* بسم الله الرحمن الرحيم
* ENVIRONMENTAL HEALTH
* (1)
* Dr Khalid El Tohami
* 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**
* ** 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
* On large scale

- 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
* Household purification

*boiling:*

*chemical disinfection:* (bleaching powder, chlorine solution, high test

hypochlorite, chlorine tablets, iodine, potassium permanganate)

*filteration:*

* 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, SO2, NO, and fly ash.**

**petrochemical industries HCl, and organic halides.**

**other industries CO, CO2 , ozone, H2S, SO2……etc**

* **Domestic sources:**

**Domestic combustion of coal, wood, or oil is a major source of smoke, dust, SO2, 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