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Environmental Hazard: Industrial Wastes, Health Implication and Social Workers Role in Combating the Industrial Menace

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Abstract: Industry has become an essential part of modern society and waste production is an inevitable outcome of the developmental activities. Therefore, waste generated by industries poses lots of hazard on human health and the environment if not properly treated, stored, manage or disposed. Most communities are faced with these challenges because of the number of industries established in those areas. This paper focused on industrial waste, its types which include; chemical, solid and hazardous industrial waste; health hazards and chronic diseases contacted as a result of human exposure through air, water, land and contact to those industrial activities. Production and improper wastes disposal were also discussed. In order to combat or ameliorate those challenges and health issues affecting human beings in various communities as a result of improper disposal of industrial waste, social workers are charged with the responsibility to serve as the mouth piece or advocate, mediator, educator and stand at the gap between the community, industries and government.

Key words: Waste, Industrial waste, Human health, Social work

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I. INTRODUCTION

Waste has been a major environmental issue everywhere since the industrial revolution. Waste is any substance which is discarded after primary use or in other words, it is of no use. It is something which originally served a purpose, but is no longer useful, for example refuse. Human beings generate a huge amount of waste in their day to day life. A material becomes waste when it is discarded without expecting to be compensated for its inherent values. In general, waste comes in many different forms and may be categorized in a variety of ways namely; solid form which constitutes unwanted substance discarded by human society (eg. Old car tires, broken furniture's etc). Liquid form includes waste generated from washing, flushing or manufacturing processes of industries or sewage effluents. On the other hand, waste can be in gaseous form, that is waste that are released in the form of gases from automobiles like carbon monoxide, factories or burning of fossil fuels like petroleum.

Waste has various types, but this work focuses on what constitute industrial waste. Industry has become an essential part of modern society and waste production is an inevitable outcome of the development. Industrialization has been the result of rapid developments in technology and the increasing demand in our daily lives. In other words, these industries are essential to the progress of human civilization. There is almost no alternative to industrialization for meeting the high worldwide demand (Earthuntouched, 2014). Rapid industrialization, increase in the global population and the rising demand for food and other essentials, have resulted in the generation of huge quantity of wastes both solid, liquid and gas in industrial sectors, which are dumped anywhere. There are millions of factories such as; mills, industries, mining plants etc, around the world and these industries use raw materials to produce finished goods for consumers. During the manufacturing process, there are materials which are rendered useless and these constitute the industrial waste. However, either due to resource crunch or inefficient infrastructure, not all of this waste gets collected or transported to the final dumpsites. These wastes may pose a potential hazard to the human health or the environment when improperly treated, stored, transported or disposed of or managed. Improper waste management and illegal waste shipments can have negative impacts on both environment and public health. Negative impacts can be due to different

handling and disposal activities resulting in soil, water and air pollutions. Inadequately disposal of or unwanted waste may cause serious health problems for population surrounding the area of disposal.

Industrial waste constitute waste produced by industrial activity which includes any material that is rendered useless during a manufacturing process such as that of factories, industries, mills, mining operations (Maczulak, 2010). In other words, industrial waste contains a diversity of impurities and therefore for this reason alone, its treatment constitutes a special task. Sources of industrial waste includes; manufacturing and processing industries like chemical plants, cement factories, power plant, textile industries, food processing industries, petroleum industries (Byju's Biology, 2016).

Different categories of industrial waste

There are various classifications of industrial wastes, and they include:

- **Industrial chemical waste:** this is typically generated by factories, processing centers, warehouses and plants. This waste may include harmful or dangerous chemicals and chemical residue and waste disposal. Chemical may or may not be classified as hazardous waste (Hallam, 2010). There are three exposure pathways to industrial chemical waste namely; inhalation-breathing or inhaling into the lungs, ingestion-taking by mouth and skin contact that is direct contact with the skin (Missouri Department of Health and Senior Services, 2017).
- **Industrial solid waste:** this includes a variety of different materials, including paper, cardboard, plastics, packaging materials, wood, scrap metals, empty chemical containers, paint residues, filters and dust, sludges, chemically treated wood, food waste, electrical components wastes etc. industrial solid waste that are generated by businesses from an industrial manufacturing process or waste generated from non-manufacturing activities that are managed as a separated waste stream example metals, plastics etc.
- **Industrial toxic or hazardous waste:** comprised of materials that can cause serious health and safety problems if waste disposal is not handled correctly. In other words, they are wastes that possess substantial or potential threat to public health or the environment. This type of waste typically includes dangerous byproduct materials generated by factories, farms, construction sites, laboratories, garages, hospitals and certain production and manufacturing plants (Southern waste and recycling, 2015). Hazardous waste could be highly toxic to humans, animals and plants. They can be corrosive, highly inflammable or explosive, poisonous, noxious, radioactive, toxic or harmful to the health and environment and react when exposed to certain things eg gases.

Implications of industrial wastes on human health

There are lots of implications when industrial wastes are not properly handled and disposed. The effects are negative and could be detrimental to human health. Studies have shown that constant exposure of human to some chemicals such as Endocrine Disrupting Chemicals (EDCs), Bisphenol A, Cadmium, Pesticides, Polychorinated biphenyls etc. Endocrine Disrupting Chemicals (EDCs) are chemicals that interfere with the hormone (endocrine) systems at certain doses. People can be exposed to EDCs through drinking water, canned foods, personal care products like shampoo, conditioner, cosmetics etc, conventionally grown fruits and vegetables, poultry and dairy products, high mercury fish, kitchen products like plastic containers, non-stick cookware, cleaning products; thermal paper like cash register receipt, office products like ink cartridges, toner (Mercola, 2015). It causes harmful influence on health and hormone regulation. EDCs affect the thyroid hormone homeostasis which may cause neurodevelopmental damage of foetal during pregnancy. Foetuses and infants are most vulnerable to these effects because they need thyroid hormone for normal neurodevelopment. Also, Isoflavones inhibit throperoxidase (TPO) activities may cause goiter and hypothyroidism if ingested at high level particularly in iodine-deficient individuals (Pearce, 2009; Lyn, 2009).

Also, Bisphenol A chemical can cause abnormal penile/urethra development in males, early sexual maturation in females, an increase in neuro-behavioural problems such as attention deficit hyperactivity disorder (ADHA) and autism, an increase in childhood and adult obesity and type 2 diabetes, a regional decrease in sperm count and an increase in hormonally mediated cancers such as prostate and breast cancer (Saal, Akingbemi, Belcher, Birnbaum, Crain et al., 2007)

Pesticides are the only chemicals manufactured and spread in the environment specifically to be toxic, such as insecticides, herbicides and fungicides. Human beings are exposed to pesticides through ingestion of drinking water or consumption of food contaminated with toxic chemicals from industrial effluents, human dwellings, agricultural runoff, oil and mining wastes or from natural sources (Pruss-Utsun Vickers, Haefliger and Bertollini, 2011). Many studies have examined the effects of pesticides such as insecticides, herbicides and fungicides exposure and links have been found with cancer, problems with fertility and reproduction, respiratory diseases, damage of DNA, disruption of the hormone, immune and nervous system (Alton, 2016). Carbonate pesticides can lead to permanent loss of short-term memory and psychomotor speed, behavioural systems

including anxiety, irritability and depression, increased risks of miscarriage, infertility and a variety of birth defects (Tanssen, 2006).

Also, cadmium chemical in the environment comes from the burning fossil fuels such as coal or oil and incineration of municipal waste. Cadmium accumulates in the human body from solid waste affecting several organs that include liver, kidney especially to the proximal tubular cells, lungs, intestinal damage, digestive problems, bones (osteomalacia, osteoporosis), the placenta, brain, the central nervous system and bone demoralization either through direct bone damage or indirect as a result of renal dysfunction (Jerie, 2016) .

Polychlorinated biphenyls (PCBs) are aromatic, synthetic human-made chemicals of varying toxicity. PCBs can be released into the environment from poorly maintained hazardous waste sites that contain PCBs, leaks of gases from electrical transformers that contain PCBs, eating PCBs contaminated fish, drinking water or from breathing outdoor or indoor air contaminated with PCBs. Studies of PCBs in human have found increased rates of melanomas, liver cancer, gall bladder cancer, biliary tract cancer, gastrointestinal cancer and brain cancer, skin irritation, reproductive system damage (Oregon Physicians for Social Responsibility (PSR), 2014).

In addition, Arsenic is a natural component of the earth's crust and is widely distributed throughout the environment in the air, water and land. People are exposed to elevated levels of inorganic arsenic through drinking contaminated water, eating food prepared with this water and irrigation of food crops. Long-term exposure to arsenic in drinking water can cause cancer of the skin, lungs, bladder, kidney; and skin changes such as thickening and pigmentation. Ingestion of large amount of soluble inorganic arsenic can lead to gastrointestinal symptoms such as severe vomiting, disturbances of the blood and circulation, damage to the nervous system, enlargement of the liver, changes in the colour of the skin, produces tingling and loss of sensation in the limbs brain damage and eventually death (World Health Organisation (WHO), 2016).

Furthermore, disposal of refuse without proper supervision often amounts to damage to the environment and ultimately to the human body system. The direct health effects of industrial solid waste arise from excessive breeding of vermin and agents of diseases such as rats, flies, mosquitoes, cockroaches etc. These vector borne diseases include; malaria, lymphatic filariasis, onchocerciasis (river blindness), schistosomiasis, trypanosomiasis (sleeping sickness), leishmaniases, dracunculiasis, diarrhea, typhoid, dysentery, cholera, yellow fever, eye infection and skin infection such as cutaneous ephthera, leptospirosis, Lassa fever and some other hemorrhaging fevers like salmonellosis and plague (Abifade, 2017) .

Lead is a malleable and ductile metal and is therefore used widely in construction and manufacturing. Lead enters the body by ingestion or inhalation of pollutants released during indoor combustion of solid fuels, tobacco smoking or from construction materials and furnishings, contaminated indoor air and dust, batteries, costume jewelry, traditional cosmetics and medicines which goes directly to the blood stream (Pruss-Utsun et al., 2011). Younger children are particularly vulnerable to the toxic effects lead and can suffer profound and permanent adverse health effects, particularly affecting the development of the brain resulting in reduced intelligent quotient (IQ), behavioural changes such as decreased attention, increase hyperactivity, impulsivity, cognitive decline, dementia, increased antisocial behaviour and reduced educational attainment; and nervous system. Lead can cause long-term harm in adults as such; it may affect the nervous system such as cardiovascular system causing blood pressure and kidney damage. It may also cause anemia, hypertension, renal impairment, immunotoxicity and toxicity to the reproductive organs. Exposure of pregnant women to high levels of lead can cause miscarriage, stillbirth, premature birth and low birth weight as well as minor malformations (WHO), 2016).

Mercury comes from natural sources (such as volcanoes) and also from human activity. Small amount of mercury may cause serious health problems and is a threat to the development of the child in utero and early in life. Humans can be exposed to mercury through consumption of fish and shellfish contaminated with methylmercury, especially if they eat a lot of seafood and through inhalation of elementary mercury vapours during industrial processes. High dose of mercury can seriously affect the nervous system and have harmful effects on the cardiovascular, digestive, immune, reproductive systems and on lungs, kidneys, skin and eyes (European Union, 2012). Elementary and methylmercury are toxic to the central and peripheral nervous system. Neurological deficit/mental retardation, behavioural disorder, seizures, cerebral palsy, disturbances of vision, hearing, sensation, abnormal gait, abnormal speech and abnormal reflexes may be observed after inhalation, ingestion or dermal exposure of different mercury compounds. Symptoms include tremors, insomnia, memory loss, neuromuscular effects, headaches and cognitive and motor dysfunction (WHO, 2016).

Genotoxic substances may cause health effects such as caranogenicity, mutagenicity and birth defects (Yassi and Kjellstrom, 2017). On other hand, improper disposal of refuse also results to leachate and contamination of ground water and this can result in poisoning of bore holes. Solid waste from the industry can causes viral hepatitis, higher accidents of obstructive and restrictive disorder.

The emissions from different industries contain gaseous contaminants such as sulfur, carbon dioxide (CO_2), oxides of nitrogen, methane and so on. These gases when much in the atmosphere, frequently results in several illnesses and environmental hazards. Exposure to air pollution caused by industrial waste worsens the

clinical status of persons with asthma, chronic obstructive pulmonary diseases and other chronic respiratory conditions such as cough, wheezing, shortness of breath, chest pain, eye, nose and throat irritation and disruption of activities such as athletic performance. It can equally cause cardiac birth defects and low birth weight, obesogens, Alzheimers disease, Parkinson's diseases (Cooper, Marshall, Vanderlinden and Ursitti, 2011).

In addition, improper disposal of refuse also results to leachate and contamination of ground water and this can result in poisoning of bore holes. It can cause injuries e.g. from broken bottles, rusted metal objects etc, resulting in cuts and slippery constituents resulting to falls. Refuse also generates methane gas which is highly inflammable (Obinna, 2015).

Moreso, disposal of industrial waste into landfills is among the artificial aspects contributing towards soil pollution. Industrial wastes have in them varied amount of toxic materials and chemicals such that when deposited in landfills, it accumulates in the top soil thereby depreciating the fertility and biological activity of the soil due to soil poisoning. Such implications eventually contribute to ecological imbalances thus creating problems in crop productivity. Apart from that, the chemical and toxic materials in poisoning soil accumulate in plants grown in such areas causing health problems to those who consume such crops.

Roles of social workers in combating industrial waste and its effect on human health

The profession of social work is embodied by a set of core values which consist of service, social justice, dignity and worth of person, importance of human relationships, integrity and competence (National Association of Social Workers, 2012). The environmental health of communities can be improved by social workers considering the environmental implications or hazards of each of the core values.

- As educators, effective education on industrial hazards, its predisposing factors and health risks associated with through books, magazines, internet source, photographs, video, workshop, seminar, sensitization and awareness programme or goal oriented methods such as person-to-person orientation should be adopted by social workers to convey this message to the grass roots in order to raise people's awareness.
- Social workers are confronted with the task of taking multifaceted approaches to not only examine industries in the environment but to examine the activities carried out by those industries and means of waste disposal. Thus, paying attention to industrial activities that contribute hazards on the health and well-being of people.
- Clinical and industrial social workers who are knowledgeable on the symptoms of chemical contaminants-induced diseases or developmental disability people to avoid or reduce exposure to those chemical contaminants in the environment, and equally reduce the need to use other chemicals such as psychotropic medications to treat them.
- Clinical and medical social workers should assist those clients with severe chronic diseases that are not curable such as cancer to manage their condition by given them emotional support, adherence support services, live adjustment therapy for both the client and the family or the care giver.
- In treating those clients their developmental abilities have been affected, social workers should evaluate the past and present exposure of those clients to those industrial chemicals because there a relationship between mental health and industrial hazards.
- Social workers have the responsibility to take consensus of industrial exposures in the communities and advocate for the health of these communities, influences and revise existing environmental policies that sets precedence for environmental health in favour of the community well-being and equally educate them on how to use environmental legislation to advocate for their environmental rights, thereby fighting against environmental injustice in their communities.
- Social workers advocate should be involved in decision making regarding environmental enterprises that are situated in communities, and make those legislations available and accessible to prevent future risk from occurring.
- Social workers should engage with environmental engineers, industrial planners and managers, labour union and environmental activist in policy making, implementation and analysis of environmental justices in order to press for greater institutional integration of social, economic and environmental policy that will protect, benefit and amplify the political voice of disenfranchised populations.
- Social worker should spearhead an environment revolution that prioritizes human health and development. Thus, being influential in forgoing alliances with industries to help them establish initiatives that make the health of community a priority.
- Social workers can serve as mediator and equally establish community partnership between the community and various industries, to ensure maximum understanding and collaboration.

II. CONCLUSION

Based on the above discussions, it is concluded that industrial wastes have cumulative toxic and hazardous elements which adversely affect human health and environment. This hazardous elements or

emissions causes lots of chronic diseases and illness on human health which might not be cured; and degrade natural resources in the environment. Therefore, there is urgent need for monitoring, rehabilitation, orientation by social workers and other related agencies to ensure friendly and conducive environment for human dwelling, and adequate sanctioning of offenders by the government.

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