Causes Of Water Pollution To Human Health

In this developing era, industrialization and agriculturalization are increasing rapidly to provide a better life for human beings. However, water resources had been extremely affected by global development and human activities. Pollutants in water are altering the characteristics of the water in every aspect and adversely affecting the lives inside as well as outside the water. Water is essential for life and drinking water and domestic water supply is the source that could directly affect human health. The increase in the rate of mortality and morbidity due to drinking water contamination has become a global concern. This paper will discuss the effects of water pollution towards human health which can be seen in terms of how it causes waterborne diseases, toxicity, neurological system and organ failure and cancers.

Firstly, the main effect of water pollution on human health is it causes waterborne diseases. Untreated sewage water containing human and animal faeces is the main source of waterborne diseases which contributes to the increasing global mortality and fatality rate. According to WB-SCEA, Cutler, Miller, Jalan, Ravallion, Roushdy, Sieverding and Radwan, water pollution is related to acute waterborne diseases which include hepatitis, cholera, dysentery, cryptosporidiosis, giardiasis, diarrhoea and Typhoid according to researches (as cited in Wang & Yang, 2016). Simultaneously, according to Khan, Shahnaz, Jehan, Rehman, Shah and Din(2013), waterborne diseases are mainly caused by the presence coliform bacteria in water. This statement is supported by Owa when other studies have shown that contaminated water source for drinking and domestic use leads to a serious life risk for humans as pollutants are strong agents of waterborne diseases. However, some researchers points out that coliform bacteria is not the direct factor of waterborne diseases but pathogens are. Research from Emanuel, Pierre and Perrodin(2009) states that :

“Coliform bacteria may not cause disease, but used as one of the indicators of pathogenic contamination that can cause diseases such as intestinal infections, dysentery, hepatitis, typhoid fever, cholera and other illnesses.”

(as cited in Khan, Shahnaz, Jehan, Rehman, Shah and Din, 2013, pg.100)

Bacteria, protozoa and viruses are examples of pathogens that poses significant hazard in water resources towards human health. Human drinks and uses water everyday, therefore the higher the exposure rate towards contaminated water, the higher the chances of getting waterborne diseases.

Moreover, high level of pollutants in water will cause toxicity to human body. Metals that form poisonous soluble compounds and accumulate in body tissue are toxic. Excessive intake of drinking water containing various anions and heavy metals such as Cd, Cr, Co, Hg, Ni, Pb, Zn has tremendous harmful effects on human health (Khan et al., 2013). Heavy metals affects human in various ways including deficiency or toxicity. The statement is agreed by Filon, D’Agostina, Crosera, Adami, Bovenzi, Maina when other studies have reported that allergy and hand eczema can be caused by drinking water containing Ni (as cited in Khan et al., 2013). In addition, World Health Organization(WHO) presents that severe Zn toxicity symptoms include vomiting, electrolyte imbalance, dehydration, abdominal pain, lethargy, nausea, dizziness and

lack of muscular coordination while ingestion of raised concentration of SO4 through water will cause health complication such as laxative action (as cited in Khan et al., 2013).The effects of accumulation of heavy metals such as Pb and NO3 in human body are more serious in children compared to adults. R.C. Gupta, Seth, A.K. Gupta, Bassin and J.K. Gupta claim that excessive intake of NO3 in drinking water is the major factor of methemoglobinemia (blue baby syndrome) while Bruning-Fann and Kaneene argue that adults have higher tolerance levels towards NO3 with little or no acute toxicity effects (as cited in Khan et al., 2013). Briefly, heavy metals in water are toxic and may pose health complications.

Rather than that, water pollution brings damage to human neurological system and vital organs. Intake of chemicals and heavy metals contaminated water possesses threat to human health. Based on Lehloesa, Muyima, Gerlach, Cury, Krug and Line, Pb will accumulate in the skeleton and cause adverse impacts on health after ingestion, which include the symptoms of tiredness, lassitude, slight abdominal discomfort, irritability, anemia, neurophysiological effects and behavioral changes (as cited in Khan et al., 2013). Khan agreed by stating that Pb contamination will lead to convulsions, major brain damage, organ dysfunction, coma, and ultimately death in children while low to moderate levels of exposure may cause hearing loss, inhibit growth, and learning disabilities. Besides injuries caused by Pb contamination, pollution of water by other heavy metal such as Manganese also results in serious damage of brain. In fact, Manganese is a neurotoxin which will lead to learning disabilities and deficits in intellectual function in children if consumed, according to Zoni and Lucchini. (as cited in Villanueva, Kogevinas, Cordier, Templeton, Vermeulen, Nuckols, Nieuwenhuijsen & Levallois, 2014). The report of USEPA (1977) shows that :

“The Cd exposure can cause the health problems such as nausea, vomiting, diarrhea, muscle cramps, salvation, sensory disturbances, liver injury convulsions, shocks and renal failure.”

(as cited in Khan, Shahnaz, Jehan, Rehman, Shah and Din, 2013, pg.100).

In addition, research of Jones, Miller, Otles and Cagindi states that long-term exposure to heavy metal causes slowly progressing physical, muscular and neurological degenerative processes that resembles Alzheimer's disease, Parkinson's disease, muscular dystrophy, multiple sclerosis, gangrene, diabetes mellitus, hypertension and ischemic heart disease (as cited in Fernández-Luqueño et al., 2013). In short, intake of polluted water causes malfunction of human body systems and brings damage to vital organs.

Finally, water pollution also causes cancer. According to Muhammad, Shah and Khan, excessive intake of water polluted by heavy metals including Cd, Cr, Co, Hg, Ni, Pb and Zn might cause cancer (as cited in Khan et al., 2013). Furthermore, sufficient evidence in IARC shows that arsenic in drinking water causes urinary bladder, lung, and skin cancer (as cited in Villanueva et al,.2014). Various types of cancer caused by water pollution result in large amount of human death. This can be supported by the statement of Marshall, Ferreccio, Yuan, Bates, Steinmau, Selvin, Liaw and Smith, which claims that the increase in population exposure to arsenic-polluted drinking water starting in 1958 increases the lung and bladder cancer mortality for human (as cited in Fernández-Luqueño et al., 2013). Additionally, Fe will also cause malignant tumours, colorectal, liver, lung, gastric and kidney cancer as it promotes the persistency of hepatitis B or C infection (as cited in Khan et al., 2013). In a word, water pollution poses risks to human life.

In conclusion, the hazardous effects of water pollution towards human health are mostly due to anions, heavy metals and pathogens. Water contamination has major repercussions on human health. The main consequence of water pollution is waterborne disease which is due to the presence of pathogens and bacteria in water which causes infection in human body. Heavy metal in water sources could cause acute toxicity and also chronic toxicity on human if its concentration exceeds the permissible limit. Encephalopathy and organ failure are collectively due to heavy metal contamination in water sources which could alter and impair the body functions. Next, contaminants also have carcinogenic effects towards human health. Water pollution in generally induced by human beings and it affects the whole world especially infants and also low-income group. Hence, actions need to be taken to control water pollution to reduce the health risks. The governments should work together to raise awareness and educate their people to resolve the problem of water pollution.