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Final Exam

Adm no aipms/221/2019

DIPLOMA IN WATER, HYGIENE AND SANITATION

**Final Exam**

1. *Diarrhea among children under 5 is common in many rural villages. What environmental factors or practices may cause diarrhea in young children? Explain three ways to prevent it.*

***Diarrhea among children under 5 is common in many rural villages***

Diarrhea among children under 5 is common in many rural villages because of poor hygiene experienced due to the fact that most rural villages have no pit latrines or poor flush-pit latrines that contribute to poor hygiene creating a path of the spread of malaria disease. The environmental factors or practices causing diarrhea example proper sanitation, hand washing facilities, improved latrine, and poor knowledge.

***Ways of preventing Diarrhea***

* ***The building of Ventilated improved pit*** -Ventilated improved pit is easier to construct as compared to pour flash pit latrines it has a pipe fitted to the pit and also improved to overcome the disadvantages of simple pit latrines e.g. flies and mosquito nuisance and doors. The smell is carried upwards by the pipe effect and flies are prevented from leaving the pit spreading diseases thus according to Doucette, et al, (2019).
* The pit latrine should not be situated near the house it should be some reasonable distance from the house and in the open for good ventilation and it should have some openings to ensure a good flow of air in the pit to prevent bad odors. It should also be constructed using quality materials to avoid easy breakdown by strong winds or heavy downpour thus Fetter, C. W. (2018). Not washing hands before eating.
* ***Proper Deposition of faeces-***Deposition of feces in the open can lead to them being carried to the water streams or underground water and even flies can transfer pathogens from them into the foods and when consumed through the contaminated water or food can lead to water-borne diseases or vector-borne diseases e.g. diarrhea, dysentery, cholera, typhoid, and infection by intestinal worms thus Cairncross, S., & Feachem, R. (2018).
* These can be reduced by providing well and maintained latrines and toilets for the people in an area as cited by Ssekamatte, et al, (2018).
* When organic and food waste is accumulated in the open they provide breeding space for rats and flies which are vectors of diseases thus Greenberg, B. (2019), the problems can be managed by ensuring proper disposal of food and organic waste in the compound.
* ***Washing of hands before eating-***Washing of hands before eating is a good hygienic practice and is very appropriate to curb the risk of transmitting pathogens into the mouth that might lead to diseases transmitted fiscally as cited by Cairncross, S., & Feachem, R. (2018).
* These problems can be reduced by ensuring proper washing of hands before and even after eating and creating public awareness to the people on the benefits of washing the hands before and after eating as a hygienic practice thus Maji, et al, (2018).

1. ***Think about the possible types of pollution that could be produced from a health center.***
   1. ***List the types of pollution that could be produced, giving one example of each type.***

***From health care there are several types of pollution:***

* ***Air pollution-***This is a type of pollution thatreleases chemicals that are emitted into the atmosphere that normally comes from the pharmaceutical products and chemicals in the health center facility used for treatment purposes.
* ***Water pollution:*** the release of wastes, chemicals, and other contaminants into surface and groundwater that is being used in the health care facility as water for cleaning surfaces may be when cleaning of maternity floors and the water used is drawn from the wells within the facility which may be is contaminated through gloves used in holding the bucket while fetching the water from the wells.
* ***Soil Pollution-***Is the act of releasing waste, chemicals, and other contaminants into the soil which normally happens in a health facility by the disposal of pharmaceutical waste into landfills.

##### ***Air pollution****-*Occurs due to the releasing of chemicals in gaseous or dust from within the atmosphere which might involve burning of pharmaceutical waste into the atmosphere.

* ***Land/Soil pollution-***Occurs through the disposal of pharmaceutical waste to an open land causing a lot of landfills. In the long term it might lead to groundwater pollution.

*Therefore the following sources can be used as the most trusted sources of clean water in a health facility.*

* **Source of clean water for drinking**–there must be a good source of clean drinking water to prevent the spread of water-borne diseases because of the use of unclean water Su, et al, (2018).
* **Latrines and urinals** –for a good health center environment there must be toilets and urinals for the young pupils to ensure human waste re properly disposed to prevent contraction of diseases related to such waste thus according to Rangeela, et al, (2018).
* **Hand washing facilities**– In the health center compound there should be hand wash facilities to assist the pupils to clean their hands before and after eating and after using the toilets and urinals to help in protecting them from germs that may cause diseases thus Wolf, et al, and (2018).
  1. ***Describe the two main approaches to pollution management. Outline the pollution management methods that could be used for the pollutants you have listed.***
* ***Incineration as the first method of pollution management*** is a good way of disposing of solid waste for effective sanitation and solid waste management. Incineration is a good way of disposing of solid waste for effective sanitation and solid waste management. Not only has it reduced the amount that was initially disposed of in sanitary landfills, but it can also be used in the generation of electricity. Depending on the degree of recovery and the type of materials in the solid waste, it has a 95% to 96% chance of reducing the mass of the solid waste. First, materials have to be separated into two say organic waste and inorganic waste.
* Organic waste can be disposed of using methods such as composting while the inorganic materials are incinerated. Incineration makes use of high temperatures to convert the waste materials into gas, heat, and particles. The gases and particles are usually treated before being released into the atmosphere. Moreover, incineration can be used to dispose of used medical equipment or hazardous industrial waste through heat treatment. Heat treatment ensures that the toxins contained in the waste are destroyed to avoid any danger of contact with people.
* Opponents of waste incineration, however, argue that waste incineration produces harmful particles, such as carbon monoxide and carbon dioxide, which can affect the atmospheric environment. Waste burning produces smoke that contains several dioxides and furans that are a significant contributor to the depletion of the ozone layer and hence global warming. Although there are new technologies that ensure that the gases are treated before being released into the atmosphere, studies have shown that these gases are still not environmentally sustainable. According to research in the journal Environmental Science and Technology, burning waste emits pollution and toxic particles into the air. (weather.com, 2014).
* These also contribute to increases the chance of global warming, hence making the technology unsafe for the environment. Furthermore, incineration facilities rely on heavy metals such as lead in their processes which are also harmful to human health when released. The dioxide and furan contents also have adverse effects on human health causing illnesses such as lung cancer when inhaled (Kimberlee, 2017).
* ***Reducing Overpopulation rate* -** the number of people living in urban areas is making people squish themselves in small rooms in urban areas. This rate of the increasing population depends on the degree of recovery and the type of materials in the solid waste; it has a 95% to 96% chance of reducing the mass of the solid waste. First, materials have to be separated into two say organic waste and inorganic waste. Organic waste can be disposed of using methods such as composting while the inorganic materials are incinerated thus according to Lee, et al, (2018).

1. ***Give three reasons for incorporating plans for M&E during the early stages of a project’s development.***

* ***Track progress:*** M&E helps in tracking progress in such a way that assessing inputs, outputs, and outcomes, in general, allows managers in achieving specific objectives.
* ***Measure impact:*** M&E helps I reducing guesswork and the possibility of biases in reporting the results by away of asking several questions such as the impact of the program.
* ***Increase accountability:*** M&E can provide the basis for accountability if the information gathered by the M&E process is reported and shared with users and other stakeholders at all levels.
* ***Inform decision making:*** M&E helps in the provision of evidence about the successes and failures existing in the project.

1. ***Explain four factors that are important when choosing a sanitation technology***

-In choosing sanitation technology the following factors must be considered to ensure the project is successful.

### a. Site Specific Environmental Factors

In this case, one of the main factors to be considered is an environmental factor which may involve surface water, the condition of the soil and lastly disposing of human waste. Natural waste can be discarded utilizing strategies, for example, fertilizing the soil while the inorganic materials are burned. Cremation utilizes high temperatures to change over the waste materials into gas, warmth, and particles. The gases and particles are typically treated before being discharged into the climate. Besides, burning can be utilized to discard utilized medicinal hardware or unsafe mechanical waste through warmth treatment. Warmth treatment guarantees that the poisons contained in the waste are obliterated to dodge any risk of contact with individuals.

### b. Community Physical Factors

### The physical factors within the community must be considered for example in a community where a landfill is allocated for disposal of waste and it is far away from residential areas and rivers that might sweep the waste into a flowing pool of water can be more appropriate for a landfill, therefore, it is true sanitation technologies relies on community physical factors.

### c. Social and Cultural Factors

### Social and cultural factors that affect sanitation and the community practices involving hygienic interventions must be properly designed. Sanitation technology to be implemented in this place involves a technology that should be friendly to social and cultural factors like using dry technologies for communities with less or no water access as compared to communities with access to water for maintaining toilet hygiene. In a community where privacy is a sensitive issue then for example building of a toilet must be designed to keep the privacy of the users.

1. ***Define Sustainability. Explain four factors that can be used to foster sustainability in WASH projects.***

***b. Giving reasons explain 5 conditions that will help in improving the water supply situation in your country.***

***Community involvement:***when the community is involved in the project, it gives them ownership and the spirit to give assistance o the project for the whole duration. Their involvement in the project helps them exercise their skills and knowledge acquired by different groups of people Middlestadt, et al, (2018).

***Train local groups:***for proper implementation and planning of a project, the local groups should be engaged and since they may lack the technical know-how of the project it could be necessary to offer them training first on the project for its success thus according to Sremakaew, et al,(2018).

***Community promotion:***educating the community on the importance of the project is also important for the project and also offering promotions for some of the members of the community might encourage them more to work for the project for good results Doyle, et al, (2018).

1. ***What are the key factors to be considered when planning a new landfill in small and medium-sized towns? List at least four factors.***

* ***Incineration*** -is a good way of disposing of solid waste for effective sanitation and solid waste management. Incineration is a good way of disposing of solid waste for effective sanitation and solid waste management. Not only has it reduced the amount that was initially disposed of in sanitary landfills, but it can also be used in the generation of electricity. Depending on the degree of recovery and the type of materials in the solid waste, it has a 95% to 96% chance of reducing the mass of the solid waste. First, materials have to be separated into two say organic waste and inorganic waste Ten Hoeve, et al, (2018).
* Organic waste can be disposed of using methods such as composting while the inorganic materials are incinerated. Incineration makes use of high temperatures to convert the waste materials into gas, heat, and particles. According to Ayiania, et al, (2019), the gases and particles are usually treated before being released into the atmosphere. Moreover, incineration can be used to dispose of used medical equipment or hazardous industrial waste through heat treatment. Heat treatment ensures that the toxins contained in the waste are destroyed to avoid any danger of contact with people.
* Opponents of waste incineration, however, argue that waste incineration produces harmful particles, such as carbon monoxide and carbon dioxide, which can affect the atmospheric environment. According to Demirbas, A. (2005), waste burning produces smoke that contains several dioxides and furans that are a significant contributor to the depletion of the ozone layer and hence global warming. Although there are new technologies that ensure that the gases are treated before being released into the atmosphere, studies have shown that these gases are still not environmentally sustainable. According to research in the journal Environmental Science and Technology, burning waste emits pollution and toxic particles into the air Bi, et al, (2010).

***b) Explain how incineration differs from open burning***

* **Incineration means burning something completely-** Waste burning produces smoke that contains several dioxides and furans that are a significant contributor to the depletion of the ozone layer and hence global warming. Although there are new technologies that ensure that the gases are treated before being released into the atmosphere, studies have shown that these gases are still not environmentally sustainable. According to research in the journal Environmental Science and Technology, burning waste emits pollution and toxic particles into the air Ten Hoeve, et al, (2018).
* **Open burning-** This is complete burning in open land. As indicated by Demirbas, A. (2005), Waste burning produces smoke that contains several dioxides and furans that are a significant contributor to the depletion of the ozone layer and hence global warming. Although there are new technologies that ensure that the gases are treated before being released into the atmosphere, studies have shown that these gases are still not environmentally sustainable. According to research in the journal Environmental Science and Technology, burning waste emits pollution and toxic particles into the air. (weather.com, 2014).

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

Water Safety Plans is an improved risk management instrument designed to guarantee the protection of drinking water through the use of a complete risk evaluation and risk management approach that covers all steps in water supply from the source to the sources thus according to Proskuryakova, et al, (2018). It enables operators identifying and controlling risks rather than just analyzing them, it Fosters teamwork, planning, coordination and documentation and also it ensures a holistic approach to ensure safe drinking water from catchment to consumers.

***The presentation of a public-private partnership can be assessed through the following factors.***

* ***Accessibility*:** What percentages of people get access to water? Does the distance between the people and the water spot less than 1 km or 30 minutes walking period? Pickering and Davis (2012), using survey data from 26 sub-Saharan countries, found that the further away a water source was, the less water was used; when the distance was more than 30 minutes away, households collected less water than was necessary for basic needs.
* ***Reasonable price:*** Is the cost of water needed to be less than 5% income of the household?
* ***Cost recovery*:** Is the recharge of providing the water being recovered?
* ***Minimization of non-taxable water*:** Is the reduction of more than 15%?
* ***Water value*:** Is there an observation of common standards?
* ***Operational competence*:** What is the quantity of water distributed per capita? What is the period of water deliverance within one hour each day?

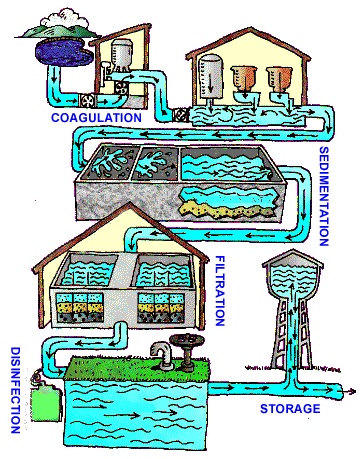
1. ***What are the possible interventions to manage solid waste in an emergency situation? Explain at least three actions that could be taken.***

* Solid wastes in urban centers in most countries are a by-product of a broad spectrum of industrial, services as well as manufacturing processes. Solid wastes in developing countries, for example, include industrial, municipal, medical and agricultural waste. Typical wastes include plastic, scrap metals, clinical wastes, etc. Left unattended, it turns toxic.
* As a common practice, there is generally poor solid waste management in most urban centers, with low garbage collection. Over 60% of solid waste is not collected and has the potential of increasing environmental degradation, pollution, loss of aesthetic and amenities and critical disease outbreaks.
* Sub-Saharan Africa due to the country's high growth and governance problems. Furthermore, the complexity (a mixture of medical, industrial and agricultural) of waste makes its management difficult. Inadequate solid waste management (SWM) practices evidently affect the quality of the environment and public health of residents in many urban centers.
* **Disposal via landfills-**In emergency situation generally about 40% of the total wastes generated in the urban center are collected and disposed of at designated disposal sites all such sites are dumpsites.
* **Open burning -** of waste at these dumps and landfills is the greatest source of air pollutants such as sulfur oxides, oxides of carbon, particulates, dioxins, and furans. Such waste also may have industrial waste composed of toxic chemicals including heavy metals, salts, detergents, and medical waste. This is dumped in unsuitable areas or let to pour into rivers.

1. ***What are the most important questions you would need to address in a rapid assessment of an emergency?***

* What does Information need to Be Collected During a Rapid Assessment?
* What was the cause of the disaster?
* How can disaster victims be helped?
* Which kind of aid do they need?
* Do we have enough materials and tools to address the challenges?

1. ***Filtration and disinfection are important water treatment processes. Briefly describe each of these processes and explain their role in making water safe to drink***

* Filtration and disinfection are important water treatment processes due to the fact that lack of water, sanitation, and hygienic interventions causes poor hygienic interventions as the act of cleaning structuring and maintaining good standards of cleanliness to all structure of the oral cavity, may it be soft or hard tissue to prevent disease manifestation. Hygienic interventions are important for the factions of Mastication, esthetic beauty, and speech Kwan, et al, (2005). Children with poor hygienic interventions can have a detrimental effect on their academic performance in school. Their co-curriculum activities can also be affected, which can later affect their success in life. Children who suffer from poor hygienic interventions are many times more likely to have restricted activities compared to children who are with good hygienic interventions and maintain the same; some of those disadvantages included missing to school to seek for oral treatment such as extraction or carious painful teeth and treatment of other periodontal diseases (Developing dentistry 2014).
* As part of the promotion of hygienic interventions and general body health, it can be easy to conduct it in places where the entire population live, play, work and learn, this is the most creative, simple, clear and cost-effective way to improve hygienic interventions which later leads to good living. (Developing dentistry 2014).Traditionally oral care had low priority in the health care system in most countries (community dentistry 2nd edition) this is because most of the resources were being directed towards World control of Communicable Diseases. Some traditions had cultural practice such as filing of upper anterior teeth which they considered as beauty, and others extracted their lower anterior teeth, as well as extraction of Natal teeth. (Community Dentistry).Within the last few decades changes have occurred in oral health. Developing countries have shown a gradual increase in the preference of the two commonly occurring dental diseases (WHO 2012).
* Drinking water sources are subject to contamination and require appropriate treatment to remove disease-causing agents. Public drinking water systems use various methods of water treatment to provide safe drinking water for their communities. Today, the most common steps in water treatment used by community water systems 
* **Coagulation and Flocculation**

Coagulation and flocculation are often the first steps in water treatment. Chemicals with a positive charge are added to the water. The positive charge of these chemicals neutralizes the negative charge of dirt and other dissolved particles in the water. When this occurs, the particles bind with the chemicals and form larger particles, called floc.

* **Sedimentation**

During sedimentation, floc settles to the bottom of the water supply, due to its weight. This settling process is called sedimentation.

* **Filtration**

Once the floc has settled to the bottom of the water supply, the clear water on top will pass through filters of varying compositions (sand, gravel, and charcoal) and pore sizes, in order to remove dissolved particles, such as dust, parasites, bacteria, viruses, and chemicals.

* **Disinfection**

After the water has been filtered, a disinfectant (for example, chlorine, chloramine) may be added in order to kill any remaining parasites, bacteria, and viruses, and to protect the water from germs when it is piped to homes and businesses.

1. ***List the five factors that make a water source ideal to use.***

* The water source is fully enclosed or capped and no surface water can run directly into it.
* People do not step into the water while collecting it.
* Latrines, solid waste pits, animal excreta and other sources of pollution are located as far away as possible from the water source and on the ground lower in elevation than the water source.
* There is no stagnant water within 5 meters of the water source.
* The water collection buckets or hand pump at the source are kept clean.

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