**Public Health Final Examination.**

**Name: Marik Abraham Malok.**

**Institution: Africa Center for Project Management (ACPM).**

**Course: Public Health.**

**Admission No: ACPM/DIP/197/2019.**

**Course Code: D012.**

**Assignment: Final examination.**

**Year: 2019.**

**Month of submission: October -2019.**

**Question 1. List the types of people who are most vulnerable to waterborne diseases. Explain your answers why and how to overcome the diseases.**

According to Beauty Health Tips (2016), diseases spreading through contaminated water are known as waterborne diseases. This involves with bacterial, viral or protozoan organisms. The contamination of water may be due to bacterial, viral or protozoan organisms. The infection is caused due to drinking water, or may be a chance of occurring from swimming water or due to cuts in the skin. By these ways, the infection can enter into the body and affect you.

Waterborne diseases cause due to water contamination. Thus, it may occur due to flood water or animal carry to human, silt, toxic chemical wastes and oil. This may occur due to the infectious diseases that are associated with drinking water, such as diarrhea and dysentery.

There are different types of waterborne diseases such as;

* Cholera.
* Dysentery.
* Typhoid fever.
* Cryptosporidiosis.
* Amebic dysentery.
* Hepatitis A.
* Brainerd diarrhea.
* Giardia.

According to Medlifeweb newsletter, (2017), the types of people who are most vulnerable to waterborne diseases are;

* 1. People with weak immune system.

2. Children and babies

3. Pregnant women.

4. Ill persons or prone to diseases.

5. Elderly people.

People with weak immune systems due to underlying medical conditions, such as cancer, diabetes, liver or kidney disease, alcoholism, and HIV or AIDS, children, pregnant women and elderly people are more likely to get waterborne diseases infection because CD4 cells (which HIV destroys) are responsible for locating infections in the human Body and coordinating the destruction of those infections. Healthy People have between 700-1500 (depending on source) AIDS sufferers have below 200 (note if CD4 count rises above 200 due to medication they are still classified as having AIDS) The low CD4 count allows Infection to enter the body and replicate with little to no resistance. What can be minor to a healthy person could prove fatal to an AIDS sufferer.

Treatments that make it more difficult for the body to fight off illness, such as steroids and chemotherapy, also can increase the chance of waterborne diseases infection (Centers for Disease Control and Prevention, 2016)*.*

How to overcome waterborne diseases.

Waterborne diseases in simple words are the diseases that originate from contaminated or filthy waters that can prove to be severely injurious to our health. It is not the water but the microorganisms that are transmitted through such water that cause the water borne diseases (Medlifeweb newsletter, 2017)*.*

The following are the ways to overcome waterborne diseases;

1. Water can be filtered to remove any visible dirt and appear visibly clean and free of any silt or sand.
2. Always drink clean safe water. Use either clean potable water or clear water that has been made safe using water purifiers to kill any harmful bacteria present. Do not drink untreated water.
3. Ensure that any stored water is clean and germ free for subsequent use.
4. Dettol antiseptic liquid should be added in stored water for bathing to kill harmful bacteria.
5. Practice excellence hand hygiene, washing hands thoroughly with soap after using toilet, before preparing food and before eating.
6. Ensure all food is washed cleaned and thoroughly cooked to kill harmful bacteria and other harmful germs that may be present.
7. Be immunized to protect yourself from vaccine preventable diseases.
8. Avoid eating street foods from places nearby open drains or sewage. Avoid consuming ice products prepared from contaminated water.
9. Keep the surroundings near groundwater sources like hand pumps, wells, etc clean.
10. Do not pass sewage or waste materials in water bodies thus contaminating them. This may be the source of your drinking water or groundwater and may enter your body in some way or the other.

**Question 2. Suppose that inhabitants of a village obtain water from a spring. What advice would you give to the users about the prevention of contaminants entering the spring?**

The advice I could give is that;

Springs should be protected from flooding and surface water pollution by constructing a deep diversion ditch above and around the spring. The ditch should be constructed so that it collects surface water running towards the spring and carries or diverts it away. It needs to be deep enough to carry all surface water away, even in a heavy rainstorm (the Open University 2016).

Also small springs are typically protected by a ‘spring box which is constructed of brick, masonry or concrete, and is built around the spring so that water flows directly out of the box into a pipe or cistern, without being exposed to outside pollution such as run-off, bird droppings and animals. The spring box should have a watertight cover with a lock. Larger springs serving towns are protected in a similar way (the Open University 2016).

**Question 3. The following are pollution sources. Give two specific pollutants for each source.**

1. A residential area:

The specific pollutants for residential area are;

**1. Carbon Monoxide (CO):** Carbon Monoxide is a highly toxic and dangerous pollutant, infamous for its lack of identifying color and smell. At one point, this gas was extremely prevalent in homes for use in domestic heating before it was found to be unsuitable, and it has since been replaced by much safer solutions such as  and electricity. However, this gas is far from extinct in human use. Other common sources of Carbon Monoxide are old gas and fuel appliances, incinerators, and even cigarettes. Carbon Monoxide can have a profound effect on the environment as it is extremely poisonous, and can contribute to very dangerous ground-level air and ozone conditions (Conserve Energy Future 2019).

**2. Lead (Pb):** Lead has long been known to be a dangerous substance. Once commonplace in nearly all gas and aviation fuels, there has since been tremendous effort to reduce the amount of lead found in these substances. Since the introduction of lead-free gasoline, the volume of lead in the atmosphere has dropped enormously. Lead can not only be poisonous to humans, but it also has a profound effect upon Contaminating air, soil, and water, lead can cause damage to flora and fauna alike(Conserve Energy Future 2019).

1. A metal plating plant:

Toxic air pollutants.

These are substances in the air that, if you are exposed to them, could increase your chances of experiencing health problems. Toxic air pollutants also can cause ecological impacts. An example of a toxic air pollutant is the chemical benzene, which is in gasoline. Inhaling fumes that contain benzene could increase your chances of getting cancer.

Government agencies are most concerned about substances that fit one or more of these descriptions:

* Can cause serious health effects, such as cancer, birth defects, immediate death, or other serious illnesses.
* Are released to the air in large enough amounts to be toxic.
* Reach many people.

1. Agricultural activities**:**

Agricultural pollutants include;

Insecticides, herbicides, pesticides,

Natural and chemical fertilizers,

drainage from animal feedlots, salt from field irrigation, and silts from uncontrolled soil erosion.

1. An uncontrolled landfill site**:**

Waste Transportation Contamination**:**

Landfills are often developed away from large areas of residence in places such as industrial zones, which means there is often a long process for transporting waste from its source to a landfill. Most U.S. states carefully regulate waste transportation, but trucks leaking quantities of solid and hazardous wastes may leak small quantities during transport or be involved in accidents that cause a release of waste material into surface water. The U.S. Department of Transportation reports that more than 5,000 hazardous materials trucks are involved in accidents every year. In 2013, a truck carrying hazardous sewage sludge to a landfill site in Colorado spilled an estimated 22,000 pounds of waste in the vicinity of a nearby stream; response crews struggled to clean up the spill before it reached the water source.

Over population of birds:

Landfills are known for drawing in large quantities of bird species that feed on newly disposed trash before it is buried. At landfill sites along major water bodies, these birds can infest those bodies of water at night causing secondary contamination from animal byproducts. The over population of birds in water bodies has been known to create dangerous bacteria formation and promote unhealthy levels of plant growth in water ecosystems.

1. Urban surface water run-off:

1. Bacteria.

The levels of bacteria found in urban runoff almost always exceed public health standards for recreational swimming and wading. Generally, fecal coli form bacteria counts for urban runoff are 20 to 40 times higher than the health standard for swimming.

2. Sediment;

Like rural runoff, urban runoff is loaded with sediment. Cities may have less soil erosion than rural areas, but urban areas produce their own distinctive mix of sediment — flakes of metal from rusting vehicles, particles from vehicle exhaust, bits of tires and brake linings, chunks of pavement, and soot from residential chimneys as well as industrial smokestacks.

**Question 4. Explain 5 reasons why emergencies can put people at greater risk of waterborne disease.**

According to Merriam Webster, (2015), an emergency is defined as an unexpected and usually dangerous situation that calls for immediate action. Floods, droughts and earthquakes are all possible causes of emergency situations. In such an emergency, many systems you rely on may not function as well as they usually do. Utilities such as electricity, water and phone services may be disrupted. War and other conflicts can also be the cause of emergencies and may result in many people leaving their homes and moving to safer areas. Refugee camps for people fleeing from natural or man-made disasters may be established in locations that do not have the resources to meet basic human needs for water, food and shelter.

The following are the reasons why emergencies can put people at great risk of waterborne disease (The Open University 2016):

1. Water supply systems may be broken or contaminated so people only have unsafe water to drink. In this case people in emergency situations are generally much more susceptible to illness and death from disease, often caused by a lack of inadequate water supplies and poor hygiene.
2. Lack of latrines or other safe method for disposing of human waste forces people to defecate in the open hence put people at great risk of waterborne diseases.
3. Disruption of normal routine and regular habits means that people may not wash their hands at critical times.
4. Flies and other disease vectors may increase in the disturbed conditions following an emergency.
5. Some emergencies will force people out of their homes to refugee camps which may be in locations with insufficient resources to meet people’s needs. Overcrowding can add to the increased health risk in these camps.

**Question 5. In your own words, what is your understanding of public health and what are its key elements?**

According to my understanding, public health is the branch of medicine dealing with population or community health, which including hygiene, epidemiology, and disease prevention.

The key elements of public health are as follows;

1. Monitor the health status; i.e. to identify health problem of the community.
2. Diagnose and investigate health problems and hazards in the community.
3. Inform, educate and empower people about health issues.
4. Mobilize community partnership to identify and solve health problems.
5. Develop policies and plans that support individual and community health efforts.
6. Enforce laws and regulations that protect health and ensure safety.
7. Link People to needed personal health services and assure the provision of health care when otherwise unavailable.
8. Assure a competent workforce for public health and personal health care.
9. Evaluate effectiveness, accessibility and quality of personal and population based services.
10. Research for new insights and innovative solutions to health problems.

**Question 6. Discuss how environmental health and sanitation affect the nutritional status of the vulnerable groups.**

Vulnerability is defined as susceptibility or increased risk for health problems ( De Chesnay,2008).A group of individuals are considered at higher risk for illness when their physical,emotional,psychological, or social health is compromised (a day,2001).

Children, pregnant women, elderly people, malnourished people, and people who are ill or immunocompromised, are particularly vulnerable when a disaster strikes, and take a relatively high share of the disease burden associated with emergencies. Poverty and its common consequences such as malnutrition, homelessness, poor housing and destitution is a major contributor to vulnerability.

Children and Pregnant women:

Here the developing fetus is extremely vulnerable to environment pollunts. The vital system e.g. nervous and respiratory system and metabolic pathways in the fetus, bodies are still developing. Hence environmental exposure at that early stage of life prolongs period in which chronic illness may develop as result of exposure.

Children spend more times outdoor which increase environmental exposure to pollutants. It is noted that Israeli population o children make up to 30%.

The fertility rate is high in Israel with average of 3.13 children for both Jewish and Arab women.

Additional research on pregnant women stated that insufficiency of iodine in pregnant mothers is also a problem.

Individuals with chronic diseases and elderly:

Individuals with chronic diseases and elderly peopleliving with diseases such as asthma and diabetes may be more vulnerable to effects of environmental pollutants and because of the deterioration of their physiologic, biochemical and immunologic parameters, elderly may be more sensitive to environmental pollunts.

Low SES (socioeconomic status) individuals are more vulnerable to the adverse health effects of environmental exposure due to intrinsic factors e.g. higher smoking rates (compare to general public) and increased like hood of living near hazardous waste sites, industrial facilities and major roads.

**Question 7. Paul, a resident in the outskirts of your town, consults you about building a latrine in the compound of his house. He is an open-minded man who is keen to improve life for his family. He has a wife and three young children, and his elderly mother also lives with them. He doesn’t have a tap in his house and gets water from a nearby well. The area has heavy soil and the rock below is impermeable.**

1. Which types of latrine are possible choices for him?

Paul cannot install a water carriage system because he does not have a piped water supply; therefore, he has to install a pit latrine of some sort. The possible choices are a single pit latrine, a pit latrine with slab, a VIP latrine with slab, a double pit latrine or one of the ecosan systems, namely an Arborloo (the Open University 2016).

1. Which types of latrine would you recommend, and why?

The VIP latrine is preferable to a simple latrine, but an ecosan system would be better because this would produce a useful product as well as protecting the health of the family and the environment. You would need to ask Paul about his attitude to using an ecological sanitation system and whether he would be willing to make use of the composted waste material. He is a farmer so he may be able to use it on his fields and he is open-minded so this system may be attractive to him. If he was reluctant to dig out the compost you could recommend the Arborloo system because that does not require handling; the tree is planted on top of the filled pit (the Open University 2016).

1. What other advice would you give him about the location, design and construction of the latrine?

I should advise him to consider the location of the pit. It must be at least 15 m away from his well and preferably a greater distance. It must also be at a lower level according to the slope of the land. He should also consider the wind direction and place the latrine downwind and at a convenient distance from the house. Paul would need to consider the design of the squat hole to ensure it is safe for his children and comfortable for his elderly mother. You could advise him about possible materials to be used for the superstructure and recommend what is available locally. You should also advise him to install a hand washingh facility next to the latrine (the Open University 2016).

**Question 8. Explain five ways in which urbanization creates challenges for effective sanitation and solid waste management.**

According to Conserve Energy Future (2019), urbanization is a process whereby populations move from rural to urban area, enabling cities and towns to grow. It can also be termed as the progressive increase of the number of people living in towns and cities. It is highly influenced by the notion that cities and towns have achieved better economic, political, and social mileages compared to the rural areas.

Accordingly, urbanization is very common in developing and developed worlds as more and more people have the tendency of moving closer to towns and cities to acquire “privileged” social and economic services as well as benefits. These include social and economic advantages such as better education, health care, sanitation, housing, business opportunities, and transportation (Conserve Energy Future, 2019).

Living very close together:

There are several possible answers to this question, but the main challenges from urbanization are caused by many people living very close together which put pressure on all urban services.

Rate of increase in population:

The rate of increase in population is very fast and the development of infrastructure for water supply and sanitation services cannot maintain the same pace of change.

Lack of essential facilities:

People arriving in cities often live in informal settlements which are developed without planning or control and lack essential facilities for the people who live there.

Water and sanitation problems:

Because of overpopulation and rapid population increase in most urban centers, it is common to find that there are inadequate sewage facilities. Municipalities and local governments are faced with serious resource crisis in the management of sewage facilities. As a result, sanitation becomes poor and sewages flow chaotically, and they are drained into neighboring streams, rivers, lakes, or seas. Eventually, communicable diseases such as typhoid, dysentery, plague, and diarrhea spread very fast leading to suffering and even deaths. Overcrowding also highly contributes to water scarcity as supply falls short of demand.

Poor health and spread of diseases:

The social, economic and living conditions in congested urban areas affects access and utilization of public health care services. Slum areas in particular experience poor sanitation and insufficient water supply which generally make slum populations susceptible to communicable diseases. The environmental problems such as urban pollution also cause many health problems namely allergies, asthma, infertility, food poisoning, cancer and even premature deaths.

Urban crime:

Issues of lack of resources, unemployment, overcrowding, poverty, and lack of social services and education habitually leads to many social problems including violence, drug abuse, and crime. Most of the crimes such as murder, rape, kidnapping, riots, assault, theft, robbery, and hijacking are reported to be more prominent in the urban vicinities. Besides, poverty related crimes are the highest in fast-growing urban regions. These acts of urban crime normally upset the peace and tranquility of cities/towns.

**Question 9. How do good sanitation and waste management practices bring a positive effect to urban inhabitants? Give examples for effects on:**

1. Health.

Effects on health: Good sanitation and waste management help to keep people separate from potential sources of pathogens. They reduce the risk of contaminating water supplies with pathogens and discourage the transmission of disease (the Open University 2016).

1. Education.

Effects on education: Healthy children have fewer days off school through illness. When they are at school, healthy children learn better than sick children. Providing good sanitation facilities encourages children to attend school, particularly girls during their menstrual periods (the Open University 2016).

1. Economic conditions.

Effects on economic conditions: The health benefits promoted by good sanitation and waste make for a more productive community. Less money is spent on healthcare and people lose fewer days off work through caring for the sick (the Open University 2016).

1. The environment.

As per effects on the environment, good sanitation and waste management means that there will be less faeces and waste deposited in public places and less pollution of the water and soil (the Open University 2016).

**Question 10. List and briefly describe the measures by which the success or otherwise of a public–private partnership providing water supply services can be assessed**.

According to the Open University (2016) the following measures may be used to the success of a public private partnership (PPP) providing water supply.

1. Accessibility.

The extent of coverage of the population, and the distance to the water point.

2. Affordability.

The cost of the water needed should be less than 5% of the household’s income.

3. Cost recovery.

The cost of providing the water should be claimed back from the population.

4. Minimisation of non-revenue water.

This should be reduced to 15% or less.

5. Water quality.

The water should meet national standards for quality.

6. Operational efficiency.

The quantity of water supplied per capita, and the duration of water supply per day.

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