NSC 316 (EHS)
SCOPE OF ENVIRONMENTAL HEALTH

By

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B.Sc (Ilorin), M.Sc (Ibadan) PhD in view

22/05/2024

OUTLINE

- Introduction
- Scope of Environmental Health
- Components of Environmental Health
- Conclusion

INTRODUCTION

- Environmental health is a branch of public health that addresses all aspects of the broader environment that can affect human health

- Environmental health take cognizance of human health and diseases that are determined by environmental factors(WHO, 2022).

INTRODUCTION CONT'D

- It also refers to the assessment and control of environmental factors (air, water, food, temperature and sunlight) that can potentially affect human health.

- It focuses on the direct pathological effects of chemicals, radiation and certain biological agents in dwellings, natural environment as well as their indirect effect on wellbeing

SCOPE of Environmental Health Specialist

- They play a vital role in keeping the environment around every organism in the food chain and at each trophic level safe.

- Safety is key because of the danger caused by humans in our environment.

COMPONENTS OF ENVIRONMENTAL HEALTH

- Clean Air
- Stable climate
- Adequate clean water
- Sanitation and hygiene
- Safe use of Chemicals
- Protection from radiation
- Sound agricultural practices
- Natural preservation of ecological services

CONCLUSION

- Every substance is a poison at a particular dosage. It is the dose that makes the poison.
- Man started polluting the environment the day he lights the first fire, killed the first animal and cut down the first tree.
- Toxins can be reduced in our environment; we need a safe environment to be sane

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NSC 316 (EHS)
WATER SANITATION AND HYGIENE (WASH)

By

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29/05/2024

WATER SANITATION AND HYGIENE (WASH)

OUTLINE

- Introduction
- Clean Water
- (SDG Goal 6)
- Functions of Clean Water
- Water Contaminants
- Health Consequences of Drinking Contaminated Water.
- Processes of Making Water Clean and Safe
- Conclusion

INTRODUCTION

- The term Sanitation is the Science of Safeguarding Your health

- Environmental Sanitation is the control of every factor in man's physical environment that could have a deleterious effect on his physical development and survival (WHO, 2022).

INTRODUCTION CONT'D

- The concept of WASH has to do with making an Entity Clean
- Water Sanitation and hygiene (WASH) is centered around SDG Goal 6 (Clean Water for all) and is sponsored by WHO.
- The human right to Safe drinking water and Sanitation was adopted in 2010 under a United Nation Resolution calling for safe, affordable, acceptable, available and accessible drinking water and Sanitation services for all (WHO, 2022)

WATER

- The human body is approximately 75 percent water and is essential for the continuation of life and homeostasis of the body.
- Water is used in the human body for a number of different functions, such as a lubricant in the body, body temperature regulation, removing harmful toxins in the body, and transporting nutrients throughout the body.

WATER

- Water Covers more than 70% of the earth's surface. Life on earth started with water.

- Every living thing on earth depends on water (Water is as important as Air).

WATER SANITATION and HYGIENE

- Clean Water is life itself. It is also our health, food, Leisure and Energy.

- Clean water must be odorless, tasteless, colorless

- It is estimated that each person on earth needs 20 to 50liters of clean safe water each and every day. This clean water is to be used for drinking, cooking, simple hygiene, etc.

SDG's Goals towards WASH related target

- Water use efficiency across all sectors, supply off freshwater to people suffering from water scarcity.
- Integrated water resources management and water related ecosystem
- Access to Safe Water
- Adequate Sanitation and Hygiene
- Elimination of Open Defecation
- Reduced untreated waste water

FUNCTIONS OF CLEAN WATER

- Clean water is a vital need at home (Cooking, drinking, washing and bathing).
- It is a transport corridor and a climate regulator. Oceans and seas are the largest carbon sink in the world. They capture carbon dioxide in the atmosphere. You don’t stay around the river and complain of heat in the night neither do you enter water and feel hot. (Convection)

FUNCTIONS OF CLEAN WATER

- It plays a critical role in maintaining the body's functions and necessary for bodily processes like digestion, transportation of nutrient, absorption, blood formation.
- Inadequate access to clean water can lead to a host of health problems including water borne diseases such as cholera, typhoid and dysentery

FUNCTIONS OF CLEAN WATER

- It also plays a crucial role in Promoting Mental Health and Well-being. Access to clean water is essential for Maintaining Personal hygiene which can have a significant Impact on self-esteem and Overall mental health
- Environmental Health and wellbeing is dependent on clean water. The diversity in our ecosystem (Rainforest, Coral reef and Mangrove forest) relies on clean water to thrive and a lot of People depend on it for their livelihood

WATER CONTAMINANTS

- Water Pollution is any contamination of water with chemicals or other hazardous substances that are detrimental to Human, animal or plant health.
- Water Pollutants makes water unfit for use because they affect the quality

POSSSIBLE SOURCE OF WATER CONTAMINANTS

- Corroded Water Pipes that leach Harmful Chemicals Such as lead
- Hazardous Waste sites (Dumpsites Close to Water body)
- Industrial Discharge (Effluent)
- Pesticides and Fertilizers from Agricultural operation through Run-off
- Naturally occurring Hazardous chemicals such as Arsenic
- Sewage (Open Defecation) and food processing wastes (Abattoir discharge)

HEALTH EFFECTS OF DRINKING CONTAMINATED WATER

- The health effect can range from mild to severe depending on the chemical and total exposure.
- Arsenic- A known Human carcinogen associated with Skin, Lung, bladder, Kidney and liver Cancer. Arsenic occurs naturally in the soil, it gets into the water through Run-off and Windblown
- Lead- Behavioral and Developmental Effects in Children. It causes Cardiovascular and Kidney problems. Heart diseases, high blood pressure and cardiac arrest.

HEALTH EFFECTS OF DRINKING CONTAMINATED WATER

- Hydraulic Fracturing (Fracking) Chemicals: It damages the immune system and reproductive system. Borehole digging.

- Pesticides: Neuro-developmental Effects and Parkinson's Diseases.

HEALTH EFFECTS OF DRINKING CONTAMINATED WATER

- There are a number of different infectious agents detrimental to human health that grow in contaminated/unsanitary water which can cause a number of waterborne illnesses; such as cholera, hepatitis, typhoid, and diarrhea. Take for example, diarrheal diseases from cholera, this agent and illness is responsible for 1.8 million deaths worldwide.

PROCESSES OF MAKING WATER CLEAN AND SAFE

- Boiling
- Disinfect (Chlorine bleach, Chlorine dioxide)
- Filter
- Use of Ultra violet light
- Solar Disinfection

CONCLUSION

- Having access to clean water is often neglected and not understood completely.

- Initial goal needs to be implemented by government officials and policy makers to look out for those individuals that lack access to clean water In our ENVIRONMENT.

THANK YOU

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NSC 316 (EHS)
FOOD SAFETY and HYGIENE

By

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B.Sc (Ilorin), M.Sc (Ibadan) PhD in view.

29/05/2024

OUTLINE

- Food Security
- Components of Food Security
- Food Safety
- Principles of Food Safety
- Consequences of Eating Unsafe food
- Food hygiene
- Food production Environment
- Conclusion

INTRODUCTION

- Food security is defined as access by all people at all times to sufficient, safe and nutritious food for a healthy and active life

- We all have a right to adequate food that not only meets the minimum requirements for survival but is also safe and nutritionally adequate for health and well-being (UN General Assembly, 2012).

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Components of Food Security

- There are three components of food security:
- Availability: Sufficient quantities of appropriate food are available from domestic production, commercial imports or food assistance.
- Access. Adequate income or other resources are available to access appropriate food through home production, buying, barter, gifts, borrowing or food aid.
- Utilization. Food is properly used through appropriate food processing and storage practices, adequate knowledge and application of nutrition and child care, and adequate health and sanitation services.

4

Food safety

- Food is consumed by humans in order to supply the body with nutrients needed for growth, development and to achieve optimal health.
- The safety of the food consumed determines the health status of the consumer.
- it becomes necessary to ensure that the food and water consumed by individuals is free from all hazards that may render the food unsafe for consumption and injurious to the health of the consumer.

5

Food safety

- Certain diseases (known as Food borne diseases)have been associated with consumption of contaminated (unsafe) foods.
- Food borne diseases (FBDs) refer to any disease of an infectious or toxic nature resulting from consumption of contaminated food or water.
- They can be caused by physical, chemical or biological (pathogenic organisms) hazards or contaminants during the food supply chain (production, processing, storage, transport and distribution of food, as well as in the household).

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Food safety

- It encompasses ways to prevent foodborne diseases, arising from food contamination with pathogens or chemicals, during production, processing, storage, transport and distribution of food, as well as in the household.
- Food safety also includes the standards and controls that are in place to protect consumers from unsafe foods (HLPE, 2017).
- It ensures the prevention of consumption of unsafe food and water which creates a vicious circle of diseases that affects particularly the more vulnerable groups (including children, elderly and the sick (WHO, 2015).

7

Principles of Food safety

- Cleaning the food properly
- Separating raw from cooked foods
- Cooking food properly before consumption
- Storage at the right temperature
- Using safe water and raw materials for food production ((WHO, 2018)

8

Consequences of Eating Unsafe Food

- Pesticide residues and certain agricultural practices can increase the risk of endocrine disruption, which multiplies the risk of certain cancers.
- Chronic health effects often result from prolonged ingestion of low to moderate levels of mycotoxins. For example, aflatoxin which has been linked to stunting (Smith *et al*., 2015).
- Significant numbers of poor people living in rural areas or urban slums do not have access to safe food and water, and consequently suffer from diarrhoea and other diseases that contribute to malnutrition.

Food Hygiene

- Food hygiene are all the measures put in -place to ensure food safety from production to consumption (WHO, 2018).
- Along the food supply chain;

✓Food can become contaminated at any point during slaughtering or harvesting, processing, storage, distribution, transportation and preparation.

✓Lack of adequate food hygiene can lead to food borne diseases and death of the consumer

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Food Production Environment

- The food production environment should be kept clean in order to prevent the transmission of microorganism to the food being produced.
- Water for food production should be of public health standard.
- All equipment that comes in contact with food should be properly cleaned and sanitized
- Maintain High level of Personal hygiene always

Conclusion

- The principles of food safety aim to prevent food from becoming contaminated and causing food borne illness.
- It encompasses the process along the food chain (production, processing, distribution, preparation and consumption of food)that ensures that food is safe from any form of hazard that may adversely affect the health of the consumers.
- We all have right to safe food says WHO and SDG; how true?

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NSC 316 (EHS)
HOUSING AND DISPOSAL OF WASTES

By

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05/06/2024

OUTLINE

- Introduction
- Solid Wastes
- Methods of Waste disposal
- Impact of waste disposal method on health
- Safe method of disposing waste
- Recommendations

Introduction

- Housing and waste management facilities plays an important role in determining the health status of individuals within a community.
- housing is one of the three basic needs of mankind and it is the most important requirement for the physical survival of man after food.
- Poor housing conditions can cause worsening health issues and also affect the overall productivity of individuals occupying those spaces

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Introduction

- Waste is an unavoidable by-product of most human activity. Economic development and rising living standards in Nigeria. have led to increases in the quantity and complexity of generated waste, whilst industrial diversification and the provision of expanded health-care facilities have added substantial quantities of industrial hazardous waste and biomedical waste into the waste stream with potentially severe environmental and human health consequences.

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Solid wastes

- Solid wastes includes household refuse, agricultural remnants, food leftovers, plastic bags, tin cans, ash and packaging such as cartons and used sacks. They become waste once they have been discarded because they are no longer needed in their present form
- The principal sources of solid waste are residential households agricultural, commercial, construction, industrial and institutional sectors.
- MSW is extremely variable in composition, depending on the income and lifestyle of the generators.

Method of waste disposal

- Waste Collection and Transport
- Litter and clandestine dumping (Open Dumping)
- Landfilling
- Composting
- Incineration

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Waste collection and transport

- Municipal solid waste (MSW) is gathered in a variety of containers ranging from old kerosene cans and rattan baskets to used grocery bags and plastic drums or bins.
- In some cities, neighbourhood-dumping areas have been designated (formally or informally) on roadsides from which bagged and loose waste is collected.
- A wide variety of collection systems are used including door to-door collection and indirect collection, by which containers, skips or communal bins are placed near markets, in residential areas and other appropriate locations.

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Open dumping

- Open Dumping Open dumping is the most widespread method of solid waste disposal in the region and typically involves the uncontrolled disposal of waste without measures to control leachate, dust, odour, landfill gas or vermin.
- The causes of littering and clandestine dumping in urban areas occur because of inadequate availability of litter bins along walkways, inadequate public awareness of their responsibilities as urban dwellers, and inadequate refuse collection service.
- Littering occurs everywhere and often into drains, while clandestine dumping is commonly on vacant lots, public spaces, or along waterways.

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Open dumping

Figure 1. Awotan Dumpsite in Ibadan, Nigeria. The largest dumpsite in West Africa

Environmental and Health Impacts of Household Solid Waste Disposal Practices

- Indiscriminate disposal, burning, and burying of solid waste pose major environmental and health threats through pollution and through the breeding of pathogenic organisms.

- Infectious diseases of poor sanitation will be endemic to such population

Associated Risk

- Disease transmission: Solid waste may provide breeding sites for mosquitoes. Aedes genus lay eggs in water stored in discarded items such as tins and drums. These are responsible for the spread of dengue and yellow fever. It is also a breeding ground for Anopheles mosquitoes and culex species.
- Decomposing organic waste attracts animals, vermin and flies. Flies will play a major role in the transmission of fecal-oral diseases particularly where domestic waste contain faeces.
- In time of famine or food scarcity, members of the affected population may be attracted to waste heaps to scavenge for food. This can lead to dysentery

Associated Risk

Figure 2: Goats feeding on the dumpsite

Associated Risk

- Pollution: poor management of the collection and disposal of solid waste will lead to leachate pollution of surface water or groundwater. This may cause significant problems if the waste contains toxic substances of nearby water sources.

Recommended management strategies to minimize litter and clandestine dumping include:

- Encourage use of containers or bags for waste at the point of collection for each household and establishment.

- Implement a regular collection schedule with sufficient frequency to avoid accumulation of garbage.

- Use vehicles appropriate for the geographic conditions and waste types to maximize reliability of collection

Continuation

- Encourage residents to put waste out at designated times and locations.

- Encourage separation of recyclable materials at the point of generation, so that the collection points do not become sorting points for informal sector waste pickers

- Where possible, blocking off access to dumping sites and fining illegal dumpers

Safe method of waste disposal

- Biological Treatment Biological treatment includes composting with other organic materials for the preparation of soil products 4 (i.e., aerobic treatment), and anaerobic digestion.

- Use of Incinerators

- Recycling Plant

NSC 316 (EHS)
Socio-cultural Factors in Health and Illness

By

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05/06/2024

OUTLINE

- Introduction
- Hereditary
- Environment
- Lifestyle
- Socio-economic conditions
- Health services
- Education
- Income
- Housing

Introduction

- The definition of health has evolved over time because it cannot be measured directly.

- A number of variables have been used as indicators of the concept of health.

- However, a view of health as something much broader than the mere absence of disease has led to an evolution in thinking about the framework for health determinants

Introduction

- Kaplan and colleagues (2000) proposed a multilevel approach to health determinants which includes:
- Pathophysiological pathways, genetic/constitutional factors,
- individual risk factors, social relationships,
- living conditions, neighbourhoods
- communities, institutions, social and economic policies as the major forces that affect health.

Introduction

- Institute of Medicine (2003) emphasized that improving the health of populations requires understanding the ecology of health and the interconnections with the biological, behavioural, physical, and socio-environmental spheres.
- Who Will Keep the Public Healthy?

Hereditary

- A number of diseases are known to be of genetic origin e.g Epilepsy, Mental Retardation, Diabetes, Cancer.

- Genetic Factors are also responsible for certain Abnormal types of responses to drugs or different metabolic patterns such as haemolysis caused by anti-malaria drugs

Environment

- The environment directly influences the physical, mental and social well-being of the human population.

- The environmental factors from housing, water supply, air, noise, psychological stress and family structure through social and economic support system to the organization of health and social welfare services in the community

Lifestyle

- Lifestyle denotes the way that people live, reflecting Social values attitudes and activities.
- It consists of cultural and behaviour patterns and life-long personal habits like smoking and alcoholism.
- Many health problems encountered today such as Coronary heart diseases, Obesity, Lung cancer e.t.c are associated with lifestyle

Socio-Economic Condition

- Economic status: Economic status determines the purchasing power, standard of living, quality of life, family size and attention towards health care.
- Education: Education greatly influences the healthcare status, illiteracy closely coincides with Poverty, malnutrition and ill health and high mortality rates
- Occupation: Suitable Employment in productive work promotes health, job, satisfaction is an important factor contributing to mental health and well-being

Socio-Economic Condition

- Political system: Political Decisions and political will concerning resource allocation, man power, policy, choice of technology, environmental protection and the extent to which health services are made available and accessible to different segments of the society are the means through which the political system can shape the health of the people in a country. (Minimum wage, NHIS).

Health services

- The purpose of effective health services is to improve the health status of the population.

- Examples: Provision of safe water and healthy Environment, Immunization of Prospective mothers, infants and children.

Education

- Education gives us the tools we need to make good decisions about your health.
- People with more education are more likely to live longer.
- Education also tends to lead to higher paying jobs
- These often come with benefits such as health, insurance, healthier working conditions and the opportunity to make connections with other people.
- All of these things add up to better their health

Income

- The amount of money you make has an effect on your health people with higher incomes tend to be healthier and live longer than people with low incomes.
- High earners are likely to live in safe neighbohooods where they have access to grocercy stores, healthy foods and have more access to safe spaces for exercise on other activities
- Low earners will live in the slum, face situations that will lead to poor health (Unsafe housing, unhealthy food and less time for Physical activity

Housing

- Where you live has a significant impact on your health. People who are continuously exposed to poor living conditions have a higher risk of developing health problems.
- It is important that your home is safe and suitable. Neighbourhood conditions are an important part of housing and can also affect your health. A neighbourhood that is free from violence, crime and pollutions gives children and adults a safe place for physical activity.

NSC 316 (EHS)
Control of Vectors

By

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12/06/2024

OUTLINE

- Introduction
- Vector Borne Disease
- Importance of Vector Control
- Preventive Measure

Introduction

- Vectors are living organisms that serve as vehicles to transmit a pathogen (a disease-causing agent like a virus or parasite) from a host to a human or to an animal or both.

- They are predominantly pests, such as insects and ticks. Birds and mammals such as rats and mice can also be considered vectors, as they both can carry and transmit disease.

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Problem of Vector Borne Disease

- Vector-borne diseases account for 17 percent of the estimated global burden of all infectious diseases.

- They have a significant negative impact on human and animal health, along with huge economic implications due to reduced human capacity and extra strain on health services. Here are some of the biggest threats today.

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Vector Borne Disease

- Malaria has the biggest impact on human health. Despite a 42 percent reduction in malaria mortality rates since 2000 due to improved control measures, malaria still kills one child almost every minute.
- Dengue fever incidences have grown dramatically around the world in recent decades. The World Health Organization (WHO) estimates there may be 50–100 million dengue infections worldwide every year

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Vector Borne Disease

- River blindness, also known as onchocerciasis, is a parasitic infection spread by the bites of small black flies that breed in rapidly flowing rivers. It is one of the leading causes of preventable blindness in the world and is endemic to 36 countries in Africa and Latin America.

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Vector Borne Disease

- Sleeping sickness occurs in 36 sub-Saharan Africa countries where tsetse flies transmit the disease to humans. In cattle the disease, called Nagana, kills millions of cattle a year.
- Chagas disease is spread by infected bugs. About 7 million to 8 million4 people are estimated to be infected worldwide, mostly in Latin America. The disease that starts with swelling of the eyelids, fever and fatigue, but can lead to malnutrition, cardiac disorders and even heart failure

Importance of Vector Control

- Given the dramatic impact vector-borne diseases can have on humans and animals.
- Vector control is crucial to reduce the incidence of infection from diseases; this is especially important for those for which there is currently no effective cure or preventive medical measures available, such as Dengue, West Nile virus and Chikungunya virus.

Importance of Vector Control

- Even for vector-borne diseases for which effective and targeted medical treatment exists, such as malaria, issues such as cost, delivery, correct diagnosis, drug resistance and other challenges make disease control through the use of medical drugs alone an unrealistic alternative to disease prevention by vector control. Both prevention and treatment are needed

Methods of Vector Control

- Vector control involves using preventive methods to eradicate or control vector populations, in order to limit the transmission and spread of diseases.
- Preventative measures include:

✓ Habitat control

✓ Reducing contact with vectors

✓ Chemical control

✓ Biological control

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Habitat Control

- Removing or reducing the number of places where the vector can breed helps to limit populations from growing excessively. For example, by removing stagnant water, removing old tires and empty cans which serve as mosquito breeding habitats and through good management of used water.

Figure 2: Goats feeding on the dumpsite

Reducing Contact with Vectors

- Reducing the risk of exposure to insects or animals that are vectors of diseases can limit the risk of infection. For example, using bed nets, adding window screens to homes, or wearing protective clothing can help reduce the likelihood of coming into contact with vectors. An important component of exposure reduction is also the promotion of health education and raising awareness of risks. Bed nets treated with insecticide can reduce the risk of insect bites and infection.

Chemical Control

- Insecticides, larvicides, rodenticides and repellents are used to control pests and can be used to control vectors. For example, larvicides can be used in mosquito breeding zones; insecticides can be applied to house walls (indoor residual spraying); bed nets treated with insecticide and use of personal skin repellents can reduce the risk of insect bites and thus infection. The use of pesticides for vector control is supported by the World Health Organization (WHO) and has proven to be highly effective

Biological Control

- The use of predators (natural enemies of the vectors), bacterial toxins or botanical compounds can help control vector populations. For example, using fish that eat mosquito larvae or the introduction of sterilized male tsetse flies in order to reduce the breeding rate of these flies are methods to control vectors and reduce the risk of infection

Conclusion

- Vector control plays a vital role in public health and livestock management programs around the world. Without these interventions, dangerous diseases would proliferate unchecked and with the increased movement of populations and livestock, the global spread of disease is a growing concern.

- All these measures are important elements for an integrated approach to control the spread of vector borne diseases. The choice of the most appropriate method(s) to use depends on the disease pattern and behaviour of the vector

NSC 316 (EHS)
Air Pollution

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12/06/2024

OUTLINE

- Introduction
- Forms of Air Pollution
- Sources of Air Pollution
- Ozone
- Causes of Ozone Pollution
- Effects of Ozone Pollution

Introduction

- Air pollution is recognized today as a major health risk. Exposure to air pollution, both ambient and household increases a person's risk of contracting a disease such as lung cancer, stroke, heart disease and chronic bronchitis.
- The science is clear, breathing polluted air increases the risk of debilitating and deadly diseases. Air pollution is now the world's fourth leading fatal health risk, causing one in ten deaths in 2013.

Air Pollution

- Air pollution is especially severe in some of the world's fastest growing urban regions where greater economic activity is contributing to higher levels of pollution and to greater exposure due to their dependence on burning solid fuels such as wood, charcoal, coal, and dung in their homes for cooking and heating

Air Pollution

- Air pollution is not just a health risk but also a drag on development by causing illness and premature death. It reduces the quality of life by causing a loss of productive labor. It can have a lasting effect on productivity e.g by stunting plant growth and reducing the productivity of agriculture which is the foundation of any growing population.

Forms of Air Pollution

- Air pollution takes many forms. One of the most damaging pollutant is PM2.5, which is very fine particulate matter (PM) with an aerodynamic diameter of less than 2.5 micrometers which makes it penetrate into the lungs.
- The chemical makeup varies depending on their source. They often contain compounds such as carbon, sulfate, nitrate compounds and other heavy metals.

Effect of Air pollution

- It damages people's health: pollution can have a lasting effect on economic productivity and perpetuate existing inequalities.

- Children are highly sensitive to the effect of toxins: Small traces of substances such as lead or polycyclic aromatic hydrocarbons found in polluted air in a child's blood can result in cognitive delay (Peterson et al., 2015)

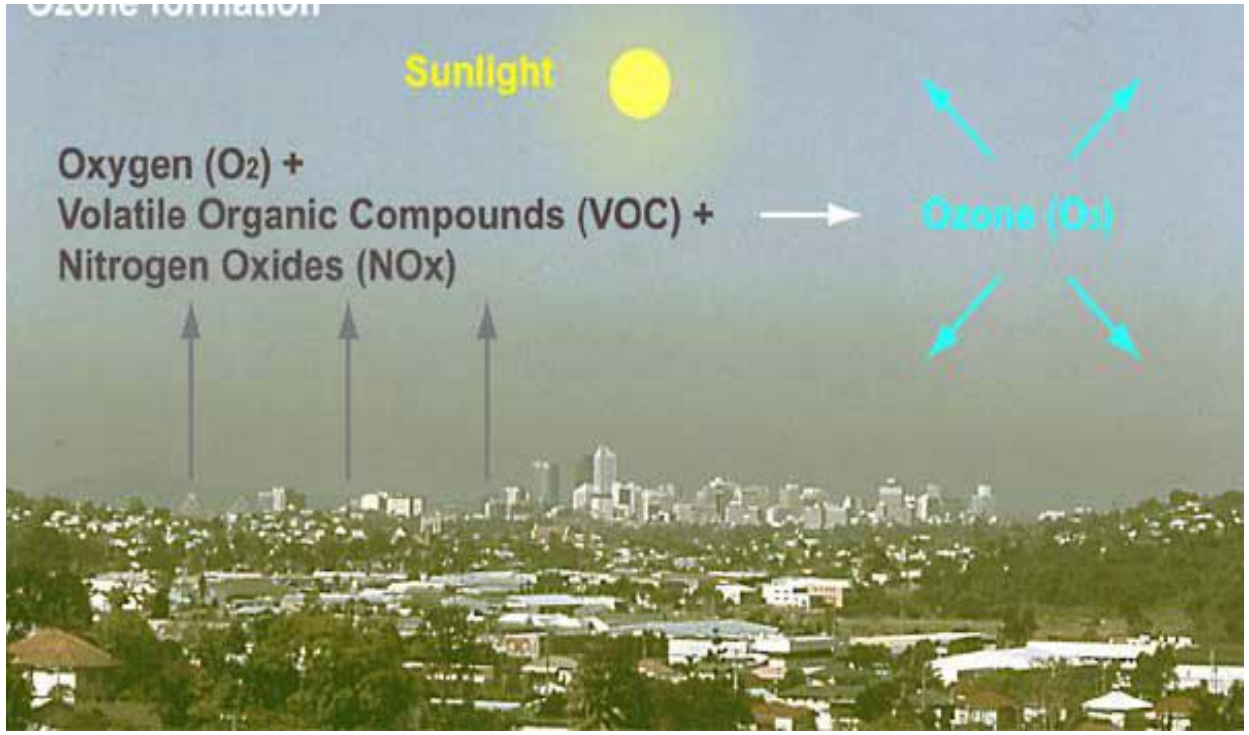
Sources of Air Pollution

- The sources of air pollution are:
- vehicles emissions,
- tobacco smoke, coal combustion,
- power plants,
- aerosol spray
- manufacturing facilities.

Ozone

- Ozone is a gas that can form and react under the action of light that is present in two layers of the atmosphere. High up in the atmosphere, ozone forms a layer that shields the earth from uv rays. However, at ground level, ozone is considered a major air pollutant. Ground level ozone is formed from other pollutants and can react with other substances.

Formation of Ozone in the atmosphere



Causes of ozone pollution.

- Tail pipe emissions from automobile traffic are main contributors to ozone pollution. Ozone pollution is created when certain chemicals in auto emissions interact with heat and sunlight. Emissions from certain manufacturing operations also contribute to ozone pollution. Ozone is invisible and can be a problem even when visibility is very good. The concentration is often very low in busy urban centers and higher in suburban and adjacent rural areas. Ozone can be transported through air over long distances and across borders

Effects of ozone pollution.

- Ground level ozone is a public health concern. Prolonged exposure to low level ozone concentrations is as harmful to human health as exposure to higher levels for shorter durations.
- It inflames lung tissues and can cause coughing, chest pains, and asthma. Children are most at risk from exposure to ozone because they play and exercise outdoors during the months.

Effects of ozone pollution.

- The current world health organization recommendation standards for permissible level of Ozone in the air is slated at 50ppb.
- Ozone pollution worsens as daily temperature increases. Ozone pollution tends to be more severe in urban areas where vehicular and industrial emissions cluster and where the temperature are often higher than in surrounding sub urban places (Fishman et al., 2011).

NSC 316 (EHS)
Accident and Disaster Management

By

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12/06/2024

Outline

- Introduction
- Classification of accidents
- Causes of accidents
- Accident management
- Types of Disaster
- Causes of Disaster
- Effect of Disaster
- Disaster management cycle

Introduction

- Accidents: This is an unpleasant, unexpected, unforeseen or unintended happening which often times result from negligence that causes injury, loss, and Damage. It can be caused by a mistake, Machine failure and natural disaster.
- Disaster‘ is defined as a crisis situation causing wide spread damage which far exceeds our ability to recover. it connotes a negative event leading to suffering and destruction.

Classification of Accidents

- It can be classified in various ways such as:

✓ Classification Based on the magnitude of danger of life and property. These can be subdivided into four categories

✓ Minor Accident: No loss of life.

✓ Moderate Accident: There is Injury but no Loss of Life and Property.

✓ Major Accident: There is Loss of Life

✓ Disaster: There is extensive loss of Property and Life

Classification of Accidents

- **Classification Based on Principal Cause and Effect**

These can be subdivided into several categories such as:

✓ Fires and Explosions initiated by surge, sparks and short circuit currents

✓ Electrical Accidents (Shocks and Flashovers, failures and accidents in electrical plants

✓ Chemical Accidents and Explosion: Emission of Gases, Fumes and Dust, Nuclear Disaster, Radiation of Radioactive Rays

Classification of Accidents

- **Classification Based on Principal Cause and Effect**

✓ Accidents with Machines, Plants, tools; These can be caused by Human errors, failure of Plant accessory.

✓ Manmade accidents : Theft, Sabotage

✓ Natural Disaster: Flood, Lightning, Volcanoes, earthquakes

Causes of Accidents

- An accident can occur by the unsafe act of a person or by existence of a mechanical or physical hazard. Human error is often the main reason for accidents. The three situations for human errors are:

✓ Overload: (Mismatch between load and capacity of the person at the time of action

✓ Incorrect response by the person to a situation due to insufficient training, fatigue and anxiety

✓ Improper activity

Accident Management

- Identify unsafe condition
- Analyse the causes and effect of unsafe conditions
- Decide the method of attack
- Remove unsafe condition
- Be alert
- Educate and train personnel.

Types of Disaster

- Disasters are commonly categorised by their origin; natural or manmade.

✓ Natural Disasters: These are disasters due to natural causes. They include the following: earthquakes, volcanoes, landslides, tornado, hurricane, heat wave, drought, floods, sea level changes such as tsunamis, and tornadoes. Biological event are another type of natural disaster. These include (http://wedc.lboro.ac.uk) insect plagues, disease epidemics. In turn these natural events may trigger: avalanches (snow slides); excessive erosion, wildfires; and crop failure.

Types of Disaster

- Man-Made Disasters: These are disasters or emergencies that happen due to man's activity in the environment. Recently, however, technological disasters have been included in the category. The Bhopal gas release and the Chernobyl nuclear accident are two examples of a man-made disaster. Forest fires (initiated by man) may be another example. Other examples include (Aniefiok, 2011): oil spillage, conflict, fire outbreak, indoor air pollution, road traffic accident (RTA), water pollution in relation to heavy metals and toxic elements, and deforestation:

Causes of Disaster

- There are several factors which have been linked to the risk for disaster occurrence or the risk for heightened mortality in the event of a disaster. One such factor is the environment.
- Causes of Natural disaster:

✓Climate change

✓Underground movement that affect the earth crust

Climate Change

- Climate change refers to any change in climate over time, whether due to natural variability or as a result of human activity
- A significant change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods, which is able to cause disequilibrium in the ecosystem, effecting health, agriculture, water supply, and causing flooding, drought.

Underground Movement of the Earth Crust

- Underground movement which affects the earth crust is continually affected by internal forces, resulting in rapid and discernible movement of the rocks, known generally as earthquakes.

- The earth movement is capable of causing earthquakes, landslides and other natural disasters.

Causes Of Man-Made Disaster

- Deforestation is an example of man's activity in the environment. Deforestation increases the risk for landslides and soil erosion.
- Increase in consumption of fossil fuels with industrialisation. Global climate change from the build-up of greenhouse gases may lead to a greater frequency of extreme weather events (heat waves) in the future, as well as sea level rise

Causes Of Man-Made Disaster

- Accidents globally, deaths and injuries resulting from road traffic crashes are major and growing public health problem (Aniefiok, 2011). Over 20 million people are severely injured or killed on the world's road each year, with greatest burden on low-income countries.
- Several factors are attributable to road traffic accidents. Topmost among them is human factor. Even when all other factors seem to be right, human behaviour on the road leaves much to be desired.

Causes Of Man-Made Disaster

- Disease epidemics: 70-80% of illnesses are related to water contamination and poor sanitation (Aniefiok, 2011). Majority of people still practice indiscriminate open field defecation, which lead to wide spread soil pollution in villages and urban slums, especially in camps and make-shift settlements created during emergencies.

EFFECT OF DISASTER

- Disaster whether caused by Extreme of Nature, failures of essential services or technology, exotic diseases, insect infestations, acts of violence, human action or any other cause disrupt communities and cause not only widespread death, but also massive social disruption and outbreaks of epidemic disease and famine, leaving survivors entirely dependent on outside relief.
- Disasters can exert their effects on social environment, built environment, Economic environment and Natural environment

Disaster Management

- There are a chain of activities that surrounds Disaster management in environmental health and safety. These activities include hazard prevention, preparedness, emergency response, relief and recovery, including activities to reconstruct infrastructure and rehabilitate shattered lives and livelihoods.
- The culmination of these activities is known as Disaster management cycle. This cycle consists of connected activities and phases, some of which occur simultaneously (at the same time)

Disaster Management Cycle

- The disaster-management cycle is the cycle that allows us to work in a systematic way when we are faced with a disaster.

- The disaster-management cycle is made up of phases which enables appropriate actions at all points in the cycle leading to greater preparedness, better warnings, reduced vulnerability or the prevention of disasters during the next iteration (the act of doing something again) of the cycle

Phases of Disaster Management

- ✓ Planning, prevention, preparedness and mitigation.
- ✓ Emergency response
- ✓ Recovery, rehabilitation and reconstruction to promote sustainable development

Mitigation

- Mitigation is a time when efforts are made to prevent hazards from developing into disasters altogether or to reduce the effects of disasters.
- Mitigation is the effort to reduce loss of life and property by lessening the impact of disasters. This is achieved through risk analysis (identify possible risks), which results in information that provides a foundation for mitigation activities that reduce risk, and help protect financial investment.

Mitigation Cont'd

- The mitigation phase differs from the other phases in that it focuses on long-term measures for reducing or eliminating risk. Mitigation is the most cost-efficient method for reducing the effect of hazards (Lindell et al., 2006).
- Mitigation includes providing regulations regarding evacuation, sanctions against those who refuse to obey the regulations (such as mandatory evacuations), and communication of risks to the public.

Preparedness

- Preparedness is a continuous cycle of planning, managing, organising, training, equipping, exercising, creating, evaluating, monitoring and improving activities to ensure effective coordination and the enhancement of capabilities of concerned organisations to prevent, protect against, respond to, recover from, create resources and mitigate the effects of natural disasters, acts of terrorism, and other man-made disasters.

Preparedness Cont'd

- In the preparedness phase, emergency managers develop plans of action carefully to manage and counter their risks and take action to build the necessary capabilities needed to implement such plans.

Response

- This is the phase which includes the mobilisation of the necessary emergency services and first responders in the disaster area. This will include a first wave of core emergency services, such as fire fighters, police and ambulance crews.
- A well-rehearsed emergency plan developed as part of the preparedness phase enables efficient coordination of rescue. Where required, search and rescue efforts commence at an early stage.

Recovery

- In the recovery phase, the aim is to restore the affected area to its previous state. It differs from the response phase in its focus. Recovery efforts are concerned with issues and decisions that must be made after immediate needs are addressed.
- Recovery efforts are primarily concerned with actions that involve rebuilding destroyed property, reemployment, and the repair of other essential infrastructure (Haddow and Jane 2003).

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Disease causation in the environment and control of Hazards

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Outline

- Introduction
- Models of Disease causation
- Control of Hazards

Introduction

- Diseases are misbehaving Molecules in the body of a living organism.
- Disease is caused when a Susceptible host is exposed to the causative agents in a compatible environment.
- Disease is deviation of the body cells, tissues, organs and system from the normal function
- It is the maladjustments of the living organism to the environments

Models of Disease causation

- There are several models of disease causation in epidemiology but the most widely applied models are:
- Epidemiological triad (Triangle)
- The wheel of Disease Causation
- The web
- Rothman's Component Cause model

Epidemiological Triad

- This is the traditional model of Infectious disease causation
- It has three components;

✓External Agents

✓Susceptible Host

✓An Environmental Factors that interrelate in a variety of component ways to produce disease

Agent factors

- Infectious Agents: Microorganisms (Viruses, Bacteria, Parasites and other Microbes. This has to do with factors like
- ✓Adaptability, host range, virulence, pathogenicity.
- Nutritive: Excesses or Deficiencies (Cholesterol, Vitamins, Proteins)
- Chemical Agents: Carbon Monoxide, Drugs. It has to do with factors like toxicity dose, half life
- Physical agents: Ionizing Radiation, Flood, Wind,. It has to do with factors like composition, magnitude and exposure time

Host factors

- These factors are intrinsic factors that influence an individual exposure, susceptibility or response to a causative agent
- Host factors that affect an individual risk of exposure to an agent are Age, race, sex, breed and feeding habit
- Host factors which affect susceptibility and response to a causative agent are Genetic Composition, Nutritional and immunological status

Environmental Factors

- These are Extrinsic factors that affect the agent and the host. These includes;

✓ Physical Factors: Climate, Geology

✓ Biological Factors: Insects that Transmit Agents (Anopheles Mosquitoes that transmits *Plasmodium falciparum*)

✓ Socio-economic Factors: Crowding, Sanitation and Availability of Health care Services

The wheel of disease causation

- This model de-emphasizes the agent as the sole cause of disease
- It emphasizes the interplay of physical, biological and social environments with genetics in the mix
- It is a disease causation model that discriminates between necessary and sufficient factors

Necessary and Sufficient Factors

- A Necessary cause is a causal Factor whose presence is required for the occurrence of the effect. If disease does not develop without the factor being present, the causation factor is necessary
- Sufficient cause is a minimum set of conditions, factors or events needed to produce a given outcome. The factors that form a sufficient cause are called component causes.

Example

- *Tubercle bacillus* is required to cause Tuberculosis but alone does not always cause it.
- The bacteria is a necessary and not a sufficient cause and this is true for most infectious diseases.
- You must be vulnerable and be exposed to them before you can be infected

Assignment

- How do we control hazards in the Environment