- بسم الله الرحمن الرحيم
- ENVIRONMENTAL HEALTH
- (1)

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- OJECTIVES

- To describe environment and health
- To explain exposure and dose
- To assess the hazards from different environmental factors
- Environment

- Environment :
  = The external factors (living – non living – material – non material) which surrounds man.
- Descriptive classification:
  Physical: water, air, housing,etc.
  Biological: animal, plant,etc.
  Social: customs, income, etc.
- Bad or poor environment leads to ill-health
- Man responsible for pollution

WHO definition:

“ The control of all those factors in man’s physical environment

which exercise or may exercise a deleterious effect on his physical development, health & survival."

- So now it called ENVIROMENTAL HEALTH
- Its purpose is to create & maintain ecological conditions that will promote health & prevent disease
- It is complex, needs a multi-disciplinary programme of action

- Explain exposure and dose

- **Exposure**
  – Any condition which provides an opportunity for an external environmental agent to enter the body
  Examples of Exposure
  „ Contaminated groundwater
  – Ingestion (drinking water)
  – Dermal contact (bathing)
  – Inhalation (during showering)
  „ Contaminated surface water
    - Explain exposure and dose

- **Contaminated surface soil**
  - dermal absorption of contaminants
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  „ Contaminated food
  – Ingestion of contaminated muscle tissue or vegetables

  „ Contaminated air
  – Inhalation of “fugitive dusts”

  - Explain exposure and dose
- **Dose**
  – The amount of agent actually deposited within the

body, Typically, the distinction between exposure and dose is blurred, although in reality, significantly different doses can result from the same exposure

- Assess the hazards from different environmental factors

- **Risk assessment**
  - **The determination of the probability that an adverse effect will result from a defined exposure**

- **Risk management**
  - **The process of weighing**

different policies and selecting the most appropriate intervention strategy based on the results of risk assessment and social, economic, political concerns.

- Assess the hazards from different environmental factors

- **Risk Assessment Activities**

1. Hazard identification

– Characterize the innate toxic effect of the agent

2. Exposure assessment

– Measure or estimate the intensity, frequency,

and duration of human exposure to the agent

- Assess the hazards from different environmental factors

3. Dose-response assessment
– Characterize the relationships between varying doses and adverse effects in exposed populations

4. Risk characterization
– Estimate the incidence of

health effects of exposure

- INTRODUCTION

- One of the essential public health care element is safe drinking water & sanitation.
- Water is one of the physical component of the environment
- It is not only a vital environmental factor to all forms of life, but has a great role in socio-economic development.
- Lack of water ill health
- No state of positive health & well-being without safe water

SAFE &WHOLESOME WATER

- Free from pathogenic agents
- Free from harmful chemical substances
- Free from color and taste
- Usable for domestic purposes

If not so we call it polluted or contaminated water

Water requirement

- Basic physiological requirement = 2 liters/head/day

- Public health (domestic purposes) =

  150-200 liters/head/day

  - Uses of water

  - Domestic use
  - Public purposes
  - Industrial purposes
  - Agricultural purposes
  - Power production
  - Carrying away waste

  - Sources of water supply

  Water source must be:

  - Sufficient in quantity
  - Acceptable in quality

  Three main sources:

  - Rain

- Surface water

  Impounding Reservoirs Rivers & Streams

  Tanks, Ponds, & Lakes
- Ground water

  Shallow Wells Deep Wells Springs

- 1. Rain

Characteristics:

Physically : Purest water – clear – bright – sparkling

Chemically: soft (only 0.0005 dissolved solids)

Bacteriologically: from clean districts free from pathogenic agents

Impurities

Dust – soot – microorganisms – carbon dioxide – nitrogen – oxygen & ammonia

Acid rains (gaseous sulphur – nitrogen oxide)

- 2. Surface Water
- Include : rivers, tanks, lakes, wades, sea, man made reservoirs
- It prone to contamination so it never safe without sanitary protection & purification.
- *Impurities:* depends on the catchment area

- PURIFICATION OF WATER
- <u>On large scale</u>
  - Storage

- Filtration
- Disinfection

- On small scale
  - Household purification of water
  - Disinfection of wells

STORAGE

- during which some natural purification take place

physical: impurities settle by gravity

chemical: oxidation = dec.amonia & inc. nitrares

biological: death of 90% of microorganisms in 5-7 days. (optimum=10-14)

● FILTRATION

● *Slow sand or biological filters*

Simple,easy,cheap, high quality treatment

● *Rapid sand or mechanical filters*

Deals directly with raw water, less space, rapid, more flexible, easy washing

● DISINFECTION

● Criteria of useful water disinfectant

- powerful within time & not affected by water properties
- no product of reaction

- cheap, safe, with accurate application to water
- property of leaving residual concentration
- easy detectable by rabid simple techniques

- Chlorination
- Ozonation
- Ultraviolet irradiation
- PURIFICATION ON SMALL SCALE

➓ Household purification

boiling:

chemical disinfection: (bleaching powder, chlorine solution, high test hypochlorite, chlorine tablets, iodine, potassium permanganate)

filteration:

➓ Disinfection of wells

- 1.1 billion = no access to safe water
  2.4 billion = no access to basic sanitation
  2.2 million = die each year from diarrhoea

dr. G.H. Brundtland message

AIR POLLUTION

Air pollution ;

- **Is the presence in the ambient (surrounding) atmosphere of substances (e.g. gases, mixtures, and particulate matter) generated by the activities of man in concentrations that interfere**

with human health, safety, or are injurious to vegetation and animals and other environmental media.

Sources of air pollution ●

- **Motor vehicles, especially in urban areas. They emit:**

-hydrocarbons

-nitrogen oxides

-carbon monoxide

-lead

-black smoke and malodorous fumes.

- **Industries:**

combustion of fuel to generate heat and power smoke, SO_2, NO, and fly ash.

petrochemical industries HCl, and organic halides.

other industries CO, CO_2 , ozone, H_2S, SO_2……etc

- **Domestic sources:**

  Domestic combustion of coal, wood, or oil is a major source of smoke, dust, SO_2, and NO.

- **Tobacco smoke:**

  Most direct and important source of air pollution.

  -active smokers

  -passive smokers

- **Miscellaneous:**

  These comprise:

  -burning refuse

  -incinerators

  -pesticide spraying

  -natural sources (windborne dust, fungi, moulds, bacteria)

  -nuclear energy programs.

Effects Of Air Pollution

- **About 1.3 billion urban residents worldwide are exposed to air pollution level above recommended levels**
- **2 aspects to be taken into consideration:**

  -Health aspect

  -Social and economic aspect.

- HEALTH

- Damages the human respiratory systems.
- Both immediate and delayed effects.
  -immediate: suffocation and death.
  -delayed: chronic bronchitis, cancer, bronchial asthma, emphysema, and allergies

❖ Lead poisoning in children.

- **SOCIAL AND ECONOMIC ASPECTS**

✓

✓ **Destruction of animal and plant life.**

✓ **Corrosion of metals.**

✓ **Damage to buildings.**

✓ **Cost of cleaning and maintenance**.

- THANKS