Human Health and Infectious Diseases

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Abstract – **Human body has a defence mechanism to act against various agents which disturb the well being. Health is described in physical, mental and social dimensions. A disease is an abnormal condition that affects the structure or function of one or many parts of the body. A disease can be infectious or non infectious. Infectious diseases are bacterial, viral, fungal, protozoan and helminthic. Bacterial diseases are typhoid, pneumonia, dysentery, diarrhoea, plague and diphtheria. Viral diseases are common cold, influenza, AIDS, dengue fever and chikunguniya. Protozoan diseases are malaria and amoebiasis. Helminth diseases include ascariasis and elephantiasis. Fungal diseases are ringworm, dandruff and athletes foot. This paper discusses the causative agent(s), transmission mode, symptoms, confirmatory tests, prevention and treatment of these infectious diseases. All these diseases can be avoided by following proper immunisation schedule provided by the healthcare authorities.**

Keywords: **Health, Immunisation, Infectious, Life Style, Symptoms.**

I. INTRODUCTION

'Health is Wealth' is an apt proverb. There can be no wealth greater than the good health, a person enjoys. In a healthy state, a person keeps himself physically, mentally and socially fit[1]. Human body has a complex defence mechanism to keep itself fit and act against various agents which disturb the well being. Being exposed to diseases, the body develops resistance towards diseases and gains immunity.

II. DIMENSIONS OF HEALTH

A. Physical Dimension

A disease-free person looks bright with his skin shining; enjoys normal metabolism; has lustrous hair and no dark circles around his eyes.

B. Mental Dimension

A mentally healthy person knows his capacities and does not over estimate or under estimate himself. He can easily judge others strengths and weaknesses.

C. Social Dimension

A person, who is able to adjust in society, does not find fault with others. He maintains good interpersonal relationship with family members and colleagues. He is free from interpersonal conflicts and will never quarrel with others.

III. INFECTIOUS DISEASES

In early years, people thought that blood was stagnant in the body. Later it was proved that it circulates all over the body. When an impurity mixes with the blood, it causes a disease. A disease is an abnormal condition or ill health that negatively affects the structure or function of one or many parts of an organism. Disease can occur due to life style or genetic and metabolic reasons. A disease can be infectious or non infectious.

A. Infectious Diseases

Diseases, caused by infectious agents called pathogens, transmitted from one to another through infectious articles or fomites are called infectious diseases.

B. Non Infectious Diseases

Diseases that do not spread through fomites are called non infectious diseases.

Infectious diseases can be bacterial, viral, fungal, protozoan or helminthic.

1. Bacterial Diseases

Bacterial diseases include typhoid, pneumonia, dysentery, diarrhoea, plague and diphtheria.

a. Typhoid

Typhoid fever is an acute illness associated with increase in body temperature.

Causative Agent(s):	Salmonella Typhi.
Transmission:	Through contaminated food and water.
Symptoms:	Fever, headache, intestinal perforation.
Confirmatory Tests:	Widal Stain Test / Slide Agglutination Test / Ring Test, Typhodoint Test and Tudex Test. In all these tests, Salmonella is characterised by the presence of osama false.
Prevention:	Use of vaccines will not provide complete prevention. So, maintaining proper hygiene can avoid typhoid fever.
Treatment:	It can be treated by appropriate antibiotic therapy like chloramphenicol.

b. Pneumonia

It affects the alveoli of the lungs and causes difficulty in breathing.

Causative Agent(s):	Hemophilus Influenzae and Streptococcus Pneumonia.
Transmission:	Through viruses and bacteria present in the nose and throat which can infect the lungs, if inhaled. It also transmits via air borne droplets.
Symptoms:	Nail colour changes from grey to blue, due to the fluid in the alveoli.
Confirmatory Tests:	Nil.
Prevention:	By suitable pneumococcal vaccination at suitable age.
Treatment:	Antibiotics like penicillin, cough medicines, fever reducers etc.

c. Dysentery

It includes rice water stool, accompanied with lower abdominal pain and cramps.

Causative Agent(s):	Salmonella Shigella.
Transmission:	Through ingestion of faecal food containing the cyst Entamoeba histolytica.
Symptoms:	Abdominal pain, fever and chills, nausea, vomiting, painful passing of stools.
Confirmatory Tests:	Stool and blood test.
Prevention:	Proper hygiene.
Treatment:	Will normally resolve without any treatment.

d. Diarrhea

It includes stools with blood. Loose stools cause uncontrollable bowel movement. Because the pathogens bind it towards the opening of the anus and it involves immediate output.

Causative Agent(s):	Giardia Lamblia and Cryptosoporidium.
Transmission:	Through contaminated food and water.
Symptoms:	Abdominal pain, altered bowel movements.
Confirmatory Tests:	Blood test, stool test, sigmoidoscopy, colonoscopy.
Prevention:	Nutritional interventions.
Treatment:	Anti-diarrheal medications like Zinc supplements.

e. Plague

It is a gram negative, non motile bacterium disease. It can be pneumonic and bubonic. The former affects the lungs and the latter causes swelling in the lymph nodes.

Causative Agent(s):	Yersinia Pestis.
Transmission:	When a rat infected with this bacterium bites the person.
Symptoms:	headache, fever, vomiting, swollen lymph nodes.
Confirmatory Tests:	Wayson stain test.
Prevention:	Avoiding contact with infected animals.
Treatment:	Streptomycin & other antibiotics like genlamin, doxycycline etc.

f. Diphtheria

It is an airborne disease. It is a gram positive, non motile bacterium disease. It causes damage to the mucous membrane and affects the nasal passage and throat.

Causative Agent(s):	Corny bacterium Diphtheria.
Transmission:	Through respiratory droplets.
Symptoms:	Sore throat, fever, swollen lymph nodes, weakness.
Confirmatory Tests:	Doctors take samples from damaged tissues and test for diphtheria.
Prevention:	Vaccines.
Treatment:	Antibiotics.

2. Viral Diseases

Viral diseases include common cold, influenza, AIDS, dengue fever and chikunguniya.

a. Common Cold

It affects children than adults. More than 100 strains of virus are responsible to cause common cold in man. It affects the nasal passage and upper respiratory tract and not the lungs. It is very difficult to find medicines for common cold, because there are many types of viruses. However having healthy food and maintaining proper hygiene can prevent from common cold.

Causative Agent(s):	Rhino virus.
Transmission:	Through direct contact with infectious agents.
Symptoms:	Cough, sore throat, runny nose, fever.
Confirmatory Tests:	Nil.
Prevention:	Maintaining proper hygiene.
Treatment:	Nil.

b. Influenza

There are many types of flu. The onset is after 2 days of exposure.

Causative Agent(s):	Influenza virus
Transmission:	Through air affected with cough, sneeze etc.
Symptoms:	High fever, runny nose, muscle pain, headache etc.
Confirmatory Tests:	Testing the nose sputum for virus.
Prevention:	Maintaining proper hygiene like washing hands, giving proper influenza vaccine at a suitable age.
Treatment:	antiviral drugs like oseltamivir.

c. Acquired Immuno Deficiency Syndrome (AIDS)

AIDS is a dreadful disease. Robert Gallo at National Institute of Health, USA and Luc Montagnier at Pasteur Institute, Paris isolated the Human Immuno Deficiency Virus (HIV), which causes AIDS [1]. HIV causes profound immuno suppression in humans. It is due to the depletion of one type of White Blood Cell (WBC), which is involved in the formation of antibodies called CD4 plus T-helper cells (lymphocytes).

Causative Agent(s):	Retro virus with Glycoprotein envelope and genetic material – Ribo Nucleic Acid (RNA).
Transmission:	Through sexual contact or transfusion of blood and blood products.
Symptoms:	Significant weight loss, chronic diarrhoea, prolonged fever, opportunistic infections such as tuberculosis, candidiasis and recurrent herpes zoster (viral) infection.
Confirmatory Tests:	Enzyme Linked Immuno Sorbent Assay (ELISA) and Western Blot.
Prevention:	Protected sexual behaviour, Safe sex practices, Screening of blood for HIV before blood transfusion, Usage of disposable syringes in

hospitals, not sharing razors or blades, not tattooing using a common needle.

Treatment: Highly Active Anti Retro viral Therapy (HAART) - an anti HIV cocktail of protease inhibitors and other anti retro viral medications.

d. Dengue Fever

It is a mosquito borne viral disease occurring in tropical and subtropical regions.

Causative Agent(s): Aedes Albipictus.
Transmission: Through the bite of the mosquito Aedes Albipictus.
Symptoms: Decrease in blood platelet level, decrease in WBC count, onset after three to four days after the bite of the vector, headache, fever, skin rash, vomiting.
Confirmatory Tests: Positive IgM and IgG tests for dengue antibodies.
Prevention: Dengue fever vaccine, avoiding mosquito exposure.
Treatment: Blood transfusion, supportive care etc.

e. Chikunguniya

It is a viral infection transmitted by mosquitoes.

Causative Agent(s): Aedes Aegypti and alpha virus.
Transmission: By the bite of the vector aedes aegypti or alpha virus.
Symptoms: Fever, joint pain, headache etc.
Confirmatory Tests: Testing the serum or plasma for virus.
Prevention: Avoid mosquito bite.
Treatment: Supportive care.

3. Protozoan Diseases

Protozoan diseases include malaria and amoebiasis.

a. Malaria

A disease caused by plasmodium parasite and transmitted by the bite of infected mosquitoes.

Causative Agent(s): Plasmodium. Plasmodium is of many types - Plasmodium Vivax, Plasmodium Malaria, Plasmodium Ovale and Plasmodium Falciparum. Of these, Plasmodium Falciparum is malignant and fatal.
Transmission: Through vector female anopheles mosquito.
Symptoms: Recurring bouts of fever (106°F) after 3 to 4 hours. When the fever subsides, chills recur at regular intervals. This change in body temperature is due to release of toxic substance Heamozoin in the blood. The infective stage of Plasmodium is called

	Sporozoite. The vector (primary host) of this disease is female anopheles mosquito. The secondary host is man.
Confirmatory Tests:	Antigenic detection. Immuno chromatographic tests provide results in 2-15 minutes.
Prevention:	Avoiding mosquitoes breeding in places like stagnant water, ditches etc., Making Gambusa fish eating mosquito larva.
Treatment:	Chloroquine. Malaria caused by plasmodium falciparum is cured by intravenous infection.

b. Amoebiasis

The vector of this disease is house fly.

Causative Agent(s):	Entamoeba Histolytica.
Transmission:	Through contaminated food by faecal matter.
Symptoms:	Abdominal Pain, Diarrhea.
Confirmatory Tests:	Stool antigen test to detect Entamoeba histolytica.
Prevention:	Proper hygiene.
Treatment:	Gastro intestinal amoebiasis is treated with nitro imidazole drugs, which kill amoebas in the blood, intestine and liver abscesses. Since Entamoeba histolytica is not seen in every stool sample, several stool samples are tested.

4. Helminth Diseases

Helminth diseases include ascariasis and elephantiasis.

a. Ascariasis

It is an infection of small intestine.

Causative Agent(s):	Ascariasis lumbricoides (a special type of round worm).
Transmission:	Through contaminated food and water. The pathogenic agents are present in soil and in moist places. The person acquires this disease by accidentally swallowing the eggs of the pathogen.
Symptoms:	Abdominal swelling, shortness of breath, Diarrea.
Confirmatory Tests:	Stool test.
Prevention:	Practice good hygiene.
Treatment:	Albendazole, mebendazole, levamisole etc.

b. Elephantiasis (Lymphatic Filariasis)

It is a tropical, parasitic disease that affects the lymph nodes and lymph vessels.

Causative Agent(s):	Wucheria Brancofti and Wuheria Malayi
Transmission:	By the bite of the vector.
Symptoms:	Chronic inflammation of lymph nodes and genital organs caused by culex mosquito, Aedes and anopheles, abnormal swelling of legs, swelling of scrotum, breasts etc.

Confirmatory Tests:	By physical examination.
Prevention:	Prevent from mosquito bites.
Treatment:	Diethyl carbamazine avoids further infection. Surgical methods to treat elephantiasis are being researched.

5. Fungal Diseases

Fungal diseases include ringworm, dandruff and athletes foot. A person affected with fungal disease finds it difficult to move properly in the society. Fungal diseases cause skin rashes and intense itching.

a. Ringworm (Tenia Corporis)

It is a highly contagious fungal disease affecting skin or scalp.

Causative Agent(s):	Epidermophyton (ring worm in arms and glabarous skin). Epidermophyton floccosum causes nail bed infection especially in hostellers.
Transmission:	Through fomites.
Symptoms:	Darkening of skin, fissures, peeling, red rashes, scaly patches, hair loss and itchy scalp.
Confirmatory Tests:	Antifungal creams, ointments etc.
Prevention:	Proper hygiene.
Treatment:	Griseofulvin, terbinafine, itraconazole, fluconazole.

b. Dandruff (Tenia Capitis)

It is a non-contagious skin condition that affects the scalp.

Causative Agent(s):	Micosporum.
Transmission:	Nil.
Symptoms:	Itchy and flaking skin of scalp.
Confirmatory Tests:	Nil.
Prevention:	Using shampoo with tea tree oil.
Treatment:	Antifungal creams like ketoconazole.

c. Athletes Foot (Tenia Pedis)

It is a fungal infection that usually begins between the toes.

Causative Agent(s):	Trichophyton.
Transmission:	Through direct contact with infection, walking in barefoot.
Symptoms:	Itching, scaling, redness.
Confirmatory Tests:	Skin test.
Prevention:	Proper hygiene
Treatment:	Natural home remedies.

IV. CONCLUSION

Diseases are associated with many symptoms and signs. Diseases may be caused due to genetic, metabolic or due to improper life style. All these pathogenic diseases can be avoided by following proper immunisation schedule provided by the healthcare authorities and by maintaining proper health conditions. Proper diet, exercising, having rich vegetables and fruits can prevent from many diseases.

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