represent a variety of disciplines, with each health professional making a unique contribution. Each health professionals assess the patient, identifies patient's needs within the discipline's domain and sets rehabilitative goals. Team members hold group sessions at frequent intervals to collaborate, evaluate progress, and modify goals as needed to facilitate rehabilitation and to promote independence, self-respect, and an acceptable quality of life for the patient.

The rehabilitation team includes

the patient

patient's family

the rehabilitation nurse/ community health practitioners.

The **patient** is the key member of the rehabilitation team. He or she is the focus of the team effort and the one who determines the final outcomes of

the process. The patient participates in goal setting, in learning to function using remaining abilities and in adjusting to living with disabilities.

The **patient's family** is also incorporated into the team. The family is a dynamic system. So disability of one member affects the other family members. Only by incorporating the family into the rehabilitation process can the family system adapt to the change in one of its members. The family provides ongoing support, participates in problem solving and should learn to provide necessary ongoing care.

The **rehabilitation nurse/community health practitioners** develops a therapeutic and supportive relationship with the patient and the family. The nurse always emphasizes the patient's assts and strengths, positively reinforcing his or her efforts to improve self-concept and self-care abilities. During community health practitioners/nurse-patient interaction, they actively listen, encourage and share the patient's successes.

Using the standard process, the nurse/ community health practitioners develops a plan of care designed to facilitate rehabilitation, restore and maintain optimum health and prevent complications. The nurse/community health practitioners helps the patient identify strengths and past successes and develop new goals. Coping with the disability, self care, mobility, skin care and bowel and bladder management are frequently areas for their intervention. The nurse/community health practitioners assumes the roles of caregiver, teacher, counselor, patient advocates and consultant. The nurse is often the case manager responsible for coordinating the total rehabilitative plan, collaborating with and coordinating the services provided by all members of the health care team including the home care nurse who is responsible for directing the patient's care after return to the home.

Other members of the rehabilitation team may include: a physician, community health practitioners, nurse practitioner, psychiatrist, physical therapist, occupational therapist, speech-language therapist, psychologist, psychiatric liaison nurse, social worker, vocational counselor, orthotist or prosthesis, rehabilitation engineer and sex counselor or therapist.

Areas of special rehabilitation practice

Although rehabilitation is a component of every patient's care, there are specialty rehabilitation programs established in general hospitals, free-standing rehabilitation hospitals, and outpatient facilities. The Commission for the Accreditation of Rehabilitation Facilities (CARF) sets standards for these programs and monitors compliance with them.

Special rehabilitation programs often meet the needs of patients with neurological disabilities. Stroke recovery programs and traumatic brain injury rehabilitation emphasize cognitive remediation: assisting patients to compensate for memory, perpetual, judgment, and safety deficits as well ass teaching self-care and mobility skills. Other goals include assisting patients to swallow food safely and to communicate effectively. In addition to stroke and brain injury, other neurological disorders treated include multiple sclerosis, Parkinson's disease, amyotrophic lateral sclerosis and nervous system tumors.

The number of spinal cord injury rehabilitation programs has increased since World War II. Integral components of the programs include understanding the effects and complications of spinal cord injury; neurogenic bowel and bladder management; sexuality and male fertility enhancement; self-care including prevention of skin breakdown; bed mobility and transfers; and driving with adaptive equipment. The programs also focus on vocational assessment, training and reentry into

employment and the community.

Orthopedic rehabilitation programs provide comprehensive services to traumatic or non traumatic amputee patients, patients undergoing joint replacements, and patients with arthritis. The goals of the programme include: pain management, learning to be independent with prosthesis or a new joint, energy conservation and joint protection.

Patients with myocardial begins rehabilitation during acute hospitalization and continues on an outpatient basis. The goals are on monitoring, progressive exercise, nutritional counseling; stress management and sexuality.

Others are simplified in this table

Cases	Rehabilitative programme	Goals of rehabilitation
Patient with restrictive or chronic obstructive pulmonary disease	Pulmonary	Effective breathing patterns; energy conservation, self medication and home ventillatory mgt.
Chronic pain	Alternative pain treatment modalities	Exercise, supportive counseling and vocational evaluation
Burn rehabilitation	Intensive burn care	Joint mobility, self-care and counseling

Nurses/community health practitioners Responsibilities towards all rehabilitation cases

Skillful and knowledgeable about patients case

Assessment of actual or potential substance abuse

Thorough physical and psychological evaluation

Detoxification

Counseling

Medical treatment

Psychological assistance for the patient and family

Treatment of any coexisting psychiatric illness

Referral to community resources for social, legal, spiritual or vocational assistance.

Encourage self help groups

Assessment of functional abilities

Comprehensive assessment of functional capacity is the basis for developing a rehabilitation programme. Functional capacity measures a person's ability to perform activities of ADLs and IADLS. ADLs include activities performed to meet basic needs, such as personal hygiene, dressing, toileting, eating and moving. IADLs include activities that are necessary for independent living such as the ability to shop for and prepare meals, use the telephone. Clean, manage finances and travel.

The community health practitioners observes the patient performing specific activities (e.g. eating, dressing) and notes the degree of independence; the time taken; the patient's mobility, coordination, endurance and the amount of assistance required. Good joint motion, muscular strength, cardiovascular reserve and an intact neurological system are also carefully assessed, because functional ability depends on these factors as well. These tools provide a way to standardize assessment parameters and supply a scale or score against which improvements may be measured. They also clearly communicate the patient's level of

functioning to all members of the rehabilitation team. Rehabilitation staffs use these tools to provide an initial assessment of the patient's abilities and to monitor the patient's progress in independence.

One of the most frequently used tools to assess the patient's level of independence is the Functional Independence Measure (FIM). The FIM is a minimum data set, measuring18 items. The self-care items measured are eating, bathing, grooming, dressing upper body, toileting, bladder management, and bowel management. The FM addresses transfers and the ability to ambulate and climb stairs and also includes communication and social cognition items.

A **WeeFIM instrument** is used for children. For both children and adults, scoring is based on a seven-point scale with items used to assess the patient's level of independence.

The **PULSES** profile is used to assess the following

Physical condition(e.g. health/illness status)

Upper extremity functions (e.g. eating, bathing)

Lower extremity functions (e.g. transfer, ambulation)

Sensory function (e.g. vision,hearing,speech)

Excretory function (i.e. control of bowel or bladder),

Situational factors (e.g. social and financial support

Each of these areas is rated on a scale from one (independent) to four (greatest dependency).

The **Barthel Index** is used to measure the patient's level of independence in ADLs (feeding, bathing, dressing, grooming), continence, toileting, transfers and ambulation (or wheelchair mobility). This scale does not address communicative or cognitive abilities.

The **Patient Evaluation Conference System (PECS)** contains 15 categories. This comprehensive assessment scale includes such as medications, pain, and nutrition, use of assistive devices, psychological status, vocation and recreation. There are many other assessment tools designed to evaluate function in persons with specific disabling conditions.

In addition to the detailed functional assessment, the nurse assesses the patient's physical, mental, emotional, spiritual, social and economic status. Secondary problems related to the disability such as muscle atrophy and deconditioning are assessed as are residual strengths unaffected by disease or disability.

Other areas that require nursing assessment include

Potential for altered skin integrity

Altered bowel and bladder control

Sexual dysfunction

4.0 Conclusion

Rehabilitation services are required by more people than ever before because of advances in technology that save or prolong the lives of seriously ill, injured and disabled patients. Increasing numbers of patients who are recovering from serious illnesses or injuries are returning to their homes and communications with ongoing needs. Every patient, regardless of age, gender, ethnic group, socioeconomic status or diagnosis has a right to rehabilitation services.

5.0 Summary

The goal of rehabilitation is to help the patient gain a positive self-image through effective coping. The nurse must recognize different coping abilities and identify when the patient is not coping well or not adjusting to

the disability. The patient and family may benefit from participating in a support group or talking with a mental health professional to achieve this goal.

6.0 Tutor Marked Assignment

1. Describe the community health workers' role in rehabilitation

7.0 References for further readings

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Unit 14: International Labour Organization

1.0 Introduction

The International Labour Organization (ILO) was created in 1919 by Part XIII of the Versatile Peace Treaty ending in World War 1. It grew out of nineteenth century labour and social movement which culminated in widespread demands for social justice and higher standards for the world's working people. In 1946, after the demise of the League of Nations, the ILO became the first specialized agency associated with the United Nations. The original membership of forty-five countries in 1919 has grown to 121 in 1971.

2.0 Objectives

At the end of this unit you are expected to:

- Describe the structure of International Labour Organization
- State how ILO works
- Examine the contributions of ILO to United Nations AIDS

3.0 Main Content

The annual International Labour Conference, the ILO supreme deliberative body, is composed of four representatives from each member country: two government delegates, one worker and one employer delegate, each of whom may speak and vote independently. Between conferences, the work of the ILO is guided by the Governing Body, comprising twenty-four government, twelve worker and twelve employer member twelve deputy members from each of these three groups. The International Labour Office in Geneva, Switzerland, is the organization's secretariat, operational headquarters, research centre and publishing house. Its operations are staffed at headquarters and around the world by more than 3,000 people of some 100 nationalities. Activities are decentralized to regional, area and branch offices in over forty countries.

The ILO has three major tasks, the first of which is the adoption of International Labour Standards called conventions and recommendations for implementation by member states. The convention and recommendations guidelines contain guidelines on child labour, protection of women workers, hours of work, rest and holidays with pay, labour inspection, vocational guidance and training, social security protection, workers' housing, occupational health and safety, conditions of work at sea and protection of migrant workers.

They also cover questions of basic human rights, among them, freedom of association, collective bargaining, the abolition of forced labour, the elimination of discrimination in employment and the promotion of full employment. By 1970, 134 conventions and 142 recommendations had been adopted by the International Labour Organization. Each of them is a stimulus, as well as a model for national legislation and for practical application in member countries.

A second major task which has steadily expanded for the past two decades is that of technical cooperation to assist developing nations. More than half of ILO's resources are devoted to technical cooperation programme carried out in close association with the United Nations Development Programme and often with other UN specialized agencies. These activities are concentrated in four major areas: development of human resources through vocational training and management development, employment planning and promotion; the development of social institutions in such fields as labour administration, labour relations, cooperatives and rural development; conditions of work and life – for example, occupational safety and health, social security, remunerations, hours of work, welfare, etc.

Marking the beginning of its second half-century, the ILO launched the World Employment programme, designed to help provide employment and training opportunities for their swelling populations.The World Employment programme will be the ILO's main contribution to the United Nations Second Development Decade.

There are some 900 ILO experts of fifty-five different nationalities at work on more than 300 technical cooperation projects in over 100 countries around the world.

Third, standard setting and technical cooperation are bolstered by an extensive research, training, education and publication programme. The ILO is a major source of publications and documentation on labour and social matters. It has established two specialized educational institutions: the International Institute for Labour Studies in Geneva and the International Centre for Advanced Technical and Vocational Training in Turin, Italy.

Since its inception the ILO has had six Directors-General: Albert Thomas (1919-1932) of France: Harold B. Butler (1932-1938) of the United Kingdom: John G. Ireland; David A. Morse (1948-1970) of the United States; Wilfred Jenks (1970) of the United Kingdom

3.2 How International Labour Organization Works

3.2.1 International Labour Conference

The member states of the ILO meet at the International Labour Conference in June of each year in Geneva. Two governments delegated, an employer delegate and a worker delegate represent each member state. Technical advisors assist the delegations which are usually headed by Cabinet Ministers who take the floor on behalf of their governments.

Employer and worker delegates can freely express themselves and vote according to instructions received from their organizations. They sometimes vote against each other or even against their government representatives.

The Conference establishes and adopts International Labour Standards and is a forum for discussion of key social and labour questions. It also adopts the organization's budget and elects the governing body.

3.2.2 The Governing Body

The Governing Body is the executive council of the ILO and meets three times a year in Geneva. It takes decisions on ILO policy and establishes the programme and the budget which it then submits to the Conference for adoption. It also elects the Director-General.

The ILO Governing Body is composed of 28 government members, 14 employer members and 14 worker member states of chief industrial importance permanently hold ten of the government seats. Government representatives are elected at the Conference every three years, taking into account geographical distribution. The employers and workers elect their own representatives respectively.

3.2.3 The International Labour Office

The International Labour Office is the permanent secretariat of the International Labour Organization. It is the focal point for ILO's overall activities, which it prepares under scrutiny of the Governing Body and under the leadership of a Director-General, who is elected for a five year renewable term.

The office employs some 1,900 officials of over 110 nationalities at the Geneva headquarters and in 40 fields around the world. In addition, some 600 experts undertake missions in all regions of the world under the programme of technical cooperation. The office also contains a research and documentation centre and a printing facility, which issue many specialized studies, reports and periodicals.

3.3 The International Labour Organization (ILO) and contributions to United Nations Agency for International Developments (UNAIDS

The International Labour Organization (ILO) is the United Nations Agency with special responsibility for the world of labour.

The ILO's goal is productive and remunerative employment for all based

on the principles of social justice and equality.

The epidemic is a threat to all of the organization's four strategic objectives: fundamental principles and rights at work: employment, income generation and skills; social protection and social dialogue.

Worldwide, at least 26 million workers in their productive prime are infected with HIV. The epidemic is a labour and workplace issue because it threatens livelihoods, productivity, rights at work and economic growth. It also worsens existing problems of inadequate social protection, gender inequalities and child labour.

AIDS is a development crisis that can only be resolved with a multisectoral response. The ILO's particular contribution to UNAIDS includes:

- a tripartite membership encouraging the mobilization of governments, employers and workers against HIV;
- direct access to the workplace with its opportunities for HIV prevention as well as care, support and treatment;
- long- standing experience in framing international standards to protect the rights of workers;
- a global network of field offices and technical cooperation projects and substantial capacity for research, information sharing and training.

4.0 Conclusion

The ILO accomplishes its work through three main bodies all of which comprise government, employer and worker representatives.

5.0 Summary

In structure, the ILO is unique among world organizations in that the representatives of the workers and of the employers have an equal voice

with those of governments in formulating its policies.

6.0 Tutor Marked Assignment

1. Describe the structure of International Labour Organization and explain its mode of operation.

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