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Existence Of Spirituality Of Divine And Sacred Rivers Are In Danger Due To Unsafe, Unscientific And Untreated Biomedical Waste Disposal

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ABSTRACT

Human consciousness serves as a bridge between the physical and spiritual realms. Mental and spiritual states have a direct impact on the physical world and vice versa. The physical and spiritual realms have a complex relationship and constitute a complete, inseparable connection. Anything that we pass from one generation to next impact on our spiritual world. Clean and greener environment, that is free from deadly and dangerous microorganisms is our prime concern and responsibility. It's our moral duty to pass our natural heritage to our next generation in that way our previous generation hand-over to us. All of us want only to go ahead in life in any extent without thinking about our environment. Urbanization, modernization, deforestation, betterment in health facilities, settlement of life, experimentation upon flora and fauna, unnecessary habitat disturbance, nuclear weapons formation, greediness toward obtaining more and more from nature all these activities disbalance our ecosystem and push our environment in danger zone.

As development proceed, all of us want better and better health care facilities, but at the same time during healthcare activities a massive amount of Biomedical waste (BMW) generated, which is one of the major cause of natural disturbance in present time all over the world. Bio-Medical wastes are the things used in hospitals like sharp needles, fluid blood, glass, plastic bottles, solid plastics, and anatomical waste, human body parts, bandages, and cotton, I.V Tubing, biotechnology and microbiology wastes, unborn fetus, placenta, dead bodies and many others.

In our study town Siwan, Bihar there is no proper and scientific biomedical waste management system, which severely affect our environment. Daha River which runs along town side also severely affected by solid as well as liquid biomedical waste, because biomedical waste especially liquid biomedical waste having heavy chemicals, drugs and antibiotics drain in domestic drainage system without any scientific

treatment which alter its water quality and affect aquatic life and all other activities which depend upon water like irrigation, local villagers' livelihood, bathing, animals water needs and so on. In this manner heavy chemicals, drugs and antibiotics enters into the food chain and upcoming future is in danger zone. And unfortunately, the rivers the divine source which is also an indication of purity as Hindu mythology get impure day by day due to unscientific and improper release of liquid biomedical waste.

Keyword: Urbanization, Experimentation, Deforestation, BMW, Anatomical waste

INTRODUCTION

Sasmita Biswal et al.,2013 state that any waste or its by-product which is generated during treatment, diagnosis, immunization, or testing of human beings or animals are called "Bio-medical waste" either it is solid BMW or liquid BMW. Massive amount of biomedical waste especially disposable items like syringes, gloves personal protective kits and many more impose a heavy burden upon whole environment. The term "Disposable syringe Tide pollution" gained prominence in the late 1980s when significant amounts of Biomedical waste including disposable syringes washed ashore on beaches in the northeastern United States. Due to this incident flaws in the management system of biomedical waste got highlighted. Rivers and water bodies all over the world are severely polluted by liquid biomedical waste. Drainage system of most of the hospitals are not proper working, generally it released into domestic drainage system without proper and scientific treatment, which contains liquid biomedical waste- infectious body fluid, blood, chemicals, drug and antibiotic, release from path labs and test room, patients' urine and stool, and many other hazardous substances from healthcare facilities. And due to lack of proper release system in India and also many parts of the world, domestic drainage system generally released into rivers and water bodies.

POLLUTION CAUSED BY BMW

The entire ecosystem—soil, water, and air—is contaminated by biomedical waste. The soil and subsurface water are contaminated by heavy metals found in biomedical waste. When BMW's heavy metals are discarded, they begin to leach and cause environmental problems (Al Raisi et al. 2014). When plastic waste polyvinyl chloride (PVC) included in biomedical waste is treated in incinerators, toxic gases such as furans and dioxins are emitted (Thorton et al., 1996). The air is heavily contaminated by these harmful gasses, which include dioxins, furans, and numerous more. Subramanian et al. (2000) investigated the elevated levels of dioxin in human breast milk obtained from Kolkata, Mumbai, and New Delhi.

Inadequate or incorrect operation of small-scale incinerators can result in incomplete waste combustion, insufficient ash disposal, and dioxin emissions that are 40,000 times greater than the Stockholm Convention's emission limits (Batterman, 2004). Incinerator construction is prohibited in both Denmark and the Philippines. Radioactive waste, mercury waste, and PVC plastic trash are among the healthcare by-products that are most environmentally sensitive and require more care (Remy, 2001). Therefore, it is crucial to concentrate on reducing, reusing, and recycling biomedical waste in order to protect the environment as a whole from this massive and contagious waste. According to Priyadarshini et al. (2016), inefficient and unscientific disposal and treatment methods of chemically harmful, infectious, and frequently radioactive compounds contained in hospital waste pose a serious threat to human health and the community. Numerous studies to evaluate health risks have concentrated on hospital air contaminated by exposure to cytotoxic medicines. As a result, hospital waste generation has grown to be a significant issue because of its numerous ramifications as a danger factor for patients' and hospital staff's health as well as for the general public outside of the medical field (P Pasupathi et al. 2011).

BMW'S IMPACT ON DISEASE AND HUMAN HEALTH

Inadequate BMW management leads to several forms of infectious diseases and environmental degradation (Rai et al., 2020). BMW poses a serious risk to human health (Nema et al., 2011). Because generated trash contains several infections and hazardous microorganisms, it contaminates the entire environment and causes a variety of infectious diseases. The bacteria that cause infection include enterococci, non-haemolytic streptococci, anaerobic cocci, clostridium tetani, klebsiella, HIV, and HBV (Blenkharm, 1995). These microorganisms can enter the body by a variety of pathways, including ingestion, inhalation, cuts or punctures, and mucous membranes.

Exposure to blood or any other blood-fluids, aerosols, or saliva can spread infectious pathogens of HIV, hepatitis C, or other blood-borne diseases (Nejad et al. 2011). Numerous diseases are caused by the dangers of pharmaceutical and chemical waste, radioactive waste, genotoxic waste, infectious trash, or sharp objects. Inadequate management of infection waste can result in infections, sterility, genital abnormalities, cancer, mutagenicity, asthma, dermatitis, and neurological disorders in both adults and children. Sharps contaminated with bodily fluids can also cause cholera, typhoid, AIDS, hepatitis, and other viral infections (Adedigba et al. 2010; Manyele and Mujuni 2010).

The "Blue Book" states that sharps waste is regarded as an extremely hazardous waste class because they produce two problems: first, cuts, punctures, or abrasions in the skin; second, if the sharps are contaminated with dangerous pathogens, these cuts, abrasions, or punctures might become infected. "Blue Book" also notes that a hospital housekeeper in the United States contracted endocarditis and staphylococcal bacteremia following a needle injury.

ANTIBIOTIC RESISTANCE DUE TO BMW

An excellent invention for humanity is the antibiotic. It has long been used to treat a variety of fatal bacterial illnesses and has saved many lives worldwide. An emerging problem in the treatment of numerous major diseases is the development of antibiotic-resistant microorganisms (Alanis AJ, 2005). Antibiotic resistance is one of the main issues of the modern world.

Antibiotic resistance, also known as antimicrobial resistance (AMR), occurs when bacteria stop responding to a particular type of antibiotic; multidrug resistance (MDR) occurs when bacteria stop responding to many types of antibiotics. Drug-resistant microorganisms arise as a result of improper bio-medical waste management. Because of human activity, BMW is one of the primary drivers of antibiotic resistance. Antibiotic resistance originates from the waste environment (Gajalakshmi P et al. 2019). According to some research, in addition to other factors, the widespread use of antibiotics in hospitals, the direct draining off of pharmaceutical companies' effluents that prepare antibiotics, and expired drugs are key contributors of the creation of antibiotic-resistant bacteria.

Patients in hospitals frequently use antibiotics, which are partially digested by the patient's body and end up in their urine, stool, and vomiting. These substances are then directly drained off with regular sewage flow, which leads to the emergence of antibiotic-resistant bacteria. Similarly, expired antibiotics and medications are thrown out without proper treatment, which exposes the antibiotics to the bacteria and eventually causes the emergence of drug or antibiotic-resistant bacteria in the environment. Similarly, the emergence of these bacteria is also caused by pharmaceutical business effluent that is released into rivers without any appropriate scientific treatment. Receiving rivers may be negatively impacted by certain hotspots that emit antibiotic chemicals into the environment (Rodriguez-Mozaz S et al. 2015).

Not every hospital has access to effective sewage treatment facilities (WHO, 2014). Pharmaceutical businesses should be more mindful of their worldwide supply chains because unsafe "dumping" of

antibiotic-related trash provides a breeding ground for drug-resistant bacteria (SumOfUs, Bad Medicine, 2015).

Humans are incredibly avaricious and self-centered; they only care about their own interests, which can lead to numerous issues for other people or the environment. Escherichia coli, Klebsiella pneumoniae, Acinetobacter baumannii, and other community and healthcare-acquired infections Multidrug resistance is most commonly documented in Staphylococcus aureus, Streptococcus pneumoniae, Enterococcus, and Mycobacterium tuberculosis (Allen HK et al. 2010). Therefore, this antibiotic-resistant bacterium is concerning for the near future since genotype modification causes the bacteria's resistance to be passed down from one generation to the next.

COVID-19 PANDEMIC OUTBREAK'S IMPACT ON BMW

In addition to all of these issues, the COVID-19 pandemic has an impact on global health, the environment, society, and the economy. The World Health Organization (WHO) declared COVID-19 to be a pandemic on March 11, 2020. It has an impact on BMW management methods globally as well. During the COVID-19 pandemic, Wuhan, China, produced 600% more medical waste (Jiajun, 2020).

PPE kits, masks, single-use plastic, and chemicals make up the majority of this massive quantity of COVID-19 BMW (C-BMW). Every COVID sufferer in India is estimated to create more than 3.41 kg daily, which is over twice as much as the BMW produced on average (Manasi et al. 2014). BMW has an impact on the entire ecosystem. Appropriate source segregation is crucial for a successful waste management program. Numerous study found that segregation in the majority of healthcare facilities was far from adequate. Therefore, it is imperative to control it properly and scientifically. The disposal of biomedical waste will be the primary focus of environmental protection as a whole (Dr. S.V. Joga Rao, 2004).

BMW MANAGEMENT

More bio-medical waste (BMW) is produced by expanding medical institutions as a result of urbanization and population growth, and it must be properly disposed of. Handling, segregation, mutilation, disinfection, storage, transportation, and final disposal are some crucial processes in any establishment for the safe, appropriate, and scientific management of health-care waste (Acharya and Singh Meeta, 2000).

In order to manage healthcare waste in a safe, sustainable, and cost-effective manner, WHO published the first edition of "The Blue Book," or "Safe management of wastes from health-care activities," in 1999. The second edition was released in 2014 and included some new procedures, guidelines, and measures for safe disposal of BMWs. Data from 2017 indicates that India produces about 3 million tons of BMW annually, with an 8% growth rate anticipated. According to Harhay MO et al. (2009), half of the world's population suffers from incorrect BMW exposure, and the rate of BMW generation is rising more quickly than the infrastructure needed to cope.

Knowing the distinction between household and biomedical waste is crucial. Even though biomedical waste is hazardous, it is typically disposed of with household waste in developing and underdeveloped nations without receiving the necessary disinfectant treatment. This can be done by autoclaving, thermal treatment, chemical disinfection, incineration, inertization, grinding and shredding, land disposal, deep burial, microwave irradiation, or a variety of other methods. When infectious BMW is combined with municipal garbage under unfavorable environmental conditions, the entire waste may become contagious (Info Nugget, 1996). Most hospitals and nursing facilities choose to dispose of their waste via open dumping alongside city garbage (Ahmad, 1997). Although BMW requires strict safeguards, it is a very widespread practice in many countries to handle BMW like regular household garbage (Bassey BE, Benka-Coker MO, and Aluyi HS 2006).The World Health Organization's (WHO-2016) guidelines for

pollution prevention, environmental protection, workplace safety, and the adoption of cleaner production technology across all pertinent sectors should be adopted by all nations in order to recognize the seriousness of this pressing issue.

MATERIAL AND METHODS

Siwan is a highly potential patient belt, because it is hub of healthcare facilities. Nearly 1500 health-care facilities i.e., hospitals, nursing homes, clinics, veterinary, pathological laboratories, blood-banks (government and private) in Siwan town and nearly 2500 health-care facilities (government and private) in Siwan district are running.

Period of Study: From Jan 2019 to Dec 2021

Study area: Different health care facilities (HCF) both Government and private in the town

Data Collection: Primary and secondary data were collected from Bihar State Pollution Control Board (BSPCB) Patna, and District Health Society (DHS) of Siwan (Jan 2019-Dec 2021).

Data collection of "Daily Collection Report of Biomedical Waste'' of Sadar hospital and many private hospitals in Siwan (Bihar) by Medicare Environmental Management Pvt. Ltd. Muzaffarpur, Bihar, India.

Waste water samples were collected from Shiv-Ghat and Pulwa Ghat of the Daha River, Siwan for finding of different physiochemical parameter and diseases causing micro-organisms in river environment.

Waste water samples were collected from drainage of Sadar Hospital Siwan and cultured (Bihar State Pollution Control Board Patna) for finding of different diseases causing micro-organisms in hospital environment.

Questionary based survey was done for estimation of processes (like ETP for WWTP) used for proper and scientific treatment of liquid BMW.

RESULT

In my present study 47% of health-care personnel were found to have an adequate knowledge, attitude, and practice (KAP) about BMW and due to this low percentage of KAP, biomedical wastes are generally mixed into domestic waste while biomedical waste van (Medicare van by Medicare Environmental Management Pvt. Ltd. Muzaffarpur, Bihar, India) is running through-out the town. These wastes are scattered here and there all over the town and a potential source of pollution, infectious diseases and antibiotic-resistant bacteria (Fig.1, and 2). Table.1 clearly show huge amount of Biomedical waste generation in given 3 years. On an average more than 300kg/day solid biomedical waste generate in Siwan and major portion of it remains untreated. And on another hand liquid Biomedical waste treatment is in very grim condition in my study finding, only 10% HCF were equipped with Effluent Treatment Plant (ETP, Fig.3) for wastewater treatment process (WWTP) in the town, while almost 90% of hospital's drainage system is directly mixed into domestic drainage system without any scientific treatment and finally released into Daha River of Siwan (Bihar). In this way potential diseases causing micro-organisms are reached to Daha River through all over the town and pollute whole environment. Along with human beings the aquatic organisms of Daha River are in danger. Dire state of Daha River can be seen in fig.4. in which point of release of drain from all over the town is shown by red circle. It is the view of Shiv Ghat of Daha River, Siwan. Shiv Ghat having a sacred temple and place of worship. So, we can see how the spirituality is in danger.

Rivers are revered as sacred places globally, particularly in Hinduism, where major rivers like Ganga, Yamuna, and Godavari are personified as goddesses, believed to possess purifying powers and serve as lifelines for holy cities like Varanasi and Prayagraj, sites for major pilgrimages like the Kumbh Mela at the Triveni Sangam, Symbolizing divine presence, cleansing, and the connection between humanity and the divine.

Rivers are Sacred:

Divine Connection: Rivers are often considered manifestations of deities, linking the earthly realm to the divine.

Purity and Cleaning: Rivers are seen as spiritual cleansers, washing away sins and impurities.

Life-Givers: Essential for agriculture and sustenance, they symbolize life itself.

Sangam (Confluences): Points where rivers meet (or where rivers meet land/sea) are especially potent spiritual sites.

Pilgrimage Centers: Holy cities and temples cluster on riverbanks, attracting pilgrims for sacred baths (scan) and rituals.

Daha River, Siwan Bihar

The Daha River known as tributary of the Ganga. It is flooding in the rainy season but drying in summer, acting as a Vital lifeline, though facing severe pollution and encroachment issues, transforming it into a polluted drain with issues affecting local biodiversity and health. Despite its importance, the river is on the verge of extinction due to neglect, with reports of highlighting its transformation from a flowing river to a stagnant, polluted drain.

TABLE.1. YEAR WISE GENERATION (WT.) OF BIOMEDICAL WASTE IN SIWAN DISTRICT

YEAR 2019	YEAR 2020	YEAR 2021
917.42 kg/day	5874.48 kg/day	384.53 kg/day

Fig.1 Very unhygienic condition of Hospital Road Siwan Town, openly thrown Biomedical waste clearly seen

Fig. 2 Open dumping of Biomedical waste Infront of Hospital premises and Rag picker interaction with it

Fig. 3 ETP (effluent treatment plant) for waste water treatment process (WWTP)

Fig. 4 Dire State of Shiv Ghat, Daha River, Siwan, Bihar, red circle indicates the point of release of drain from all over the town. It is worship embankment and we can see how we ourselves offend the faith and the spiritually

BMW EFFECT UPON PHYSICAL, MENTAL AND SPIRITUAL WORLD

Our action/ physical realm either it is good or bad, either it is constructive or destructive is direct representation of our mental realm. Together, they form a holistic, interconnection experience, where physical action reflects internal states, and spiritual well-being impacts physical health. As we can see in which extent biomedical waste affect and pollute our surrounding and whole environment and create multifaceted problems. Hence, any types of anthropogenic activities (physical realm) which cause environmental pollution reflect mental realm and finally affect spiritual realm. So, for healthy life and environment every activities of human being's matter. We can see interconnection in the fig.5 a and b.

Fig.5.a

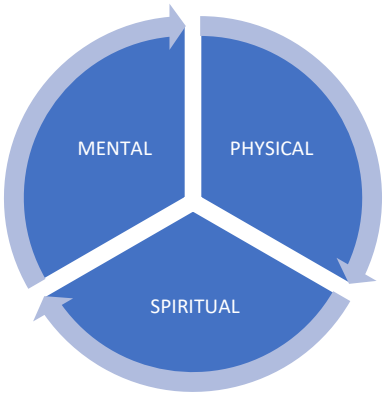

Fig.5.b

CONCLUSION

Siwan is a potential belt of patients, here a massive amount of Biomedical waste generated daily but Bio-Medical waste management is not taken seriously. Huge amount of solid and liquid Biomedical waste generated here remains untreated and this untreated, unsafe and unhygienic liquid biomedical waste released into Daha Rivers, containing patients' urine and stool other than infectious body fluid, blood, chemicals, drug and antibiotic, release from path labs and test room, and many other hazardous substances from healthcare facilities, which disturb many physiochemical parameters of Daha River and ultimately aquatic life and all other activities which depends upon rivers. Rivers are revered as sacred places globally, particularly in Hinduism symbolizing divine presence, cleansing, and the connection between humanity and the divine. Hence, any types of anthropogenic activities (physical realm) which cause environmental pollution reflect mental realm and finally affect spiritual realm. So, we human beings offend the faith and spirituality by polluting the rivers due to improper and unscientific treatment of biomedical waste especially liquid biomedical waste.

So upcoming generation is in danger. It is not a matter of serious concern for my study area only but it is a grim concern for whole world. If Biomedical waste management system will not scientific and proper, then ….

Human beings are in danger

Animals are in danger

Plants life is in danger

Rivers and water bodies are in danger zone

Ground and Soil are in danger

Air is in danger

Finally whole environment is in danger and it severely affect physical, mental and spiritual world

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