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1. Give the difference between mortality and morbidity.

Ans.

Mortality

- It is given as deaths/ population
- Mortality is the number of people who died in a given population
- Mortality rate is classified as infant mortality rate, crude death rate, child mortality rate, maternal mortality rate, etc
- It gives the estimate of number of deaths per 1000 individuals in a year
- Morbidity is a cause of mortality
- Mortality is a measure of deaths within population or geographic area

Morbidity

- It is given as incidence/population
- Morbidity is defined as the state of being diseased or disabled in a given population
- Morbidity data are collected according to disease type, age, gender, area, etc
- It determines the disease severity and the need for medical intervention Not all people who fall sick die
- Morbidity is a measure of sickness or disease within a geographic area

2. Write a note on the prevention and control of dengue (vector-borne disease).

Dengue is an infection caused by dengue virus, transmitted by *Aedes aegypti* mosquitoes that are capable of infecting humans and causing disease.

They breed in man-made containers such as cement tanks, overhead tanks, tyres, deserted coolers, discarded containers, pitchers, shoes, junk materials in which water stagnates for more than a week. They are distributed all over tropics and subtropics.

It is more common in urban areas due to high population, density, unplanned development activities without health assessment, improper water management and improper sanitation.

Dengue fever outbreak was reported in 1996 in Delhi. Viewing this outbreak, Government of India made some guidelines to combat the possible epidemics of dengue. These guidelines include various measures such as:

(1) Identification of outbreaks through surveillance

(ii) Prompt case management

(iii) Vector control

(iv) IEC (information, education and communication) for prevention, monitoring and reporting of disease

(v) Intersectoral collaboration

(vi) Active participation of the community and social mobilization

(vii) Regular monitoring of dengue cases

(viii) Timely remedial measures
Dengue gains its peak during monsoon and is not uniformly distributed throughout the year. It is endemic in 23 states/UT. All four serotypes are found in India. CFR of dengue has come down from 3.3% in 1996 to 0.57% in 2009 because of better management of dengue cases in the country,

There is no specific antiviral drug for dengue and mortality can be only minimized by early diagnosis and complete treatment of cases by following the national guidelines.

1. Surveillance:

There are two indices for measuring vector density:

House index - percentage of house positive for the larvae
Breteau index - number of containers positive for the larvae per 100 houses. They measure larval manifestation and not the adult mosquito density

2. Vector Control:

Prevention depends on control and protection from bites of mosquito that transmit it.

- Keep the surroundings clean and dry

- Sprays of larvicides are recommended in high risk localities
- Eliminate any stagnant or standing water
- Change water in birth baths every week . Empty the flower pots not in use and store them upside down

Do not keep old tires, shoes or empty boxes in open: water from other sources can collect

- Unclog roof gutters
- Empty the water cooler every 3-4 days and spray DEET based insecticide in the coolers
- All objects that may collect water should be discarded or disposed off Large tanks with taps should be kept covered

Health education should be given to the community and in schools through mass media

3. Biological and Chemical Control: Use of herbivorous fish 'Gambusia' in ornamental tanks, fountains or biocides can kill larval stages Use of chemical larvicides such as 'Abate' in big breeding containers

- Aerosol space spray during daytime in high density areas
- Keep plants such as feverfew, citronella, catnip and lavender around the house as these plants have mosquito repellent properties

4. Personal Protective Measures:

- Wear long, full sleeved and full length clothes with socks during breeding season
- Use mosquito repellent topical creams with 10%-30% DEET on skin, or mosquito repellent patches on clothes to keep mosquitoes away
- Use mosquito nets while sleeping
- Mosquitoes that spread dengue are mostly active during dawn to dusk. Prefer to stay indoors.

3. Write a note on tetanus and its prevention.

Tetanus is an acute and highly fatal disease caused by clostridium tetani (a spore forming bacteria) characterized by muscular rigidity throughout the illness along with painful paroxysmal spasms of the voluntary muscles, primarily of jaw and neck . Because of the hardness of muscles of neck and face and difficulty in opening the mouth, it is also called lock

jaw. Tetanus is common in developing countries. Tetanus occurring in newborn is called tetanus neonatorum

Epidemiological Determinants: (a) Agent Factors:

i) Agent: *Clostridium tetani* a spore forming, grampositive, anaerobic organism. The spores are highly resistant to a number of injurious agents such as boiling, phenol, cresol. autoclaving for 15 minutes at 120°C and can survive for years in the soil and dust. They germinate under anaerobic conditions and produce a potent exotoxin. They can be destroyed by steam under pressure at 120°C for 20 minutes.

(ii) Reservoir of Infection: Spores survive for months in soil and dust. The organisms are found in the intestine and faeces of herbivorous animals such as horses, cattle, goats and sheep. They may also be found frequently in the intestine of men with out causing disease. The spores get blown up to distant places anywhere including operation the atres.

(iii) Period of Communicability: None as it is nottransmitted from person to person

(iv) Exotoxin: The organism produces a soluble exotoxin that is lethally toxic. The lethal dose for a 70 kg is about 0.1 mg. The toxin acts on four areas of nervous system and blocks the inhibition ofspinal reflexes

(b) Host Factors:

Age: Tetanus can occur at any age but is most common between 5 and 40 years. Tetanus occurring in newborn is known as 'neonatal tetanus which mainly occurs at birth due to improper aseptic techniques (unclean instrument or tyingcord with unsterile clamp).

ii) Sex: Males appear to be more sensitive to tetanus toxin than females.

(iii) Occupation: Agricultural workers are at more risk due to their contact with soil.

(iv) Rural Urban Difference: Incidence is lower in urban areas than rural areas.

(v) Immunity: No age is immune to tetanus unless protected by previous immunization. Immunization from two injections of tetanus toxoid is highly effective and lasts for several years. Herd immunity does not protect the individual from tetanus.

(C) Environmental Factors:

Tetanus depends on man's physical environment: the soil, agriculture, animal husbandry.

It also depends on the social factors: unhygienic customs and habits such as the application of dust or animaldung on wounds. unhygienic and unsterile delivery practices and lack of primary

health care services Illiteracy and poor awareness lead to nonimmunization with TT in pregnant women and children

Incubation Period:

Usually 6-10 days but ranges from as short as one day to as long as several months

Mode of Transmission:

Infection occurs through contamination of wounds with tetanus spores. Injuries such as pin prick, skin abrasion, punctured wounds, burns, human bites, animal bites, stings, unsterile surgeries or deliveries, intrauterine death, dental extractions fractures, otitis media, skin ulcers, eye infections and gangrenes can cause tetanus. Under anaerobic conditions, and in presence of dead tissue, the tetanus spores germinate, bacteria proliferate and toxin is produced

Clinical Features:

Tetanus is localized:

- Spasm of muscles around the wound
- Increased tone

If tetanus is generalized

- Fever
- Tachycardia
- Sweating
- Restlessness
- Opisthotonos (typical characteristic particular facial appearance and bowing of back)
- Irritability
- Severe muscle spasms
- Repeated convulsions
- Severe pain and difficulty in opening the mouth(lockjaw).
- Breathing difficulty
- Cyanosis

Prevention:

(1) Active Immunization/Primary Immunization:

(i) Infants: Tetanus immunization should be started at age of 6 weeks along with diphtheria and pertussis immunization. Three doses of immunization are recommended 4-6 weeks apart First

booster is given at 18 months and second at school entry point. Thereafter a booster of TT given at every 10 year interval.

(ii) Older Children and Adults: If not vaccinated before primary immunization consists of two doses of absorbed TT at an interval of 8 weeks intramuscularly. A booster is given one year thereafter

(2) Prevention of Neonatal Tetanus:

(i) Aseptic Technique During Delivery: Delivery should be conducted by trained birth attendant following clean delivery practices

Umbilical cord should be cut with a blade.

Application of any indigenous substance on umbilical cord/ stump should be strictly discouraged. Clean sterile tie should be used for clamping the cord

Active Immunization of Mother during Pregnancy

According to National Schedule of immunization two doses of toxoid are recommended between 20 and 36 weeks of pregnancy, with an interval of 1-2 months in between. In previously immunized pregnant women, a booster dose is considered sufficient

(3) Prevention of Tetanus After Injury:

- Clean wound thoroughly soon after injury with soap and water to remove soil, dust, foreign bodies and necrotic tissue and abolish anaerobic conditions for germination of tetanus spores

In case of minor clean wound (wound less than 6 hours old, clean, nonpenetrating and less tissue damage), passive immunization is not required if the course of toxoid and booster completed past 5 years.

- Active immunization is given in those with partial or unimmunized status or if last dose of booster was given earlier than 10 years.

- Active immunization for minor wound is also given in those with previous immunization more than 10 years ago.

- In case of major wounds, active and passive immunization is given in those with previous immunization more than 10 years ago

4. Write a note on prevention and control of malnutrition.

Ans.

Malnutrition: It has been defined as a pathological state resulting from a relative or absolute deficiency or excess of one or more essential nutrients’.

Preventive Measures:

- Malnutrition is a disease of society, poverty and ignorance. In this everyone i.e. teacher, nurse, physician, farmer and all organizations have to contribute much to combat this malnutrition.

- Govt. of India has already started steps in order to tackle this problem. Following measures can be taken:
 - Increase food production by scientific cultivation
 - Vulnerable groups, i.e. infants, preschool children, expectant and lactating mothers, should be protected by utilizing locally available food substitution, mid day meal, cheap supplementary food, etc.
 - Fortification of Atta (flour) with protein and calcium.
 - Milk can be fortified with vitamin A and vitamin D Improvement of environmental sanitation to prevent parasitic infections.
 - Projects and programmes in the field of food and nutrition should receive a high priority.
 - Applied nutrition programme should be extended to all affected areas and vulnerable groups
 - Prevention and unnecessary loss of food in the fields, stores and during transport and cooking should be checked
 - Public education on fundamentals of diet and nutrition and help from voluntary and international organizations are necessary
 - Prevention of various communicable diseases such as measles and diarrhoea

 - Breastfeeding should also be promoted in rural areas with proper technique

- Immunization schedule should be followed to safeguard from various diseases to boost immunity
- Sanitary practice should be introduced in community area to prevent cross-infection.

5. Write a note on MTP Act.

Ans.

Medical Termination of Pregnancy Act in India came into force from 1 April 1972 (from 1 November 1976 in Jammu and Kashmir). It was passed by Government of India as a health care measure to reduce maternal morbidity and mortality resulting from illegal abortions and to motivate such women to adopt some form of contraception. The induction of abortion has thereby been liberalized under certain situations and places where such terminations can be performed along with the person(s) who can perform such terminations.

Indications/Conditions for MTP:

Five conditions have been identified under this act:

1. Medical Ground: When the continuation of pregnancy endangers the life of the woman or causes grave injury to her physical or mental health. It is done to save the life of the mother.
2. Humanitarian Ground: When pregnancy is caused by rape.
3. Eugenic Ground: To prevent birth of child born with serious physical or mental handicap.

This may occur due to various reasons.

- a. If the pregnancy in the first 3 months suffers from diseases such as:
 - i. German measles
 - ii. Small pox or chickenpox
 - iii. Viral hepatitis
 - iv. Toxoplasmosis
 - v. Any severe viral infection
- b. If the pregnant woman is treated with drugs such as antimetabolic, thalidomide, cortisone and aminopterin
- c. If the mother is treated with X-ray or radioisotopes
- d. If the parents suffer from insanity.

4. Socioeconomic Ground: Where the life of the mother is threatened by social and economic conditions.

5. Failure of Contraceptives: When the pregnancy is caused due to failure of contraceptive devices, this leads to huge mental injury to the mother. This condition is a unique feature of Indian Law and virtually allows abortion on request. Before performing abortion in women under 18 years of age, a written consent of guardian is necessary.

Who can Perform the Abortion:

Only a qualified registered medical practitioner can perform an MTP if he/she has: Experience in the practice of gynaecology and obstetrics for a period of not less than 3 years or

- Completed six months of job in gynaecology and obstetrics that enables medical practitioner to perform MTP in first trimester (up to 12 weeks of gestation)
- Experience in a hospital for at least an year, in the gynaecology and obstetrics department
- Assisted in performance of 25 cases of MTP of which at least five being performed independently in a hospital or institute approved for this purpose
- Postgraduate degree or diploma in gynaecology and obstetrics When the pregnancy exceeds 12 weeks of gestation but not more than 20 weeks, the opinion of two registered medical practitioners is necessary to terminate the pregnancy
- According to the amendment of 1975, Chief Medical Officer of a district is authorized to certify a doctor as capable for performing MTP

Place Where MTP can be done:

MTP can be performed only at the hospital established or maintained by Government or a place approved for the purpose of this Act by Government. Facilities for training and equipment have also been made available free of cost for private clinics and to all PHCs. Lady doctors are usually trained to carry out these procedures.

Methods for performing MTP:

1. First Trimester: During this period MTP can be performed by methods:

a. Suction and evacuation

b. Manual Vacuum Aspiration (MVA): it can be performed only up to 8 weeks pregnancy at PHCs

c. Medical method of abortion: using 200 mg mifepristone and 400 mcg misoprostol 48 hr later for termination of early pregnancy up to 49 days

2. Second Trimester: MTP can be performed by various medical and surgical methods. But MTP during second trimester carries high risk of mortality and morbidity.

Note:

- * Abortion services are provided in hospitals strict in confidence. The name of the abortion seeker is kept confidential as it is considered as a personal matter
- * The MTP Act has also been modified to include imprisonment for 5-10 years for those performing illegal abortions or involved in female foeticide post sex determination.
- * There are 9645 approved MTP centres in the country with annual 600,000 MTPs reported
- * Although MTP act has been implemented, still 10 lakh unsafe abortions take place in our country.

Steps towards safe MTP services:

- Decentralization of power for approval of places as MTP centres to enlarge the network of safe MTP centres
- Spreading awareness about safe MTP in the community and availability of services in the community
- Enhancing access to confidential services/counselling for safer MTP
- Training ANM, AWW and ASHA workers to provide counselling in the community
- Promoting post-abortion care through health care workers such as ASHAs, ANMs and AWWs
- Encouraging participation of private sector and NGOs towards establishing quality MTP services
- Providing comprehensive and high-quality MTP services at all family and reproductive units.

6. Write a note on prevention and control of diabetes mellitus.

Ans.

Diabetes Mellitus:

It is defined as a metabolic abnormality characterized by hyperglycaemia and disturbance of carbohydrate, fat and protein metabolism that are associated with absolute or relative deficiency of insulin secretion and/or insulin action.

Prevention and Control:

Prevention and control of diabetes include:

- Primary Prevention
- Secondary Prevention
- Tertiary Prevention

Primary Prevention:

• It would basically involve information, education and communication (IEC) strategy to educate and motivate the community and individuals

• It includes:

- Population strategy
 - Educating general community (i.e. mass approach)
 - Specific group educating (group approach)
- Individual high-risk strategy
 - Focusing on individuals with strong family history of diabetes mellitus
- Addressing communities using prominent personalities, who are themselves diabetics

Secondary Prevention:

• It would be through early diagnosis and prompt treatment mainly by screening programmes.

• Strategies could be as follows.

- Population Screening: screening of entire population of a selected random sample, i.e. fruitful only if prevalence of diabetes is very high
 - Selective Screening: undertaken in a group of people known to be at high risk such as those with family history, obese, women with history of gestational diabetes mellitus
 - Opportunistic Screening: It could be when high risk individual reports sick and comes in contact with a doctor, e.g. obese person
- All opportunities in clinical setting should be utilized to undertake screening for known end organs by various screening procedure such as:
- Urine exam for sugar

- Fasting blood sugar for glucose
- Oral GTT
- Glycosylated haemoglobin concentration

Tertiary Prevention:

- Role of doctors as well as paramedical personnel assumes importance in tertiary prevention:
 - To follow up the patient
 - To advocate continuous treatment
 - To educate patient about importance of treatment and various precautions to be taken
- Key issues to be kept in mind are
 - A follow-up of patient of diabetes should be kept including clinical assessment as well as fasting and 2 hours PP blood glucose and if available glycosylated Hb, which gives good idea of long-term control of blood glucose
 - Person should be reassured about the possibility of leading a near normal life with proper treatment and precautions
 - Patient should be educated about:
 - Not missing antidiabetic drugs
 - Not missing meals
 - Keeping diabetic identification card
 - Carrying some sugar or lozenges for any hypoglycaemic emergency
 - Foot care, footwear and daily inspection of feet

7. Mention the difference between descriptive epidemiology and analytical epidemiology.

Ans.

Descriptive Epidemiology:

Descriptive epidemiology deals with the questions: what, when, who and where

It is used in case of little knowledge about the disease

It relies on preexisting data

It demonstrates the potential associations

It gives the image of what is going on in a selected population

It identifies incidence or prevalence of a disease

Types include:

Descriptive

- Population

- Individual

Population:

. Ecological

• Individual

• Case Series Cross-sectional

Analytic Epidemiology

Analytic epidemiology deals with the questions: how and why

It is used when insight is available about various aspects of disease

It relies on developing new data

It evaluates the causality of associations

It quantifies the relationships

It is used to explore association between variables

Types Include:

_ Observational

_ Intervention

Observational:

. Case-control study

• Cohort study

• Intervention

8. Give the difference between incidence and prevalence:

Ans .:

Incidence

:

it includes new cases only during a given time period

- It is given by the formula:
No. of new case of a specific disease during a given period of time _____ $\times 100$
- Population at risk during that period 1000
- It measures the rapidity of disease occurrence
- It is a direct measure of risk
- Estimation requires exact knowledge of time of onset of disease
- Estimation by longitudinal studies
- Incidence studied in relation to population at risk

Mainly used for aetiological studies of both acute and chronic diseases. it is studied for the period of time that allows monitoring disease occurrence. Incidence is generally restricted to actual conditions

prevalence:

It includes both new and old cases during given time period

- It is given by the formula:
No. of all case w and oleh a specific disease at time _____ $\times 1000$
- population at the same point of time
- It measures the proportion of population with disease
- i does not necessarily signify high risk
- Any such knowledge is not required
- Estimation is by cross-sectional studies Prevalence is studied in relation to whole population . Mainly used for studying the magnitude of disease in community
- it is studied for a specific period of time . Prevalence is not restricted to acute condition

9. Write a note on purification of water.

Purification of water:

1. Generally three methods are used for purification of water:

(a) Boiling

(b) Chemical disinfection

(c) Filtration Boiling:

- Satisfactory method of purifying water for household purposes
 - Water must be brought to a rolling boil for 10-20 minutes.
 - It kills all bacterial, spores, cyst and ova and yield steril ized water
 - It removes temporary hardness by removing CO₂ and PPT calcium carbonate
 - It should be boiled in the same container in which it was stored to prevent contamination during storage
- Chemical Disinfection:**

Chemicals used

- Bleaching powder
- Chlorine solution
- High test hypochlorite
- Chlorine tablets
- Iodine
- Potassium permanganate

1. Bleaching Powder

- Bleaching powder or chlorinated lime (CaOCl_2), white amorphous powder with pungent smell of chlorine.
- This is stabilized bleach, when mixed with excess of lime
- Principle: to ensure a free residual chlorine of 0.5 mg/L at end of one hour contact
- Highly polluted and turbid waters are not suited for direct chlorination

2. Chlorine Solution:

- It may be prepared from bleaching powder. ■ 4 kg bleaching powder .
 - ✓ 25% available chlorine with 20 L of water
 - ✓ Gives 5% chlorine solution

--Like bleaching powder, chlorine solution is subject to losses on exposure to light or on prolonged storage

3. High Test Hypochlorite:

- HTH or perchlaron is a calcium compound which contains 60%-70% available chlorine
- More stable than bleaching powder and deteriorates much less on storage
- Solutions prepared from HTH are also used for water disinfection.

4. Chlorine Tablets:

- Various trade names (e.g.. halazone tablets) are available in the market
- Quite good for disinfecting small quantities of water, but they are costly.

*The National Environmental Engineering Research Institute, Nagpur, formulated a new type of chlorine tablet which is 15 times better than ordinary halogen tablets

- Single tablet of 0.5 g is sufficient to disinfect 20 L of water

5. Iodine:

- It may be used for emergency disinfection of water 2 drops of 2% ethanol solution of iodine will suffice for 1 L of clean water
- Contact time of 20-30 minutes is needed to disinfect . It does not react with ammonia or organic compound to any great extent
- It is unlikely to become a municipal water supply disinfectant in broad sense
- Disadvantage:
 - ✓ Costly
 - ✓ Physiologically active (thyroid activity)

6. Potassium Permanganate:

- ✓ Once widely used it is no longer water disinfection
- ✓ Powerful oxidizing agent recommended for water disinfection.
- ✓ Alter colour, smell and taste of water

Filtration:

Used for small scale through ceramic filter such as:

1. Pasteur Chamberland: Essential part is candle made of porcelain
2. Berkefeld: Candle made of Kieselguhr
3. Katadyan: Surface of filter coated with silver catalyst to kill bacteria by oligodynamic action of silver ions.
 - Filter candles of fine type usually remove bacteria found in drinking water but not viruses
 - Filter candles are liable to be logged with impurities and bacteria
 - They should be cleaned with hard brush or scrubbing under running water and boiled at least once a week.
 - Only clean water should be used with ceramic filters oThese are quite suitable for widespread use under Indian conditions.

10. (a) Define air pollution and list down its sources. (b) Explain the effects of air pollution on the health of the people. (c) Explain preventive measures to control air pollution.

(A) Air is the basis of all life forms and is necessary for survival. Clean air is essential for having good health.

- Air pollution occurs when harmful substances and biological molecules are introduced into Earth's atmosphere. It may cause diseases, allergies or death of human beings; it may also cause harm to other living organisms such as animals and food crops and may damage the natural or built environment.

- This is the consequence of man and his activities such as factories all around the world suspending harmful gases into the atmosphere for example, carbon dioxide, carbon monoxide and compounds of sulphur.
- The effect of these air pollutants on the living things can reshape the ecosystems, affect the quality of life and can alter life spans as well. It is today one of the main health hazards of the modern world. Air pollution may be defined as the presence of substances in air at concentrations, durations and frequencies that adversely affect human health, human welfare and the environment.
 - **Air Pollutants:** Those are the alien substances which are harmful for the living things and the atmosphere alike. These can be subdivided into particulate matter (aerosol) organic or inorganic gases. Out of all the three forms, gases form over 90% of the pollutants in the air. A few major man-made pollutants which are injected into the air are carbon dioxide, carbon monoxide, compound of sulphur, fluorides, ozone, metal particles of lead, nickel, arsenic and cadmium. The natural pollutants released in the air include pollen grains, gases from volcano and marsh gas. Air pollution is one of the serious present-day health and environmental problems throughout the world.
 - **Sources of Air Pollution:**
 - The main sources of air pollution are as follows: Industries: Most of the industries contribute to air pollution by emitting toxic gases and particulate matter into the atmosphere. Some of the major industries that cause air pollution are as follows:
 - a. Thermal power plants: They burn coal for producing electricity and generate sulphur dioxide, nitrogen oxide and ash particles that are extremely harmful.
 - b. Cement factories: They produce cement dust, carbon monoxide and sulphur dioxide.
 - c. Steel plants: They produce sulphur dioxide, carbon monoxide and particles.
 - 2. Automobiles and Fossil Fuels: The constant increase in the number of vehicles (both domestic and public) all around the world is becoming one of the major source of air pollution. The vehicles majorly use fossil fuels as a

source of energy, which when burnt release particulate matter and carbon monoxide, carbon dioxide, oxides of nitrogen and sulphur, major greenhouse gases and many metal compounds into the air. Long waiting at red lights and traffic jam causes slow driving which result in burning of more fuel and increased emission of smoke. More than 60% of air pollution is due to traffic or transportation with Delhi being fourth most polluted city in the world. Vehicles running on diesel produce more smoke and thus increase air pollution. 3. Domestic Sources: Domestic combustion of coal, wood or oil is a major source of smoke, dust, sulphur dioxide and nitrogen oxides.

- 4. Tobacco Smoke: Tobacco smoke released by smokers in the households and public places pollute the air of the houses as well as public places
 - 5. Others: Other factors that contribute to air pollution are as follows:
 - Fertilizers and insecticides sprayed on fields in huge amount to increase production
 - Leakage of disposed nuclear waste
 - Explosions and reactions performed for the research and development of nuclear technique, space journeys and atomic power pollute the environment
 - Natural calamities such as earthquake and floods which could trigger blasts, leaking of gases, pollen grains also pollute the air Burning of wastes (plastic, tyres).
 - Decreasing forest resources and reckless cutting of trees due to urbanization and industrialization

(b) Effects of Air Pollution

Air pollution is injurious not only to the health of the people but also to all other animals. It is a slow poison and is assuming the form of most serious problem. It also has adverse effects on soil, plants, monuments, buildings and climate.

1. Human Health:

Air pollution is very injurious to human health. It can cause various serious problems ranging from blindness to heart diseases or even worse. The effects vary according to the concentration of pollutants in the air around. The health effects can be both immediate and delayed. It can cause the following in human beings:

I. Respiratory disorders: Maximum amount of pollutants enter the body through inhaling, which in turn affects the respiratory system in many harmful ways. It could cause irritation in nose, throat respiratory damage which includes bronchitis, asthma and emphysema. Major pollutants which cause these problems are mainly chlorine, nitrogen oxide, sulphur dioxide, ozone, suspended particulate matter. Carbon monoxide is a well-known cause of death through asphyxia related to methaemoglobin formation. As the affinity Carbon monoxide to haemoglobin is 240 times stronger than that of oxygen.

ii. Health problems: Carbon monoxide is one of major pollutants which also causes health problems. It reduces the oxygen carrying capability of the blood, causing heart attack even cardiac arrest. Burning charcoal in closed rooms at nights in winter has resulted in deaths in sleep due to choking because of carbon monoxide. Other pollutants which cause heart problems include sulphur monoxide, ozone and particulate matter.

iii. Nervous breakdown and brain damage: Lead poisons many systems in the body and is especially dangerous to children developing brain and nervous system. Elevated lead levels have been associated with impaired neuropsychological development as measured by low IQ, poor school performance, reduced ability to concentrate, irritation and hyper activity. Hydrogen sulphide also causes brain damage and affects nervous system.

iv. Cancer: Inhalation of petrol and diesel exhaust can cause lung cancer because of carbon particles and benzene. Some hydrocarbons can also cause anaemia and blood cancer.

v. Eye problems: Pollutants such as nitrogen oxide, sulphur dioxide and ozone can cause irritation to

eyes, conjunctivitis and even blindness as happened in Bhopal Gas Tragedy.

vi. Birth defects: Tobacco smoke, particulate matter, carbon monoxide and benzene can produce low birthweight (LBW) babies with stunted growth. It is found that women who smoke have higher chances of abnormal babies

2. Effects on Soil and Plants:

- Air pollutants from the atmosphere are absorbed by the soil that corrodes, abrades and tarnishes the soil. These effects reduce the fertility of soil.
 - Sulphur dioxide, fluorine compounds and smog are the three air pollutants of main agricultural concern. They reduce the plant process of photosynthesis and plant respiration.
 - Sulphur dioxide also causes necrosis of leaf tissue leading to depigmented patches, a condition known as chlorosis.
 - Fluoride damages fruit trees while ozone mainly affects field crop and fruits
- 3. Effects on Monuments and Buildings:** Monuments such as Taj Mahal are facing great danger from air pollution. The black soil released from Mathura oil refineries is causing blackening of Taj Mahal and other similar buildings.
- Sulphur dioxide is worst pollutant as it gets converted to sulphurous and sulphuric acid in the presence of moisture and causes corrosion. Iron, aluminium, copper and their alloys are also liable to be corroded.

4. Other Effects:

(a) Smog: It comes from the combination of smoke and fog when the pollutants present in the atmosphere combine with fog. It forms a toxic hybrid, namely smog. It generally occurs in the winter seasons when smog comes closer to the surface of the earth because of accumulation of smoke due to heavy traffic jam on roads. It contains harmful gases such as carbon monoxide, compounds of sulphur and particulate matter. It can cause heart and lung problems.

(b) Acid Rain: When the harmful pollutants such as compounds of sulphur, nitrogen and carbon monoxide in the atmosphere combine with the moisture present in the air, it forms nitric and sulphuric acid and precipitate along with the rain on the surface of the earth. This is known

as acid rain. It can destroy crops, can cause skin diseases in humans as well as animals, respiratory problems such as asthma and bronchitis, reduce growth of fish in river, canals and ponds, stop plant growth and damage buildings made of marbles and stones and statues made of metals.

(e) Ozone Depletion:

- Ozone, though harmful near the earth's surface but on a higher levels of atmosphere protects us from the harmful ultraviolet rays of the sun, is getting depleted by the chlorofluorocarbons and other harmful pollutants.

- The depletion of the ozone by aerosols used in jet planes and CFCS released from refrigerators and air conditioners could lead to many skin problems including skin cancer.

(c) Preventive Measures to Control Air Pollution

- According to WHO. the following general principles are provided for containing air pollution.
- (1) Containment: Inhibiting the pollutants from entering into the atmosphere by stopping it at the source
- (2) Replacement: Changing today's techniques to less harmful techniques which generate lesser to no pollutants.
- (3) Dilution: Diluting the pollutants to such a level that they can be removed by natural methods
- (4) Legislation: Forming and executing certain laws made to control pollution.
- (5) International Action: Creating International Laws and pressure so that countries are forced to switch to better means of containing pollution

Methods of Prevention:

The practical day-to-day methods which can be implemented to reduce air pollution are

- Modification of industries: Industries contribute to air pollution up to a good extent. Special ways should be introduced at the currently running industries injecting pollutants in the air to stop or reduce those pollutants ejection into the air.
- Use of nonconventional energy resources should be encouraged instead of conventional ones (coal, petroleum, etc.) such as solar energy wind energy and use of natural gas. Special modifications of the vehicle engines which are today one of the biggest contributors of air pollution
- Spreading awareness regarding the issue so that people get educated and do their bit to reduce this harmful problem
- Legal measures/laws could also be imposed on industries and special sanctions should also be imposed on them so that keeping their personal benefits aside they would contribute to this cause
- Planting trees should be encourage and promoted and green belts should be established in areas where air pollution is above danger levels.
- Fertilizers and insecticides should be discouraged.

Nurses' Contribution in Prevention and Control:

- Identifying causes of air pollution around houses and neighbourhoods and try to suggest cleaner solution and alternatives to the locals
- Creating awareness about this issue around houses, localities, villages and towns about the effects air pollution has on them and the environment
- Importance of ventilating and moping
- Discouraging cigarette smoking around residential areas Discouraging burning of fire crackers on religious or festive occasions
- Suggesting ways to local farmers about handling their fertilizer units.

11. Write a note on prevention and control of anaemia.

Ans. Anaemia:

WHO defines anaemia as a result in which haemoglobin content is lower than normal, as a result of deficiency of essential nutrients, regardless of the cause of such deficiency.

Prevention and Control:

Due to its multifactorial nature, correcting anaemia often requires an integrated approach. Timely intervention can restore personal health and raise national productivity level by as much as 20%.

Main strategies to control and prevent anaemia are

- Breastfeeding and appropriate weaning
- Dietary modifications
- Deworming
- Control of infection
- Supplementation
- Iron fortification
 - Nutrition education

Breastfeeding and Appropriate Weaning:

- Breast milk is not a rich supplement of iron but bioavailability of iron from breast milk is adequate to supply iron requirement of young infant, till about 6 months
- Iron requirement of infant increases by 1 year
- Weaning should be done with iron-rich food such as vegetable soup and jaggery

Dietary Modification:

- Dietary modification must be undertaken with a view to increasing iron intake.

Diet should be rich in iron.

- Green leafy vegetables, pulses, nonvegetarian food, ragi, jaggery, fruit such as apple and custard must be

Promoted

- To increase iron absorption vitamin C should be promoted in food (such as lime, lemons, guava, amla and orange) Food inhibiting iron absorption (tea, tamarind, high fibre) should be spaced out from milk

Deworming:

- Anthelmintic drugs
- Deworming is required, especially for Infants and children

Control of Infection:

It can be achieved by:

- Immunization
- Early diagnosis and treatment
- Good hygiene
- Sanitation practices
- Good water facilities

Supplementation:

- Iron supplementation is routinely recommended for pregnant women and children under national programme for health care.
 - Therapeutic iron supplementation is required in moderate to severe case of anaemia
- Iron Fortification:

Common salt can be fortified with ferric orthophosphate or ferrous sulphate and sodium bisulphate Double fortification of salt with iron and iodine is also feasible

Nutrition Education:

- Anaemia is not caused solely due to poverty and lack of resources
- Ignorance of:
- Proper dietary intake
- Immunization
- Hygiene

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 - Sanitation
- Dietary interaction
- Ignorance must be dispelled
- This could be achieved through health education for
 - Children at school
 - Housewives
 - Men
 - Pregnant women
- Promoting use of fresh food, nutrition and cheap locally available food is also important