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Distance Learning Programme (DLP)

GENERAL SCIENCE

(UPSC PRELIMS)



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GENERAL SCIENCE

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HUMAN DISEASES

CHAPTER

Disease refers to a disorder of structure or function in a human, animal, or plant, especially one that produces specific symptoms or that affects a specific location and is not simply a direct result of physical injury. It is a departure from normal health due to structural or functional disorder of the body.

Types of Diseases

Diseases can broadly be classified as: Congenital diseases and Acquired diseases.

Congenital Diseases

- These diseases are present since birth.
- They could be due to a genetic abnormality or due to the malfunctioning of any organ or system.
- These are permanent, and generally not curable and may be inherited by the children.
- For example: Albinism, Down's syndrome, Hemophilia etc.

Acquired Diseases

- These diseases develop after birth.
- They can further be classified into:
 - Communicable (or infectious) Diseases, and
 - Noncommunicable (or noninfectious) Diseases.

Communicable Diseases

- A communicable disease is one that is spread from one person to another through a variety of ways that include: contact with blood and bodily fluids; breathing in an airborne virus; or by being bitten by an insect.
- The most common pathogens are bacteria, virus, protozoan, worms, fungi, mites, etc.
- The first symptoms of the disease do not necessarily appear immediately.
- The period between the entry of germs and the appearance of the first symptoms of the disease is known as the incubation period. Examples: Cholera, Malaria, Tuberculosis, Influenza, etc.

Diseases Caused by Bacteria

Disease	Name of Bacteria	Transmission	Symptoms
Diphtheria	Corynebacterium diphtheriae	Contact	Affects the throat, difficulty in respiration and suffocation



Pertussis (Whooping Cough)	Haemophilus pertussis	By discharge from the throat of an infected person	Continuous coughing
Tetanus	Clostridium tetani	By bacteria in soil through wounds	High fever, spasms in body, locking of jaws
Cholera	Vibrio cholerae	Flies, food, faeces, carriers	Continuous stool and vomiting
Typhoid	Salmonella typhi	Flies, food	Continuous fever, reddish eruptions on chest & abdomen
Pneumonia	Diplococcus pneumoniae	Contact with air	High fever, inflammation of lungs, fatigue
Tuberculosis	Mycobacterium tuberculosis	Coughing	General weakness, regular fever, coughing, bloodstained sputum
Syphilis	Treponema pallidum	Direct contact, sexually transmitted	Ulcer on penis or on rectum, lips, tongue, nipple, skin rash, fever
Gonorrhoea	Neisseria gonorrhoeae	Sexual contact	Pain in passing urine, discharge of pus, pain
Leprosy	Mycobacterium leprae	Long and close contact	Spots on the body and nerves are affected

Diseases Caused by Virus

Disease	Name of Virus	Transmission	Symptoms
Poliomyelitis	Polio virus	Houseflies, food and water	Fever, body pain, backbone and intestine cells are destroyed
Mumps	Mumps Virus (Paramyxovirus)	Contact, virus in saliva spreads	The movement of the jaw becomes very difficult.
Measles	Measles virus (Paramyxovirus)	Contact	Reddish eruptions on body
AIDS	HIV	Blood and sexual contact	Weak immune system
Influenza (flu)	Orthomyxovirus	Contact	Droplet infection created by sneezing, coughing or talking
Dengue	Dengue Virus (DENV) (the virus has five types)	Aedes Mosquito	Reduction in platelet count; Pain in eyes, head, muscles and joints
Chickenpox	Varicella Virus	Contact	Dark red-coloured rash or pox changing into vesicles, which then form crusts and fall
Smallpox	Variola virus	Contact	Light fever, widespread skin rash beginning with flat spots which change into raising bumps then firm fluid filled blisters which then scab.

Herpes	Herpes virus	Contact	Blisters, ulcer, pain
Meningitis	—	Contact	High fever
Rabies	Rhabdovirus	By being bitten by a mad dog	The patient becomes mad along with a severe headache, high fever.

Diseases Caused by Protozoa

Diseases	Name of Parasite	Carrier	Symptoms
Malaria	Plasmodium	Female anopheles mosquito	Chill and high fever
Kala-azar	Leishmania donovani	Sand flies	High fever
Diarrhoea	Entamoeba histolytica	—	Diarrhoea with mucus and blood
Pyorrhoea	Entamoeba gingivalis	—	Bleeding gums
Sleeping sickness	Trypanosoma	Tse-Tse flies	Fever with severe drowsiness

Diseases Caused by Fungi

- **Asthma:** It is caused by the fungus *Aspergillus fumigatus*. It reaches the lungs and obstructs their functioning.
- **Ringworm:** It is caused by fungi *Trichophyton Verrucosum*. This disease is transmitted directly through airborne spores, and contact with infected person. The common symptoms are occurrence of circular swollen bumps on the skin, irritation in the scalp and softened skin of the groin.
- **Athlete's Foot:** Athlete's foot is caused by a number of different fungi. These include species of *Trichophyton*, *Epidermophyton*, and *Microsporum*. This disease is transmitted through the infected floors and mats on which people walk barefoot. The fungus attacks the soft skin of the feet, especially between the toes.

Non-communicable Diseases

- Non Communicable Diseases (NCDs) are the conditions or diseases which are not caused by transmission of infections (like in communicable diseases).
- NCDs are non-transferable i.e., they are not contagious. They affect the human body for long term.

Non-communicable diseases can be broadly classified into the following types:

- **Deficiency Diseases:** They arise due to a deficiency of essential nutrients in the body like proteins, minerals, vitamins, etc. Examples: marasmus, scurvy, night blindness etc.
- **Hereditary Diseases:** Hereditary diseases are disorders or diseases that are inherited genetically. They are also known as genetic disorders or inherited diseases and may be passed on within the family if there is a mutant gene present. Examples: Down's syndrome, Turner's syndrome, Klinefelter's syndrome, Patau syndrome, Edward syndrome etc.
- **Degenerative Diseases:** Degenerative disease is the result of a continuous process based on degenerative cell changes, affecting tissues or organs. Normal bodily wear or lifestyle choices like exercise or eating habits may worsen degenerative diseases.



These include:

- Diseases related to heart like atherosclerosis, angina pectoris, hypertension, heart attack.
- Diseases related to blood: like anaemia, polycythemia, leukaemia.
- **Allergy:** Allergy may arise due to dust, smoke, pollen grains etc.
- **Cancer:** It is caused due to uncontrolled and abnormal cell division in the body.

Common Non-communicable Diseases

Cancer

- Cancer is the uncontrollable growth of the cells of the body. The group of cells is known as a tumor. The tumor is of two types: benign tumor and malignant tumor.
- A benign tumor is one which does not spread to the whole body and therefore does not destroy other organs of the body.
- A malignant tumor is one which spreads to the whole body, destroying other organs of the body as well.
- Proto oncogenes are genes present in everyone's body, this proto oncogene is activated by some external factors due to which they get converted into oncogenes. These oncogenes lead to proliferate growth of the cells of the human body.
- Depending upon the targeted organ, cancer can be classified into various types such as breast cancer, blood cancer, lung cancer, leukaemia, etc.

Diabetes

- Diabetes is a medical condition in which sugar or glucose in the body increases. There are two types of diabetes:
- **Diabetes type 1:** In this, the ability of pancreatic cells reduces, it produces very little insulin or no insulin at all.
- **Diabetes type 2:** In this, the body's ability to process sugar or glucose gets disturbed.
- Insulin is a ductless, peptide hormone present inside the β -cells of the islets of the pancreas. Insulin helps the body to utilize the sugar that one intakes in the diet. It prevents the blood glucose or blood sugar level from getting high.

Hypertension

- In this disease, blood pressure increases.
- The causes are excessive salt intake, smoking, diabetes, obesity and kidney disease.

Osteoporosis

- Osteoporosis, which literally means porous bone, is a disease in which the density and quality of bone are reduced.
- As bones become more porous and fragile, the risk of fracture is greatly increased.
- The loss of bone occurs silently and progressively. Often there are no symptoms until the first fracture occurs
- It happens mainly in the wrist, hip and spine.
- Osteoporosis can occur in both males and females.



Alzheimer's

- Alzheimer's disease is a progressive disorder that causes brain cells to degenerate and die.
- It is the most common cause of dementia – a continuous decline in thinking, behavioral and social skills that disrupts a person's ability to function independently.
- The early signs of the disease may be forgetting recent events or conversations. As the disease progresses, a person with Alzheimer's disease develops severe memory impairment and loses the ability to carry out everyday tasks.
- There is no proper cure and treatment for this disease. However, medication and drugs can improve the symptoms.

Heart Disease

- Heart disease is a broad category of non-communicable diseases that affects the way the heart and circulatory system perform.
- Heart disease includes rhythm irregularities, heart attack, congenital heart disease, heart failure, cardiogenic shock, etc.

Asthma

- Asthma is a medical condition of breathing and respiratory problems. It affects the bronchioles of the lungs.
- In asthma the airways narrow and swell and produce extra mucus. This can make breathing difficult and trigger coughing, wheezing and shortness of breath.
- It can be treated with inhalers, which give relief to the lungs and respiratory system. Inhalers contain certain drugs like Salbutamol, Tiotropium bromide that helps in providing relief.

Chronic Kidney Disease (CKD)

- Chronic Kidney Disease involves severe damage to the kidneys. This medical condition leads to renal failure.
- Chronic Kidney Disease occurs in stages. The early stages can be treated easily.
- Kidney diseases severely affect the metabolism of the body.

Cataract

- Cataract is the clouding of the lens of the eyes.
- It is treated by replacing the clouded lens with a clear artificial lens.

Rising Threat from Non-communicable Diseases

- Non-Communicable diseases (such as heart diseases, cancer and diabetes) are a major cause of deaths all over the globe.
- According to the WHO, Non-Communicable Diseases (NCDs) – mainly cardiovascular diseases, diabetes, respiratory diseases and cancer continue to be the top killers in the South Asia region, claiming 8.5 million lives each year.
- Globally, NCDs are responsible for over 70% of all the deaths, out of which one third includes people dying prematurely between the age of 30 and 69 years.



- According to the Indian Council of Medical Research (ICMR) report titled 'India: Health of the Nation's States', the contribution of Non-Communicable Diseases to total deaths in the country was 61.8% in 2016, as compared to 37.9 % in 1990. NCDs like cancer, hypertension, and diabetes are on the rise in India.
- The four 'major' NCDs are caused, to a large extent, by four modifiable behavioral risk factors: tobacco use, unhealthy diet, insufficient physical activity and harmful use of alcohol.
- Containing the NCDs has been listed by the WHO as its health goal for this year (2019) along with reducing mortality related to air pollution and climate change, a global influenza pandemic, etc.

Cure and Protection from Diseases

Protection from diseases is done by drugs, vaccination and serum inoculation.

- **Drugs:** They cure diseases rather than prevent them. Generally there are fewer effective drugs against viruses than bacteria. It is because viral physiology is so closely related to the host's physiology that any chemical that harms the virus, also harms the host cells.
- **Vaccination** is the administration of antigenic material (a vaccine) to stimulate an individual's immune system to develop adaptive immunity to a pathogen. Vaccines can prevent infectious disease. Vaccines stimulate the body to produce its own antibodies, without suffering from the disease. They provide active immunity.
- **Serum:** It contains prepared antibodies from some other sources. They are injected into the patient and provide immediate passive immunity. For example, antivenom is the serum that is used against snake bites.

Some Related Facts

- Isotope of cobalt is used in cancer treatment.
- Isotope of radium is used in the secondary treatment of cancer.
- Isotopes of iodine are used in the treatment of goitre.
- The pacemaker is a small device placed in the chest to control abnormal heartbeat.
- Electrocardiograph (ECG) is used to find abnormalities of the heart.
- Electroencephalogram (EEG) is used to detect brain malfunctioning.
- Magnetic Resonance Imaging (MRI) is used to find out any abnormality in the whole body.
- Cardioverter/Defibrillator is used to treat arrhythmias of the heart, i.e., to help the heart beat normally by coordinating its chambers.
- Sphygmomanometer is used to record the patient's Blood Pressure (BP).
- The stethoscope is used to hear sounds from movements within the body like heartbeats, breath sounds, etc.
- Ophthalmoscope is used to look at the retina.
- Elisa Test is the test of AIDS.
- Widal test is the test to detect typhoid.

