International Journal of Multidisciplinary Research and Development
Online ISSN: 2349-4182, Print ISSN: 2349-5979, Impact Factor: RJIF 5.72
www.allsubjectjournal.com
Volume 3; Issue 12; December 2016; Page No. 124-128

Communicable diseases: Their preventive and therapeutic aspect

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Abstract
Community associated infections remain a persistent and recognized public health risk to all. Sexually transmitted infection rates are on the rise. Tuberculosis rates are generally low but remain persistent among all communities. Hepatitis C rates are declining, but care and treatment for chronic hepatitis C infection impose a heavy burden on the health care system and there are estimates that 41 per cent of infection individuals are unaware of their infection. Diseases occur only when conditions are favorable to them to occur, in man and environment. When we are physically weak and our body resistance slides down, the mischievous microbes enter our body where they incubate and we fall ill. Same way the polluted environment around us invites the deadly germs to breed and multiply, and cause various diseases to break out. The necessary conditions for the infections or communicable diseases to occur and the processes that go with them are briefly explained in this paper.

Keywords: AIDS, malaria, tuberculosis, hepatitis, rabies, tetanus

1. Introduction
A disease is a sickness that occurs when there is an upset or breakdown in the way the body usually functions. Most diseases make one feel sick or like something is not quite right with the body, but some diseases upset places in the body that one cannot really feel, like blood, or one's internal organs. Symptoms are the changes that one can see or feel when one has a disease. Coughing can be a symptom of having a cold. People recover from some diseases in a short time. Others last a long time. Diseases that can be passed or transmitted from one person to another are called infectious or contagious, like the common cold. Illnesses like a heart attack or cancer are not contagious. If a person is around someone else who has an infectious disease, we say that person has been exposed. Very often symptoms appear much later so the person never knows when he or she was exposed to the illness, that person has become infected.
Essential conditions for communicable diseases

1.1 Presence of parasites and germs
when bacteria, viruses, fungi, protozoa or other pathogens are present in the environment (air, water, food, eatables, utensils, or personal effects of the suffering person) and make their way into the man's body by means of direct or indirect contact, they cause diseases corresponding to their nature and type. For instance, when we drink contaminated water from a pond or rusted municipal taps or consume stale food stuff or uncovered eatables infested with bacteria we contract cholera. The housefly is known as the carrier of the germ. Similarly, children contract measles when Myxovirus (Which causes it) gets transmitted to them through direct contact with the person suffering from it or through his sneezing and coughing processes.
Pathogens grow and multiply faster in hot and humid climatic conditions; hence, diseases caused by them spread faster and more violently during summer months, hot and humid weathers. Insanitation supports growth of mischievous microbes and enables them to spread around through air, water and food, and cause diseases.

1.2 Presence of the source of infection
Mosquitoes do not necessarily cause malaria until and unless they pick up the disease causing plasmodium- a protozoan parasite- from a person already suffering from it. Similarly, if a person already suffering from small pox or harboring it's germs is not kept in isolation and people stay in close proximity with him and or his clothes and utensils, they are likely to contract disease.

1.3 Means of spread
Most communicable diseases and infections are spread through direct and/ or indirect contact with the disease-inflicted individual or his clothing, utensils, personal effects, air, food and animals. Any one is likely to get affected even after great care and caution. He may not get near a suffering individual, avoid the infested clothing and utensils, and yet may inhale polluted air. We must avoid direct or indirect contact with the sufferer and his belongings as well as to eliminate the means that spread disease.

1.4 Incubation period
Some agents of disease set up a local irritation, but very soon they give evidence of general disturbance. This sort of thing is characteristic of the infectious diseases like diphtheria, scarlet fever, measles, mumps and many others. In these disorders, there is first an incubation period, during which time the individual remains well while the organisms are undergoing a developmental phase. This period varies from disease to disease. In common cold, it is very short, probably only a few hours. In most of the communicable diseases, attacking children the period is from one to three weeks, with fourteen days being a common interval.

1.5 Mechanism of infesting others

The mode and mechanism of transmission depends directly upon the life characteristics of the agent and the availability of various vectors. The malaria parasite is transmitted to man only through the bite of an infested mosquito (anopheles); plague is transmitted by the rat flea in which the complete cycle of microorganism takes place; typhoid fever depends upon several avenues which will lead from the faecal discharges of the patient with the disease, usually, or a carrier that harbours typhoid bacilli in the intestine, and from this source the route may be contamination of food by fingers or flies or of the water and milk supplies.

Once a person gets infested with a disease, he continues to carry its germs-until they are completely eliminated with curative measures. The housefly is a potential cause of the spread of cholera, trachoma, dysentery, leprosy, typhoid and many other diseases.

2. Common alert signals Indicating onset of communicable diseases,

Although each communicable disease/ infection has distinct signs and symptoms that accompany it and the alert signals that precede it, this category of diseases, by and large, manifests certain common characteristics.

- As the incubation period comes to its final stage, and the disease begins to surface, the patient may show a sudden rise in body temperature which persists but does not remain steady; it fluctuates - sometimes shooting up to 104F as in influenza.
- In case there is internal infection such as throat or lung infection leading to inflammation of the affected organ(s), there may also occur shivering as we generally notice in case of malaria.
- The area of infection may show inflammation or swelling, heat and redness usually prevailing. In acute infections the leukocytes are greatly increased in the area, in chronic infections the lymphocytes predominate.
- Small granules (pimple-like eruptions) or rashes may appear on different organs of the body, both being painful and poisonous. This happens in cases of measles, mumps, small pox etc.
- There is a sensation of headache, sore throat and pain in some other parts of the body, signaling onset of some disease. There may be a feeling of nausea and restlessness.
- In some infectious diseases, certain raised patches, which are more or less red in colour, might appear on the forehead below the hair, and these may spread to the whole of the body in due course.
- Generally, patients complain of excessive weakness throughout the body and pain in the waist and feet.
- Rise in the frequency of respiration and heartbeat, loss of appetite, concentration of urine, changes in the white blood cells and dry tongue are other danger signals of communicable diseases.

3. Selected communicable diseases

3.1 AIDS

The Acquired Immune-Deficiency Syndrome or AIDS is caused by a retro-virus known as Human Immune-deficiency Virus (HIV). Called slim disease, this breaks down the body's immune system so that the patient dies by inches. The first case of AIDS Was reported in 1981 in the world and in India in 1986. Within two decades or so, it has spread like epidemic through the world

In human beings, the AIDS is basically contracted through an unguarded sexual Contact vaginal, oral or anal. It may also be transmitted from one person to another through HIV contaminated blood transfusion, skin piercing objects like injection syringes, ear-piercing needles and punches, tattooing styluses etc, that carry HIV virus.

Common symptoms

The following prominent signs and symptoms appear in an AIDS patient:

- As the incubation period for HIV virus is as long as nine years, the patient continues to show up well until the symptoms begin to appear.
- There is a non-specific illness similar to granule fever: it includes fever, malaise (uneasiness or a feeling of discomfort), Magalia (muscular pain), enlargement of the lymph nodes, (inflammation of the throat and rashes.
- Following active infection plasma level rapidly declines and a chronic infection ensues.
- After some time, non-specific constitutional symptoms such as fevers, night sweats, diarrhea, and weight loss develop.
- Several minor infections of the skin, mucous membranes, pneumonia etc.
- Serious effect on the brain due to decreasing immunity, declining body resistance, failing strength and prowess.

ELISA and Western Blot tests are generally used to detect HIV infection in human blood.

Preventive measures

Once a person contracts AIDS, it is impossible to cure him and he has to be left to his fate. The following measures can help prevent occurrence of AIDS:

- Be educated and educate others about AIDS and do not fall into its trap, knowingly or unknowingly.
- Never have indiscriminate sex; have one partner and use condoms as a safety precaution.
- Never share with others safety razors, tooth brushes, needles, syringes or such-other objects that possibly be HIV infected.
- Never accept blood, even when essential, from an HIV infected individual.
- Practice prevention than madly search for cure, which will not be there.

Therapeutic Measures

Till date no therapy for AIDS has been discovered. Consequently, the patient has to meet his fate sooner or late.

3.2 Hepatitis

Hepatitis is an infection of the liver caused by any of the viruses such as hepatitis A virus (HAV), hepatitis B virus (HBV), hepatitis D virus (the delta agent), epidemic non-A hepatitis virus and by two non-A, non-B viruses. Hepatitis A (epidemic jaundice) is an active infectious disease caused by hepatitis A Virus (HAV). This disease has certain non-specific symptoms such as fever, chills, headache, fatigue, generalized weakness, body aches and pains. Hepatitis B (serum hepatitis) is an active systemic infection with major pathology in the liver, caused by hepatitis B virus (HBV). Hepatitis C- a third major category of hepatitis - is designated

as Non-A, Non-B (NANB) hepatitis and is caused by Hepatitis C Virus or Non-A, Non-B Hepatitis Virus (NANBV), now designated as HCV.

Hepatitis may be acute (involving inflammation of the entire liver) or chronic (liver inflammation continuing for more than six months), the later being divided into two main types - chronic persistent hepatitis, and chronic active (chronic aggressive) hepatitis.

Hepatitis is generally transmitted through faecal-oral route or parental route. The faecal-oral route refers to the infection that comes through the consumption of contaminated water and food, the disease may also have a direct spread channel such as parental route. Apart from this, hepatitis is also transmitted through variety of body secretions and excretions including saliva, semen and vaginal fluid. The blood-borne Hepatitis C variety is associated with blood transfusion, blood products, haemodialysis, pareneteral drug abuse an accidental cuts and needle-pricks in health Workers.

Common Symptoms

Symptoms of hepatitis surface within a few days to two weeks before the onset of jaundice. Loss of weight, hyper-bilary functioning, colic or shoulder pain, nausea, abdominal discomfort etc., may appear a day or two before jaundice erupts. Generalized itching is another symptom of considerable importance. Pale stool and dark urine may also be expected. In general, type A, B and C (NANB) hepatitis run similar clinical course and share identical pathological findings.

Preventive measures

For Hepatitis A

- For Control of this disease, administer hepatitis A vaccination.
- Promote and insist upon simple measures of personal hygiene.
- Arrange proper disposal of sewage to prevent water, food, milk etc, getting contaminated.
- Get vaccinated against hepatitis A With a dose of human immunoglobulin (intramuscular) before exposure to virus.

For Hepatitis B

- Have a dose of hepatitis B vaccine to stimulate production of the Surface antibodies.
- For immediate protection use hepatitis B immunoglobulin (HBIG).
- Insist on the blood donors undergoing Screen test, before donating blood.
- Educate yourself and follow principles of health and hygiene.

Hepatitis C

- Get your immune system strengthened by vaccination against hepatitis C.
- Get the contacts and routes of infection identified and plugged accordingly.

Therapeutic Measures

Treatment for hepatitis C is not always successful depending upon the virus genotype or strain type.

3.4 RABIES

Also known as hydrophobia, rabies is an active highly fatal viral infection of the central nervous system. It is caused by neurotripic virus, which is widely distributed in the nervous system, saliva, urine, lymph, milk etc, of the infected carnivorous (flesh eating) animals such as wolves, foxes, jackals and mongoose, and gets transmitted to the domesticated animals. Generally a person bitten by a mad dog contracts rabies unless he takes curative measures immediately.

Rabies is transmitted by the licks by an infected animal such as dog on the abraded skin, scratches and mucosa of the human beings. Non-bite routes include air-borne transmission from infected bats residing in caves, from laboratory workers exposed to rabies-infected tissues.

Common Symptoms

Once the disease is caused, the following signs and symptoms lasting 2 to 10 days characteristically begin to appear after 4 to 6 Weeks or even longer:

- Headache - mild or severe.
- Malaise - uneasiness or feeling of discomfort.
- Low intensity fever.
- Sore throat.
- Aversion to light, noise or cold air.
- Fear of water and apprehension of death.

Preventive Measures

- Ensure immunization against rabies of high-risk groups of people as veterinarians, dog handlers, field naturalists, laboratory workers etc.
- Eliminate stray and un-owned dogs.
- Enforce registration of dogs and licensing of all domestic pets.
- Ensure immunization of pets against rabies and destroy rabies-infected animals.
- In dog-bite cases, clean the wound immediately, provide chemical treatment and suture the wound, and administer anti-rabies serum.
- Consult the expert physician and get the case treated accordingly.

Therapeutic Measures

- Local treatment of Wounds i.e. cleansing wounds, treating them chemically, suturing them, application of anti-rabies serum, and ATs injection and penicillin.
- Observe the animal for ten days. Should it exhibit signs of rabies, the animal should be exterminated humanely. In case it remains alive and is in good health at the end of ten days, no anti-rabies treatment would be needed.
- Give the anti-rabies vaccination post haste the moment the animal either shows clinical signs of rabies, it dies during the period of observation, it cannot be identified or traced, or laboratory tests of the biting animal's brain are positive.

3.4 TETANUS

Tetanus is caused by the exotoxin of a bacillus called clostridrium tetani. It creates very small reproductive bodies (germs) in fungi or protozoa, which are highly resistant to very high temperature for as much as one hour and a half.

Generally found in animals like sheep, goats, horses, and sometimes in the intestines of man, these ghastly infection-producing germs require no oxygen for their survival. Tetanus is common in active age group (30-40 years) of people, with higher incidence in males than in females.

Tetanus often follows an injury or accident when the badly abraded skin comes in contact with soil, dust or highly infectious material, the germs of the disease enter human body, unless the wounds are immediately attended to, cleaned and washed with disinfectants. Tetanus may also be caused by the piercing of rusted nails, use of unclean or rusted surgical instruments during operation, and when vaccination is carried out with unsterilized needles.

The injuries that possibly can lead to tetanus include skin abrasions/ Punctured wounds, burns, human bites, animal stings and bites, unsterile surgery, bowl Surgery, dental extraction, injections, compound fractures, chronic skin ulcers, eye infections etc.

Common Symptoms

- Muscular rigidity, which persists throughout illness punctuated by painful paroxysmal spasms of the voluntary muscles especially muscles of jaw, face, back, neck, abdomen and lower limbs,
- Persistent fever; and
- A generalized feeling of stiffness throughout the body.

Preventive Measures

- Get infants and children immunized against tetanus with required DPT doses at prescribed intervals.
- Clean the Wounds thoroughly immediately after the injury or accident.
- Remove the foreign bodies such as soil, dust, and necrotic (dead) tissue off the wounds or the injured parts.
- Go for ATS injection when suspecting tetanus.

Therapeutic Measures

- Get the wounds treated by a qualified doctor.
- Get infants and children immune against tetanus.
- Use antibiotics on prescription from a qualified physician though it is no substitute for immunization.

3.5 Malaria

Malaria is caused by specific sporozoan parasites of the genus plasmodium and is transmitted to man by infected female anopheles mosquito. Mosquitoes are found in dark, damp, humid, watery, and shady places. They breed fast during rains when water stagnates all around.

Mosquitoes have a four-stage developmental-cycle: The egg stage, the larvae Stage, the pupae stage, and adult stage, the knowledge of which is necessary to take necessary measures to eliminate them at the breeding stage itself.

The malarial parasite called plasmodium vivax undergoes two cycles of development: the human cycle and the insect (mosquito) cycle. The human cycle begins when an infected mosquito bites a person and injects into him sporozoites. In the human body, sporozoites are destroyed by protecting phagocytes (White blood cells) but some of them escape and reach the liver cells, where they reproduce and penetrate red blood cells. In an incubation period of about 10 days they become mature to rush an attack of fever. The mosquito cycle begins when mosquito ingests gametocytes of an infected person. The gametocytes further develop into adult mosquitoes from eggs to larvae, to pupae and finally to mature insect. Thus mosquito gets infected and becomes infective.

Common Symptoms

- Sudden attack of fever with intense chilling sensation, which lasts for 15 minutes to an hour or so.
- Feeling of extreme warmth, with body temperature rising to 106°F, Which may Iast for 2 to 6 hours. Fever may vanish after profuse sweating.
- Swelling in the spleen.
- Intense headache.
- If Loss of appetite and a feeling of nausea.

Preventive Measures

- Use repellents, protective clothing, bed nets etc.
- Use domestic sprays to destroy adult mosquitoes.
- Ensure domestic sanitation.
- Fill small-scale drains and other ill-laid forms of Water management system that helps breed mosquitoes.
- Use chemoprophylaxis and chemotherapy as measures against mosquitoes.

Therapeutic Measures

- Refer the case to the medical authorities.
- Destroy mosquitoes completely.
- Use quinine or paludrin during malarial season.
- Allow a qualified medical practitioner treat the patient but keep him in hygienic conditions all through.

3.6 Tuberculosis

Also known as Consumption, tuberculosis is caused by mycobacterium tuberculosis or mycobacterium boris, and affects both pulmonary and extra-pulmonary tissues and organs like intestines, bones and lymph nodes. Tuberculosis is spread throughout the world and consumes more people than any other disease in under-developed and developing countries mostly due to economic reasons. It is no hereditary disease but is communicable in nature. 15-20 million people are suffering from tuberculosis in various countries. In India, pulmonary tuberculosis is the greatest health problem.

The major transmission channel of tuberculosis is droplet infection. When a person suffering from tuberculosis coughs, sneezes and talks he generates large number of droplets of all sizes that float about in the atmosphere. If fresh, they carry infection, which they transmit to other people around. It is erroneous to think that tuberculosis is transmitted by fomites such dishes and other articles used by a patient. The risk of infection largely depends on how people keep close to the person suffering from it. Presence of the tubercle bacilli in the air or dust which people inhale is cited to be another reason for the spread of tuberculosis. Among social reasons for the transmission of this disease are unsanitary surroundings, poverty, malnutrition, bad social customs and traditions and certain work places such as foundries, fiber and glass industry, potteries, quarries, mines, kilns etc. The period of time for infection to the onset of progressive disease may be weeks, months or even years.

Common Symptoms

- Continuous fever.

- Chest pain, and haemoptysis (spitting blood from the lungs).
- Loss of appetite.
- Weight loss.
- Persistent Coughing.

Preventive Measures

- Get yourself inoculated against tuberculosis infection.
- Ensure early detection through primary health care system.
- Be educated and make others aware of the disease.
- Improve living conditions.
- Use chemotherapy for bacterial cure i.e. to sterilize lesions quickly and completely, so as to render the patients non-infectious and prevent the development of "new" cases.
- Administer BCG vaccination to the newly born.

Therapeutic Measures

- Once the case is detected, application of chemotherapy, Which is a bacterial treatment the best curative measure for tuberculosis, though the danger Of relapse always looms large on the patient.
- BCG vaccination has been known as a therapeutic measure for TB and is used worldwide with immense success.
- Arrange rehabilitation for the patient by taking him to health resorts or hill stations, if pocket allows.
- Make surveillance an integral part of the tuberculosis prevention and treatment

4. Conclusion

A program for prevention and control of communicable diseases does not exist in isolation and will not achieve optimum efficiency or effectiveness unless it works collaboratively with other key partners involved in this field. Intersect oral collaboration and coordination on the local and regional levels is essential to ensuring the active participation of those who can contribute to controlling and preventing communicable diseases from multiple sources.

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