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Analyzing the Effects of Radioactive Waste on the Environment

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ABSTRACT: ***Radioactive elements are those elements that produce radiation. Radioactivity is the phenomenon of uncontrolled radiation releases through radioactive substances. Three-fourths of the surface of the planet is made up of oceans. It would have been inconceivable to conceive that people could severely damage these enormous quantities of water less than a century ago. Humans have been using the ocean as a landfill for trash and other waste for as long as there have been people living near the shore. Radiation is a characteristic of the natural world. It's critical to consider the overall radiation exposure, both internal and external, arising from both natural and artificial sources when evaluating how radiation affects people. Cosmic rays from extraterrestrial sources and terrestrial radiation sources both contribute to external exposure. This study focuses on the effects of radioactive waste on our environment. The results conclude that more than almost any other environmental occurrence, radioactivity in the environment prompts a strong response from the people.***

KEYWORDS: ***Environment, Health, Hospitals, Medical Waste, Radioactive Waste.***

1. INTRODUCTION

Byproducts from nuclear reactors, fuel processing factories, medical facilities, and research centers include radioactive (or nuclear) waste. Additionally, radioactive waste is produced during the decommissioning and demolition of nuclear reactors and other nuclear facilities. High-level waste and low-level waste are the two main categories. In the majority of nations, geological disposal is the recommended method for the long-term storage of high-level nuclear waste and spent nuclear fuel. Almost all national initiatives for managing radioactive waste are taking into consideration an engineered barrier, albeit the chosen host rock and the engineered barrier systems that protect and isolate the waste may vary [1]. The individual trash packages are surrounded and protected by clay, which is also employed as a tunnel seal to isolate the disposal galleries from the shafts going to the surface. As part of an integrated radioactive waste management approach, this study is intended to examine recently published studies that are concerned with testing and the use of various treatment techniques [2].

The primary goal of this study is to draw attention to the scientific community's interest in significant issues that have an impact on various therapeutic procedures. Treatment is a crucial step in the management of radioactive wastes; it tries to minimize the amount of waste that is produced to improve safety and/or lower the expense of subsequent management stages. After the treatment phase, the wastes are divided into two parts: a large volume portion with low radioactivity that can be released into the environment after complying with legal requirements, and a small volume of concentrate that contains the majority of radionuclides and is kept in the

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management system. Aqueous and organic liquid wastes were separated apart to make managing liquid radioactive wastes easier [3].

Biomedical waste is a type of waste that comprises several kinds of hazardous and infectious waste materials from the medical sector such as nursing homes, medical clinics hospitals, research centers, etc [4]. If not managed appropriately, medical waste poses a threat to the general populace. Ten distinct waste types have previously been linked to health problems. As the world's population increases, so does the number of hospitals and nursing homes, and as a result, so does the amount of garbage produced [5]–[7]. The kind of specialty, as well as the standard of the hospitals, determine the quantity and quality of wastes released every day. Furthermore, the kind and volume of waste will most likely be determined by the hospital's location. Every day, hospitals in major cities create more than 30 tons of biological waste[8].

If the medical waste disposal is not made safe before being buried or disposed of in water, it is considered a cause of pollution of marine and coastal supplies as illustrated in Figure 1. The vast quantity of medical waste created due to the rise of the medical industry across the world, as well as an increase in the usage of disposable medical supplies. Poor management of medical waste pollutes the environment, generates unpleasant odors, encourages the development and reproduction of insects, rats, and worms, and can result in the transfer of illnesses such as typhoid, diarrhea, and hepatitis through infections from blood-contaminated sharps. The goal of this essay is to look at how biomedical waste affects several environmental characteristics. All wastes from any medical treatment in healthcare institutions, research institutes, and laboratories are referred to as Bio-Medical Wastes as well as healthcare wastes.

Figure 1: Illustrates the Radioactive Waste which is Considered a Cause of Impurity of Pollution on Lands [Google].

Bio-Medical Waste (BMW) is generated by operations in healthcare, research, and diagnostic institutions that include one or more of the following, diagnosis, treatment, vaccination of humans and animals, as well as the manufacture or analysis of biological materials. Medical waste also covers wastes generated throughout any home healthcare operations. Due to the unusual output of garbage from both families and health facilities, there seems to be a disaster from the waste. “COVID-19” might spread faster if wastes from health institutions and households are not properly managed. This study focuses on the hazardous effects of medical waste on the

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environment. This study was characterized into different sections in which the first section is an introductory section where the author discussed the effects of medical waste on the environment. After that literature review section is mentioned where reviews and suggestions of the previous studies related to medical waste are discussed. Furthermore, the discussion of this study was stated in which the author discussed the classification of medical waste. Lastly, the conclusion of the present study was mentioned where the authors give the outcomes and suggestions of this study.

2. DISCUSSION

When nuclear reactors are operating and when radioisotopes are used in industry and academia, aqueous liquid radioactive waste is produced. The conducted operation has an impact on the chemical compositions and radioactivity levels of the produced wastes. Wastewater having transient beta/gamma activity is stored. If these wastes fulfilled the legal standards for chemical and biological dangers after decomposing to the exclusion level, they may be safely released into the environment. Higher radioactive aqueous wastes, as well as radionuclides with extended half-lives, may be handled by ion exchange/sorption, chemical precipitation, evaporation, reverse osmosis, filtering, and solvent extraction [9], [10].

The increase in the usage of disposable medical goods, together with the expansion of the medical industry throughout the world, has contributed to the massive amount of medical waste created over the last decades. Bad medical waste management, as a result, causes pollution, an unpleasant odor, the growth, and proliferation of insects, rodents, as well as worms, as well as the transfer of illnesses such as typhoid, cholera, and hepatitis by injuries from blood-contaminated sharp objects. Medical wastes haven't yet gotten the attention or importance they deserve in underdeveloped nations like Nigeria, where health concerns compete with limited resources. Hazardous as well as medical wastes still are processed and disposed of with residential garbage, posing a serious health danger to municipal employees, the general public, and the environment. The appropriate collection and disposal of this trash are critical since it can have a direct and indirect influence on public and environmental health. Biohazardous material is an unavoidable byproduct of any hospital. Healthcare institutions in the United States create 4 million tons of general waste every year, as per Health Care Without Harm.

Wastes are materials that are formed as a result of human and animal activity and then discarded as worthless or undesirable. All goods that people no longer use and wish to get rid of or have already dumped are referred to as waste. They are sometimes referred to as junk or garbage. Household garbage, garden waste, medical waste, old paint containers, and other items may be deemed waste. As a result, men's everyday activities might result in a wide range of waste originating from many sources. Rapid urbanization, a lack of appropriate land use, and an adequate critical service management system have resulted in a serious environmental crisis. The scope of the global solid waste problem is frequently reflected in the traditional media. The cost of disposing of this garbage makes up around 20% of a hospital's environmental services expenditures. Biomedical waste, which comprises a wide range of garbage from clinics, nursing homes, clinical research centers, hospitals, as well as medical supply stores, is diverse in terms of characteristics and content. If not adequately managed, biomedical waste poses a threat to the general public.

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of garbage produced. The type of specialty and the standards of the hospitals determine the amount and quality of trash produced every day. Moreover, the kind, as well as the quantity of waste generated by the hospital, will most likely be determined by its location. Every day, hospitals in major cities create more than 30 tons of biological waste. The fact that most hospitals, particularly those managed by the government, are not adequately maintained is cause for considerable worry. Workers at hospitals routinely contravene the medical management and management principles, which were created in 1998. The majority of nursing homes and hospital facilities deposit their trash with city rubbish in dumpsites place. Normally, hospital, as well as household garbage, are mixed on the side of the road and discarded without regard for any norms or regulations. Wherever the people exist medical waste was found. There are several sources of medical waste present in our environment (Figure 2), which affect the environment and human health every day. Some of the negative impacts of radioactive wastes are shown in below Figure 2.

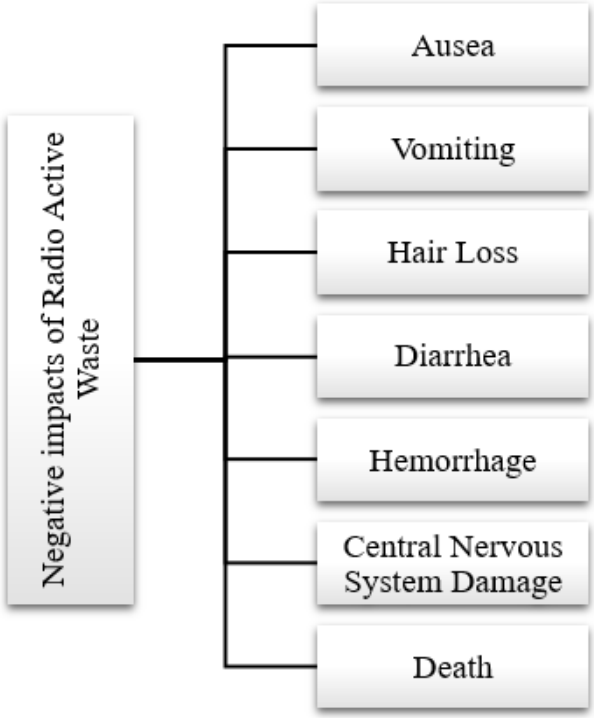

Figure 2: Representing the Negative Impacts of Radioactive Waste on Human Lives.

3. CONCLUSION

Radioactive waste is the waste created by a nuclear power plant or laboratory. They contain the vast majority of living forms as well as radioactive chemicals that are harmful to the environment. Over time, the wastes deteriorate. As a result, they would be stored in a safe area until they stop emitting radioactive material and no longer pose a threat to the environment. The radioactive isotopes and kind of waste play a role in the previously indicated time range. It took decades of intense scientific, political, and societal work to get to the current point, where several countries are within a few years of realizing their national repositories for wastes from the nuclear power

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generation industry. Geological disposal of radioactive wastes was first proposed by geoscientists working with nuclear scientists more than 50 years ago. Since the beginning of these advancements, geologists have been involved, and nearly every area of geosciences has something to offer. Geological disposal is the recommended method for handling hazardous waste. This entails putting packed radioactive waste in a specially designed, subterranean "repository". The geology (rock structure) acts as a barrier to prevent radiation from escaping.

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