**Model Three Assignment**

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**Postgraduate Diploma in Public health**

**01-Define a chronic disease with the help of two common examples. What are the characteristics of chronic diseases? How are they managed?**

**Chronic disease** refers to the disease that persists for a long period of time, which developed insidiously and progressive in nature leading to multiple organ failure and eventually death. Chronic diseases generally cannot be prevented by vaccines or by medication, nor do they just disappear. Health damaging behaviors- particularly tobacco use, lack of physical activity, and poor eating habits- are major contributors to chronic diseases. Chronic diseases tend to become more common with age.

The leading chronic diseases in the developed countries include; Arthritis, cardiovascular disease such as heart attack and stroke, Cancer of breast and colon, diabetes, hypertension and obesity.

**Arthritis**

The term arthritis refers to the inflammation of joint or joints and usually present with pain, swelling and stiffness of joints. It is not a single condition but multiple conditions affecting more than one organ and is of different types. Arthritis is of two types inflammatory and Non- inflammatory. The inflammatory types include; Osteoarthritis, Rheumatoid arthritis, ankylosing spondylitis and Gout while non-inflammatory include; Psoriatic arthritis, Lupus erythematous and fibromyalgia. Arthritis is the leading cause of disability in the world both in the developed and developing countries affecting nearly 43 million people. Although cost effective interventions available to reduce the burden of arthritis, they are underused. Regular moderate exercise offers a host benefits to people with arthritis by reducing joint pain and stiffness, building strong muscle around the joints, and increasing flexibility and endurance. Used of nonsteroidal anti-inflammatory drugs to reduce the inflammation and pain in the joints.

**Cardiovascular diseases**.

**Cardiovascular disease** is a growing concern in the world and previously was a disease of the developed countries but it has become a global problem affecting people in the developing countries as a result of increase in cases of obesity, tobacco use and sedentary lifestyle. Modifying these behaviors is critical for both preventing and controlling the disease.  **Cardiovascular disease** encompasses two of the three leading causes of death, heart attack and stroke. Risk for dying from cardiovascular disease increases with age, is higher in men than in women, and is higher in blacks than in whites.

The causes of cardiovascular disease have been relatively well established through epidemiologic studies, including the Framingham Study;

* high blood cholesterol
* high blood pressure
* Smoking as major risk factors.

**Atherosclerosis—**hardening of the arteries—is part of the development of cardiovascular disease. Pathologists performing autopsies on people who died of heart attacks found, within the inner-wall lining of the deceased’s arteries, a buildup of plaque composed of fat and cholesterol, blood cells, and clotting materials. The formation of plaque begins at an early age in life. Fatty streaks, the first stage in the development of plaque, have been found on autopsy in half the children aged 10 to 14 who died of accidental causes. High cholesterol and fat in the blood interact with other risk factors such as smoking, high blood pressure, and diabetes to form plaque in the arteries. These factors cause chronic injury of the artery’s inner wall, with the body attempts to repair, leading to a “healing” process that runs wild, becoming a disease in itself. A heart attack or stroke results when the plaque ruptures, releasing clots that may block an artery in the heart or brain, cutting off the blood supply.

**Cholesterol** is a well-known risk factor for atherosclerosis and heart disease. Cholesterol levels of 200 mg/dL (milligrams per deciliter of blood) or below are considered desirable: Persons with that level of cholesterol have less than one-half the heart attack risk than those with levels above 240 mg/dL. Most of the cholesterol in the blood is bound up with protein in various forms, and some forms are more harmful than others. For example, if a high percentage of a person’s cholesterol is in the form of high-density lipoprotein (HDL), sometimes called “good cholesterol,” the person’s risk of heart disease is much lower than that of someone with a high percentage of cholesterol in the form of low-density lipoprotein (LDL), “bad cholesterol.” The greater concern is saturated fat and Trans fat, as well as a deficiency of fruit and vegetables and Smoking that lowers HDL levels.

**Factors that lower cholesterol level in blood.**

* Vigorous exercise lowers total cholesterol and increases HDL.
* Moderate consumption of alcoholic beverages has a similar effect, although heavy drinking damages the heart.
* Other dietary substances such as fish, olive oil, and oat bran also appear to have favorable effects on blood lipids.
* Genes play an important role in the HDL–LDL balance.
* The use of cholesterol-lowering drugs called statins has increased dramatically. Stations can prevent heart attacks,

**Hypertension**—is a major risk factor for cardiovascular disease, especially stroke, contributing to the injury in the artery walls that is part of atherosclerosis. It also increases the risk of kidney disease.

**Factors that raise high blood pressure**

Hypertension can be idiopathic (Essential hypertension) or secondary hypertension due to other conditions like kidneys diseases. The risk factors of essential hypertension are;

* Obesity
* Smoking
* Lack of exercise
* Stress
* High intake of Dietary salt (sodium chloride).

**Smoking** is believed to increase the risk of cardiovascular disease through the actions of two components of tobacco smoke: nicotine and carbon monoxide.

* Nicotine, the addictive component of tobacco, is a stimulant that raises blood pressure, increases the pulse rate, stimulates release of stress hormones, and increases irritability of the heart and blood vessels.
* Carbon monoxide, a poisonous gas, binds to hemoglobin in the blood, blocking the hemoglobin’s ability to carry oxygen throughout the body
* Both nicotine and carbon monoxide place stress on the heart and blood vessels, with the long-term effect of contributing to atherosclerosis.

**Characteristic of chronic diseases**

* There is no single pathogen that neither causes cancer or heart disease, nor is there one for arthritis, diabetes, or Alzheimer’s disease.
* There is no single drug or vaccine to treat and the cure chronic diseases.
* These diseases tend to develop over long periods of time, further complicating the task of pinning down causes.
* The gradual onset provides the advantage of early detection, permitting secondary prevention— interventions early in the disease process that can mitigate its impact.

**Management of chronic diseases**

* Eating a healthy diet, exercising, and abstaining from smoking, the same behaviors that promote healthy cholesterol levels.
* People should know their own blood pressure and take appropriate measures, including drugs, if it is too high.
* Reduction in the intake of high dietary salts to prevent rise in blood pressure hence hypertension.
* Vigorous exercise lowers total cholesterol and increases HDL.
* Moderate consumption of alcoholic beverages has a positive effect on increase of HDL, although heavy drinking damages the heart
* The use of cholesterol-lowering drugs called statins.
* Routine checkup for risk factors such as blood pressure, cholesterol levels and tumor markers for breast and colon cancers.
* Use of nonsteroidal anti-inflammatory and disease modifying drugs as such Diclofenac Penicilliamine for arthritis.
* Administration of antihypertension drugs to control the blood pressure and should take for life to improve outcome.
* Use of oral anti-hyperglycemia drugs to control blood sugar in patients with diabetes 2

**2-a) Discuss the various infectious agents?**

Infectious agents are pathogenic microorganisms that cause infectious diseases and they include; bacteria, viruses, parasites and fungi.

The infectious agents are classified based on the shapes under the microscopy and ability to be stained by specific laboratory dyes. They include:

* **Bacteria**- survive on appropriate media, stain-gram-or Negative.
* **Viruse**s- obligate intercellular microorganisms which only replicated intracellularly and can DNA or RNA viruses.
* **Fungi**- Non-mobile filamentous branching strands of connected cells.
* **Metazoan**- Multicellular organisms (Parasites) which has complicated life cycles of involving several hosts.
* **Protozoa**-single celled organism with welled define nucleus, include amoeba, giardia and plasmodium species.
* **Bacteria**

These are living, single-celled organisms that can grow and reproduce outside the body when there are appropriate nutrients. Bacteria is encapsulated by cell envelope the cell wall, capsule and cell membrane which envelopes the cytoplasm. The cytoplasm is gel-like structure that contents the genetic material DNA, Ribosomes, mesosome, cytoplasmic granule and the spores. On the cell envelope are finger-like projections called flagellates and Pilli that aids the organism in movement and adhesion to the surface respectively. The bacteria are classified based on the shapes and propensity to be stained by gram stains dyes in the laboratory.

**The shapes**

Bacteria are classified into three groups according to the shapes when seen under microscopy. Bacilli are rod-shaped bacteria when observed under the Microscope. Examples include; vibrio cholerae, salmonella typhi, colostrum tetani and corny bacteria diphtheriae. Cocci are round shaped bacteria which include; streptococci the cause of sore throat and scarlet fever; Staphylococci the cause of wound infections and pneumococci the cause of pneumonic. The spirochete are corkscrew-shape bacteria the cause of syphilis.

**Gram staining**

Gram staining is the application of a crystal violet dye to culture bacteria. The bacteria that retain the color of the dye are gram positive and appears blue under microscope include; Staphylococci aureus, streptococci pneumoniae while those that do not retain are gram negative bacteria, appear red under microscope include; vibrio cholerae, salmonella typhi. The gram stain attaches to the peptidoglycan in the cell wall, and in gram negative bacteria, the peptidoglycan layer is protected by an outer membrane.

* **Viruses**

The viruses are not complete cells, they are simply complexes of nuclei acids and protein that lack the machinery to reproduce themselves. They can survive extreme conditions such as treatment with alcohol and drying in a vacuum and become active again when they are injected into living cell. They reproduce by taking control of the cell’s machinery, often killing the cell in the process. Viruses infect any living organism including the bacteria. The complete infectious virus is called Virion. The Virion consists of specific nuclei acid DNA or RNA surrounded by protein coat called capsid. Some Viruses are enveloped by lipoprotein coat, the capsid acquired from infected host cell membrane. The viruses that lack an envelope are called naked. Human diseases that are caused by Viruses include; Polio, yellow fever, hepatitis, Influenza, Measles and AIDS.

The Viruses are typically classified by genetic material DNA or RNA Viruses; the number of strands (single or double stranded Viruses), Size and shape of the capsid and whether enveloped on non-enveloped and method of replication.

DNA and RNA Viruses can be single or doubled stranded, enveloped or non-enveloped as shown in the table below:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Enveloped DNA and RNA Viruses | | Non-enveloped DNA and RNA Viruses | | | |
| Double-stranded DNA | single-stranded RNA | Double-stranded DNA | Single-stranded DNA | Double-stranded RNA | Single-stranded RNA |
| Poxviridae  (Smallpox) Herpesviridae  (Herpers simplex), Hepadnaviridae  (Hepatitis B) | Paramyxoviridae  (Measles) Orthomyxoviridae  (Influenza) Retroviridae  (HIV/AIDS) | Papovaviridae (Papilloma), Adenoviridae (adenoviruses) | Paravoviridae (Erythema infectiousm) | Reoviridae | Picornaviridae (Polio)  Caliciviridae (Norwalk) |

* **Fungi**

They are all chemoheterotrops. The pathogenic fungi are of two forms; the **yeast** which is unicellular and **molds** which is multicellular. The pathogenic fungi are dimorphic they can exist two form both as yeast and molds at different temperature. Example, Penicillum marneffei, a human pathogen that grows as a mold in room temperature and as yeast in human body. The mold grows as filamentous, branching strands of connected cells called hyphae.

The classification of Fungi based on the shapes and the site of infections.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Shapes** | | | **Site of infection** | | | |
| Hyphae | Dimorphic | Yeast | Superficial | Cutaneous | Subcutaneous | systematic |
| Aspergillus species, dermatophytes,  Pseudallescheria boyi | Blastomyces,  coccidiodes,  Histoplasma and Sporothrix | Candida species, Cryptococcus neoformans | Tinea versicolor | Dermatophytes  (Trichophyton, microsporum species) | Sporothrichosis | Candida albican,  aspergillus,  Histoplasma,  Blastomyces |

* **Parasites**

There are organisms that live in or on an organism of another species (host) and benefits by deriving nutrients at the other’s expenses. The parasite can be endo-parasites living inside the body of the organisms include; hookworm or ecto-parasite Parasites living on the body of the organism example lice. Parasites can be classified into two main groups the protozoan and the helminths.

**Protozoan**

These are single-celled microscopic organisms that can perform all the necessary functions of metabolism and reproduction. Some protozoans are free living while others parasitized other organisms for nutrients and life cycle. The protozoan structurally resembles other eukaryotic cell and possesses a cytoplasmic membrane that encloses the cytoplasm containing membrane-bound nuclei and organelles. The morphology varies widely and include; oval, spherical, and elongated cells that range from (5-10 X 1-2) MM. The example of protozoan includes; Entamoeba histolytic (Amoebiasis), Giardia lamblia (Giardiasis) and plasmodium species the cause of malaria.

**Helminths**

This is a large multicellular organism (worms) that is generally visible to the naked eyes in its adult stages. Helminths can be freely living or live as endo-parasites.

**Nematodes** –these are Roundworms and they are diverse animal phylum inhabiting a broad range of environments. They have tubular digestive systems with two openings at both ends. Includes, hookworms and Pinworms

**Trematodes**-these are leaf like flatworm and are sometimes called flukes. They have complex lifecycle and involve two hosts. They include; Schistosoma species (Blood fluke) and Paragonimus westermani (Lung fluke).

**Cestode**- tapeworms, these are ribbon-shaped multi-segmented flatworms that dwell as adults in human small intestine and measure about 3-5 Metres long. They include; Taenia saginatta, Taenia solium, Echinoccous granulosus and Diphylluobothrium Latum and Nana.

**2-b) Public health has had great success in controlling infectious diseases. Discuss the validity of this statement?**

**Immunization** stimulates the body’s immune system to recognize the pathogen and to attack it during any future exposure. Vaccination help; the individual from contracting a disease but also makes it harder for the pathogen to find susceptible hosts. To completely eliminate a pathogen from the earth by eliminating the susceptibility of its potential hosts. This was accomplished in the case of smallpox.

**Epidemiologic surveillance;** this is the system by which public health practitioners watch for disease threats so that they may step in and break the chain of infection, halting the spread of the disease. This has led into early detection of disease outbreaks before spreads or kills many people.

**Quarantine;** this is the isolation of the patient to prevent him or her from infecting others. Quarantine is still used occasionally, when the disease is serious and there is no effective vaccine. For example, patient diagnosed with tuberculosis which is slow to respond to medications, might be ordered to stay home for 2 to 4 weeks after treatment is started until the disease is no longer infectious.

**Contact tracing** is routinely used for controlling sexually transmitted diseases, such as syphilis, gonorrhea and cholera outbreak. Once a case is identified, the public health workers try to discreetly alert those who have been exposed. The public health worker asks the patient who has been diagnosed to identify the contacts and the worker notifies the contacts that they are exposed to infections.

**Hand washing** is an important way to prevent the spread of disease: It prevents restaurant workers from contaminating food, hospital workers from carrying pathogens from one patient to another, and allows all individuals to protect themselves against pathogens they may pick up from the environment and put in their mouth.

**Used and promotion of Condom**. The spread of sexually transmitted diseases can be prevented by use of a condom, a simple means of blocking the movement of the pathogens from infected to the uninfected person. This has dramatically reduced the rate of HIV/AIDS, syphilis and Gonorrhea infections amongst sex workers all over the world.

**Provision of safe and clean drinking water**; water plant purification or household purification through boiling, aqua tab and filtration of contaminated water and provision of adequate water and sewage treatment prevents the spread of water-borne diseases,

**Discovery and introduction of Antibiotic**, has reduced the rate of death from infectious diseases which were threat to human life. Example; tuberculosis, syphilis, gonorrhea and pneumonia. Now days nobody can die or disabled of these diseases if there is prompt diagnosis and treatment with antibiotics.

**Use of protective gears, such as gloves, gowns, aprons, goggles and facial mask** during patient examination, administration of injectable drugs or during Ebola and cholera outbreak. This has help in prevention of across infections from patient to patient or from patient to doctors and via versa.

**Disinfection and sterilization of surgical, medical instruments and equipment**. This has reduced and prevented surgical wound infections directly or cross wound infections from a patient to another patient during operation or dressing of wounds.

**Vector-control,** this include indoor residual spraying of houses and toilets to kill mosquitoes and vectors that are hiding in the dark corners as well covering of stagnant water with paraffin or Oil to kill the larvae by cutting the oxygen supplies.

**3. Discuss the ethical, legal, social and scientific implications of using genetic and genomics in preventing and treating disease.**

**Sickle cell disease,** a disorder of hemoglobin, the oxygen-carrying protein in the blood. Painful crises of impaired blood circulation occur in individuals who have inherited two copies of the recessive gene, which was identified in the 1970s. as covering of stagnant water with paraffin or Oil to kill the larvae by cutting the oxygen suppAttempts to initiate screening programs for sickle-cell disease, inspired by the success of Tay-Sachs screening in Jews, caused widespread confusion and ill feeling among African Americans. Healthy carriers of one gene were discriminated against in school and in employment and were denied health insurance.

If a serious disorder is diagnosed in a fetus or the genetic potential for such a problem is recognized in the parents. Aborting a fetus with a genetic or teratogenic abnormality is often the only alternative to the birth of a child with a handicap. Many Americans are uncomfortable with, if not morally opposed to, abortion. Most people would support the parents’ decision to abort a fetus with anencephaly, the absence of a brain, a condition that is rapidly and inevitably lethal. The acceptability of a Down syndrome child varies significantly among prospective parents; some couples choose abortion, while others are happy to have the child.

**Huntington’s disease.** single-gene defect in which symptoms first appear between the ages of 30 and 50. During the next 10 to 20 years, the disease progresses toward death, with symptoms that include extreme involuntary movements, intellectual deterioration, and psychiatric disturbances. Because Huntington’s disease is inherited in an autosomal dominant fashion, each child of an affected individual has a 50 percent chance of developing the disease. The psychological impact of such knowledge can be devastating, and the potential for being denied insurance or employment is significant. On the other hand, individuals with a family history of Huntington’s disease may wish to know whether they carry the gene before deciding whether to beget children.

With the increasing availability of genetic tests, there is great concern about how the information will be used. The knowledge can help individuals and their doctors make informed decisions about their lifestyle and medical care. However, there has been great concern about harmful consequences, for example if insurance companies use the information to deny coverage or prospective employers deny employment to individuals who may be more vulnerable in the work environment or who may potentially be more expensive to insure.

According to some estimates, every individual carries at least 5 to 10 genes that could make him or her sick under the wrong circumstances or could adversely affect his/her children. All people have an interest in ensuring that any knowledge about their genetic makeup will be used to do them good and not harm.

From a public health perspective, there is danger that the enthusiasm for genomics may deflect attention and resources from the important mission of preventing disease in the population. Although individuals differ in their genetic susceptibility to the most common diseases, these diseases are associated with well-known environmental and behavioral risks that are traditional targets of public health intervention

There is a place for genomics in understanding the biological basis of diseases that cannot be prevented with existing knowledge, such as breast cancer, type 1 diabetes, and Alzheimer’s disease.

However, many public health advocates believe that resources would be better spent on research and interventions aimed at modifying health-related behaviors, including smoking, diet and physical activity patterns, and sexual behavior.

There is a fine line between the worthy goal of preventing disease and disability and the use of genetic screening and abortion to select desirable traits and eliminate undesirable ones from the gene pool. The former is part of the mission of public health, but the latter comes dangerously close to the kind of eugenics practiced by Nazi Germany. The Human Genome Project set aside 3 percent to 5 percent of its funding to study the many social, ethical, and legal dilemmas that result from better understanding of human heredity. Since genetic screening first became possible in the 1960s, various groups have proposed guidelines for how screening should be done and who should be screened. Most of the principles are consistent with the recommendations proposed by an Institute of Medicine committee, which include the following:

* Newborn screening should be done only when there is a clear indication of benefit to the newborn, when a system is in place to confirm the diagnosis, and when treatment and follow-up are available for affected infants.
* Carrier identification programs should be voluntary and confidential, and they should include counseling about all choices available to the identified carriers.
* Prenatal diagnosis should include education and counseling before and after the test, informing the parents about risks and benefits of the testing procedure and the alternatives available to them.
* All tests should be of high quality, because life and death decisions are based on the results. New tests should be evaluated by the FDA, and there should be more government oversight of laboratory proficiency.
* There should be more education for the general public about genetics.

**4. Identify two infectious diseases and the possible treatment of each?**

Infectious diseases are referred to diseases that caused by microorganisms such as bacteria, viruses, parasites and fungi. The following are examples of infectious diseases.

**Cholera**

Cholera is an acute diarrheal disease that can, in the matter of hours result in profound, rapidly progressive dehydration and death. Cholera gravis the severe form of cholera is a much-feared, particular in epidemic presentation. Prompt aggressive fluid repletion and supportive case can obviate the high mortality that cholera has historically wrought.

**Etiology of cholera**

Cholera disease is caused by bacilli bacteria call Vibrio cholerae sero-group O1. However, in 1992 a new serogroup O139 emerged and caused epidemic cholera in Indian subcontinent that has killed thousands of people.

**Microbiology**

The species V. cholera comprises host of organisms classified on the basis of carbohydrate determinant of their lipopolysaccharide (LPS) O antigen. It is divided into those that agglutinate in the antisera to the O1 group antigen (V. cholera O1) and those that do not (Non V. cholera). The Non V. cholera serogroups have occasionally caused sporadic outbreaks of diarrhea, serogroup O1 until the emergence of serogroup O139, Exclusive cause of epidemic cholera. Two biotypes of V. cholera O1, classical and El Tor are distinguished. Each biotype is further subdivided into two serotypes, Inaba and Ogawa.

**Epidemiology**

The natural habitat of V. cholera is coastal salt water and blackish estuaries, where the organism lives in close relation to plankton and where it may survive in a viable but nonculturable form. Humans become infected incidentally, once infected, can act as vehicles for spread. There is no known animal reservoir for V. Cholera accepted human beings. The infectious dose of V. cholera is relatively high, it is markedly reduced in hypochlorhydric persons, in those using antacids and the when gastric acidity is buffered by a meal.

Cholera is predominantly a pediatric disease in endemic areas, but affects adults and children equally when newly introduced into a population. In endemic areas, the disease is more common in summer and fall months. Susceptibility to cholera is significantly influenced by ABO blood group status; those with type O blood are at greatest risk, while those with type AB are at least risk.

**Means of Transmission**

* Indigestion of water contaminated by human feaces is the common mean of transmission
* Consumption of contaminated food with human feaces due to poor personal hygiene or contaminated by house flies.

**Clinical manifestations**

Incubation period for cholera is 24-48 hours and begins with sudden onset of painless watery diarrhea that quickly becomes voluminous with stool exceeding 250ml/kg in 24 hours. The stool has a characteristic appearance a nonbilious, grey, slightly cloudy fluids with flecks of mucus, no blood inoffensive odor and has been called Rice water because it resemblance to water in which rice was washed out. This is followed by vomiting; Muscle cramps due to electrolyte disturbance, Thirst developed postural hypotension, weakness, and tachycardia and decreases skin turgor. Oliguria, weak or absent pulses, sunken eyes, wrinkled (washer-women) skin, somnolence and coma and death.

**Complications of cholera**

The complications derive exclusively from the effects of fluids and electrolytes depletion and include: acute renal failure due to acute tubular necrosis. Adequate and rapid fluid replacement can avert the renal failure.

**Diagnosis**

* The clinical suspicion of cholera can be confirmed by the identification of V. cholera in stool. With experience the organism can be detected directly by dark-field microscopy on wet mount of fresh stool, and the serotypes discerned by immobilization with Inaba- of Ogawa antiserum.
* Laboratory isolation of the organism requires the use selective medium, thiosulfate-citrate-bile salts-sucrose (TCBS) agar in which the organism grows as a flat yellow colony. Carey-Blair transport medium and or alkaline-peptone water-enrichment medium should be inoculated as well if there is delay in sample processing.
* In endemic areas there is little need for biochemical confirmation and characterization, standard microbiological biochemical testing for enterobacteriacease to identify the V. cholera and all vibrio are oxidase positive.
* Measurement of serum vibriocidal antibody titers can be used to confirm in non-cholera endemic regions of the world. Monoclonal antibody-based diagnostic kits and methods on the polymerase chain reaction and on DNA are developed to detect V. Cholerae O1 and O139.

**Treatment of Cholera**

Rapid and adequate replacement of fluids and electrolyte and base is required orally or intravenously. In severe case intravenous fluid is prefer about 100ml/kg of either Ringer lactate or Normal saline; however in less severe case WHO recommended Oral rehydration solution is the better.

Cereal-based formulations are receiving increased attention as alternative oral rehydration solution. A mixture with lower sugar and salt content has been evaluated in cholera patients. However, the safety of its use-in particular to cause hyponatremia in severe or moderate diarrhea

Antibiotic, it is not necessary for cure, the use of antibiotics to which the organism is susceptible will diminish the duration and volume of fluid loss and will hasten clearance of the organism from the stool.

**Control of cholera**

In an outbreak effort should first be made to identify cases, contacts tracking and treatment of the incubating carriers. Establishment of rehydration centers and instruction in rehydration techniques are essential to reduce mortality. Instituting hygiene practices in the community to reduce the spread of the disease in the population. Provision of safe and clean water to the population affected and Immunization of the population with oral cholera vaccines (OCV).

**Malaria**

Malaria is a protozoan disease transmitted by the bite of infected Anopheles mosquitoes. It is most important parasitic infection of humans, with transmission in 103 countries affecting > 1 billion people and causing between 1 and 3 million deaths each years.

**Etiology of Malaria**

Malaria is caused by protozoan called plasmodium that is transmitted by the bite of infected female Anopheles mosquitoes. There are three four of plasmodium that caused malaria in human, P. falciparum, P. Malariae, P. vivax and P. ovale. Plasmodium falciparum is the major cause of death among children and pregnant women worldwide especially in sub-Saharan Africa.

**Epidemiology of Malaria**

Malaria occurs throughout most of the tropical regions of the world with P. falciparum predominates in Africa, New Guinea and Haiti, P. Vivax is more common in Central America and Indian subcontinent. The prevalence of these two species is approximately equal in South America, Eastern Asia and Oceania. P. Malariae is found in most endemic areas, especially throughout sub-Saharan Africa but much less common. P. ovale is relatively unusual outside of Africa and, where it is found, comprises of <1% of isolates.

**Clinical manifestation of patient with Malaria**

Malaria is a very common of fever in tropical countries. The first symptoms of malaria are nonspecific and resemble symptoms of minor viral illness. The symptoms are headache, fatigue, abdominal discomfort, and muscles aches. In some instances, a prominence of headache, chest pain, abdominal pain, arthralgia, myalgia or diarrhea and vomiting may suggest another diagnosis. Although headache may be severe in malaria, there is no neck stiffness or photophobia resembling meningitis. Complicated malaria usually presents high grade fever of 39-40 degree Celsius, generalized convulsion, severe anemia and jaundice.

Cerebral malaria is characterized by coma and it is typical of P. falciparum, despite treatment the death rates is high of 20% among adult and 15% among children. To lesser degrees of obtundation, delirium abnormal behavior and focal neurological defect such eyes divergent and pout reflex. The onset may gradual or sudden following convulsion.

**Complication of severe malaria**

* Cerebral malaria
* convulsion
* Hypoglycemia
* Hypothermia
* Respiratory distress due to pulmonary Oedema
* Severe anemia
* Renal failure due to acute tubular necrosis as a result black water fever.
* Lactic acidosis
* Jaundice
* Elevated liver enzymes.

Malaria of diagnosis

* Microscopic examination of blood film both thick and thin to confirm the diagnosis and identify the species.
* Rapid antigen detection card or stick testing commonly known rapid diagnostic test for malaria.

**Treatment of malaria**

There are basically three lines of antimalarial drugs used nowadays for the treatment of malaria.

* First line antimalarial drugs-Artesunate + amodiquinine used in the treatment of uncomplicated malaria
* Second line antimalarial drugs- Artemether + Lumefantrin and Artemether injection used when the first line drugs fails or as an alternative.
* Third line antimalarial drugs this include; Artesunate injection and quinine used in the treatment of complicated malaria. Usually quinine injection is given in intravenous with dextrose 5% because of it hypoglycemia effect.

**Control of malaria**

* Sleeping under long lasting insecticide treated nets to prevent Mosquito bites
* Indoor residual spraying of the breeding ground for mosquitoes
* Use of Mosquitoes repellant to prevent mosquitoes’ bites
* Covering of stagnant water by paraffin or oil to kill the mosquito larvae.
* Early recognition, testing and treating any confirmed cases of malaria

**5. What are some public health responses to emerging infections in your country?**

In a conflict setting, WHO and partners are responding to multiple outbreaks including cholera, malaria, measles, suspected hemorrhagic fever, and kala-azar. “In spite of the insecurity, WHO is taking every opportunity to ensure that we reach the people with health care services to protect them at this time when the health system has crumbled,” says Dr, Abdulmumini Usman, and WHO Representative to South Sudan.

**Displaced people risk of cholera**

Cholera was confirmed in Juba on 21 July 2016 in the aftermath of the recent escalation of violence in Juba where clashes between the military and opposition forces resulted in hundreds of people dead and thousands displaced. As of 6 September 2016, a total of 1762 cholera cases, including 26 deaths had been reported from five states: Juba, Terekeka, Jonglei, Eastern Lakes and Imatong.

WHO is working with partners to respond to the cholera outbreak, including treating approximately 1700 cholera patients and sending health promoters to visit around 88 000 households with prevention messages and items such as water purification tablets, oral rehydration solution and soap. Additionally, WHO has participated in an extensive health promotion campaign which has reached over 2 million people countrywide with cholera prevention messages through radio talk shows, radio spots and interviews on 17 radio stations? Mass cholera vaccination campaign with oral cholera vaccines in the internal displaced camps in juba, Malakal, Bentiu including the resident of juba city.

**Malaria on the rise**

More than 1.3 million malaria cases have been reported since the beginning of 2016. Malaria cases started rising in early May and, during the week of 30 May 2016, an outbreak was declared in Bentiu, a camp for internally displaced people. By 28 August 2016, 31 counties in 8 states had exceeded the malaria epidemic threshold countrywide. Since May, over 800 000 people have received treatment for malaria through static, outreach and mobile health teams. WHO has supported airlifting of malaria medicines and commodities and malnutrition kits to Northern Bahr el Ghazal, one of the most affected states, and has donated malaria medicines and commodities to affected areas in 6 other states. WHO and other partners like PSI and IOM carried out mass distribution of mosquito nets to the resident of malaria endemic areas and the internal displaced people. Health education massages on the use of the long lasting insecticides treated net and indoor residual spraying of home and mosquito breeding especially in the Internal displaced camps by Mentor initiative.

**Vaccination best protection against measles**

Since the beginning of 2016, more than 1600 measles cases, including at least 19 deaths, have been reported countrywide. WHO has confirmed and responded to measles outbreaks in 12 counties. Since the fighting escalated in mid-2016, around 182 000 children have been vaccinated against measles. A follow-up campaign was done in October 2016. Ensuring the majority of children receive vaccination is the best protection against this highly contagious disease.

**Deadly disease spread by sandflies**

Kala-azar is the most severe form of leishmaniosis, a disease spread by sandflies. It causes fever, weight loss, anemia, enlargement of the spleen and liver, and is fatal if left untreated in most cases. The disease is endemic in parts of the country. In 2016, more than 1000 cases including 42 deaths have been reported in South Sudan. WHO co-leads the kala-azar taskforce and is supporting deployment of rapid response teams to affected areas. WHO also helps train health workers at treatment sites; provide weekly analysis of data and deployment of supplies such as rapid diagnostic kits and medicines to the treatment centers.

**Disease detection important for fast response**

Most of these infectious diseases have been controlled or eradicated from most parts of Africa but are still causing epidemics in South Sudan due to poor socio-economic conditions. When countries are struck by conflict or natural disasters, exacerbated by weak health systems, overcrowding and population displacement, they are most vulnerable to infectious disease outbreaks.

WHO supports the ministry of health early warning alert and response system (EWARS), a network of static and mobile partner-supported reporting sites, to enhance detection of disease outbreaks in populations of humanitarian concern? There are now 58 EWARS reporting sites in South Sudan, and these sites will continue to be expanded to complement the existing surveillance system in areas affected by the crisis.

**WHO support to detect and control Outbreaks?**

Despite the fragile security situation and challenging conditions to deliver health services, WHO, together with partners, is providing vital support for the people of South Sudan.

WHO/MOH trains rapid response teams to investigate and respond to emerging outbreaks and has prepositioned outbreak investigation and response kits for several infectious diseases, as well as for medical complications of severe acute malnutrition (SAM), at 9 state hubs. These supplies have been used to promptly respond to emerging outbreaks and humanitarian emergencies countrywide.

WHO continues to support the nationwide specimen referral system for timely confirmation of disease outbreaks? Working with the state rapid response teams, United Nations Humanitarian Air Service (UNHAS) and partners, WHO facilitates and supports the shipment of biological samples to the national public health laboratory and international collaborating laboratories for confirmatory testing. WHO continues to support the national public health laboratory to test samples of cholera, measles and other priority diseases, to enable a fast response that will ultimately save lives?

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Model three biomedical basis of public health.