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11. AN ENVIRONMENTAL STUDY ON PROBLEMS FACED BY HEALTHCARE VISITORS OF KANCHIPURAM DISTRICT

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ABSTRACT

India as a developing economy is healthier nation because of proper and well-developed healthcare infrastructure. This leads to improvement in the life years and happiness of the population. The high life style increases the unhealthy practices of eating culture, fast food, no exercise and other. Even children's are facing serious health issues in early ages. Due to this, every individual's visiting the hospitals at least once in a month. Many get diseases while visiting hospitals where there is poor maintenance of various wastes, which leads to air pollution, waste water pollution, bio medical waste pollution, and soil pollution. Tamil nadu serve as a hub of medical services in India which also spreads to major hospital accrued infections to human beings as well as to the environment. This research study highlights about the environmental problems which are posed by the health care centers to the humans and animals.

KEYWORDS: hospital waste ,environmental pollution, bio medical waste

INTRODUCTION

Health care waste is any waste, generated during the diagnosis, treatment or immunisation of human beings or animals. These wastes are also generated during research activities or in the production or testing of biological materials. The solid or liquid waste arising from health care including collected gaseous waste. The wastes which are disposed and/or originated from any private and public healthcare institutions, can affect human well being and health, and the environment i.e., air, water, soil, animals, landscape, and also the public order and security. Health care waste includes all types of waste generated by health care establishments, research facilities, and laboratories.

75 per cent to 90 per cent of wastes produced by the health care establishments are general or non-risk wastes comparable to domestic wastes. These wastes come mostly from the administrative and housekeeping functions of healthcare centres and may also include wastes generated during maintenance of healthcare premises. The remaining 10-25% of wastes

is regarded as hazardous and may pose a variety of health risks. The remaining 10-25% is hazardous and can be injurious to humans and animals and dangerous to the environment (Rao, 2004).

Table 1. Approximate percentage of waste type per total waste

Non-infectious waste	80%
Pathological waste and infectious waste	15 %
Sharps waste	1 %
Chemical or pharmaceutical waste	3%
Pressurises cylinders, broken thermometers..	Less than 1 %

RESEARCH PROBLEM

India has World's second highest population, next to China, having 127 crores of population with increasing number of health care facilities, silently producing thousands of tons of medical wastes everyday such as pathological wastes, blood wastes, etc. These health care wastes are highly infectious to those who handle it, may be doctors, nurses and other health care related people. The danger is really fall on the public who are using the healthcare facilities like Hospitals, Dispensaries, Labs, PHCs, CHS have the potential source to infect via these hospital wastes. This study aims to understand the different environmental problems and impact on human health of the same.

LITERATURE REVIEW

Ramesh Babu B (2009) studied with the objective to highlight the effect of hospital waste in the environment including air, land, and radioactive pollution. Air pollution in indoor chemicals from poor ventilator causes diseases like Sick Building Syndrome (SBS); in outdoor pollution, waste without pre-treatment, if it is dumped in open area will enter into the atmosphere. The Air Atmosphere too gets contaminated, causes respiratory diseases. Some radioactive effects also disturb the health of the environment. The liquid waste which let into water bodies

can alter the parameters such as pH, BOD, COD, etc., and in some cases the dioxin mix is also reported near incineration. Land gets polluted due to infectious waste, discarded medicine, chemical, lead and mercury which gets absorbed with water, water bodies, which will enter in food chain.

Hospital Pollution

An undisclosed study says, the infectious hospital waste may contain variety of pathogenic microorganisms. These may enter human body through puncture or cut in the skin, mucous membranes or by inhalation. Sharps are very dangerous because it can infect the wounds more. It has the dual risk of injury and disease transmission. The poor hospital waste management may lead to the cause of Hepatitis B and C, HIV infection, Gastro-enteric infection, skin infection, respiratory infection, blood stream infection, and radioactive toxicity and health problems associated with air and water pollution.

Table 2. The types of infections, determined by the contact with biomedical waste, pathogen agents and transmission

Infection Type	Pathogen Agents	Transmission Path
Gastrointestinal infections	Enterobacteria: Salmonella, Shigella spp. Vibrio cholera Helminthis	Faeces or/and vomiting liquid
Respiratory infections	Mycobacterium tuberculosis Measles virus Streptococcus pneumoniae	Respiratory secretions, saliva
Eye infections	Herpes virus	Eye secretions
Genital infections	Neisseria gonorrhoeae	
Herpes virus	Genital secretions	
Skin infections	Streptococcus spp	Purulent secretions
Anthrax	Bacillus anthracis	Secretion of skin lesions
Meningitis	Neisseria meningitides	LCR
AIDS	HIV	Blood, semen, vaginal secretions
Haemorrhagic fevers	Junin Viruses, Lassa, Ebola Marburg	Biological fluids and secretions
Septicaemia	Staphylococcus ssp	Blood

Viral Hepatitis type A	VHA	Faeces
Viral Hepatitis type B and C	VHB, VHC	Blood, biological fluids

Source: Nikos, 2011

Hospital waste was not being managed but it was simply 'disposed off'. The disposal of hospital waste can be very hazardous particularly when it gets mixed with municipal solid waste. All the waste dumped in uncontrolled or illegal landfills such as vacant lots in neighbouring residential areas, inhabited lands and slums. Further, unhygienic conditions in general ward toilets, coupled with frequent strikes by Class IV staff creates what are virtually secondary foci of infectious diseases within the hospital premises. Such areas are often stockpiles of heterogeneous infectious material and contribute greatly to the incidence of nosocomial infections. For example, according to a WHO report the excreted loads of some selected enteric diseases are as follows:

Table 3 Excreted loads of Infectious Agents

INFECTIOUS AGENT	AVERAGE NO. PER GRAM FECES
Shigella spp.	107
Salmonella typhi	108
Escherichia coli (pathological)	108
Hepatitis A virus	106
Source: Saurabh Sikka 2000	

The persistence of these organisms in the environment at 20-30o C is shown to variations from 2 weeks to a month. This aggravates health hazards when associated with the biomedical wastes generated in the hospitals. Bio-medical waste are being buried in small pits near the centres itself and gets exposed when stray dogs and pigs dig it out in search of food. The well defined and documented evidence is that, in developing countries, the impact of miss-managed health care wastes are transmitting hepatitis B and C, the HIV viruses through injuries by needles & syringes which are contaminated with human blood.

BEDS AND MATTRESSES

Hospitals have more beds; a single bed is used for different types of patients in the hospitals. Some mattress can absorb the infections and blood or any other secretion of human. Soiled linen and mattresses may contain pathogenic microorganisms from one diseased person which can be easily transferred to the other patients using it.

HOSPITAL PREMISES

Akter et al., (1998) reported that, there were several incidences (10 cases out of 17) of injury due to exposure to medical wastes inside or outside the hospital premises. These were as follows:

- Hands cut due to handling broken glass
- Injured by needle and fingers permanently damaged/ became cured
- Right hand became paralysed by the injury by a needle
- Two legs became paralyzed due to injury by a needle
- Skin diseases on legs and hands/ body
- Pus due to injury sometimes
- Ulcer on legs

INJECTIONS

The greatest risks possessed by infectious waste are accidental needle stick injuries, which can cause Hepatitis B and Hepatitis C and HIV infection. There are numerous other diseases which could be transmitted by contact with infectious health care workers. A report on injection practices in India, submitted to the Ministry of Health, shows that two-thirds of the injections administered are unsafe. It is estimated that 0.6 to 0.8 million needle stick injuries are annually among health care workers. The needle stick injuries have been related to certain work practices like:

- Recapping,
- Transferring of sharps between hands,
- Failing to properly dispose of sharps in puncture proof containers.

DIOXIN

The term "dioxin" is to refer both polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans, a family of 210 highly toxic and persistent chemicals that are unintentional by products of medical waste incineration and PVC plastic production. Health effects of dioxin exposure at even in extremely low concentration includes the following:

- Chronic lymphocytic leukemia, soft-tissue sarcoma, non-Hodgkin's lymphoma, and Hodgkin's disease have been linked to dioxin exposure. There are further more evidence of a possible association with liver, lung, stomach and prostate cancers.
- Immune system effect and low exposures to dioxins result in susceptibility to bacterial, viral and parasitic diseases.
- Reproductive and Developmental effects in animals, decreased fertility, decreased litter size and inability to carry pregnancies.

CHEMICAL WASTE

These hospital wastes cause poisoning by absorption through the skin or mucous membranes, by inhalation or by ingestion.

Chemicals and pharmaceuticals may also determine lesions of skin, eye, and respiratory mucosa. Chemical waste removed by drainage system may have toxic effects on ecosystems and water where are discharged.

ACID GASES

The acid gases (e.g., hydrogen chloride, nitrogen oxides and sulphur dioxides), cause acute effects such as eyes and respiratory irritation, can contribute to acid rain and may enhance the toxic effects to heavy metals. Particulate matter can cause chronic health effects. Burning of chlorine made material e.g., PVC, creates dioxin, a known animal carcinogen, and considered as human carcinogen. A lack of understanding of the modes of transmission of agents associated with blood borne diseases, the fear of a fatal disease such as the Acquired Immuno Deficiency Syndrome (AIDS), and a distrust of health care facilities and often misleading media coverage has led to intense public pressure on politicians to regulate medical waste.

ENVIRONMENTAL PROBLEMS

The improper management in bio-medical waste causes environmental problems that causes air, water and land pollution.

Air pollution can be in both indoor and outdoor atmosphere. Biomedical waste that generated by air pollution can be classified in to three types namely – Biological, chemical and radioactive. Pathogens present in the biomedical waste can enter and remain in the air for a long period in the form of spores or as pathogens. The indoor air pollution caused due to the chemicals from poor ventilation can cause diseases like Sick Building Syndrome (SBS). Most Chemicals utilized are not as per prescribed norms and over use of chemicals should be avoided.

Outdoor air pollution can be caused by pathogens. The bio-medical waste without pre-treatment if transported outside the HCF, or if it is dumped in open areas and roads, pathogens can enter into the atmosphere. Chemical pollution that causes outdoor air pollution has two major sources: open burning and incinerators. Open burning of bio-medical waste is the most harmful practice. When inhaled can cause respiratory problems.

Water Pollution, The liquid waste generated, let into sewers can lead to water pollution, without treatment or proper treatment. Water pollution can alter parameters such as pH, BOD, DO, COD, etc. There are instances where dioxins are reported from water bodies near incinerator plants. Dioxins can enter the water body from air and water.

Radioactive waste in liquid form can come from chemical or biological research, body organ

imaging, decontamination of radioactive pills, patient's urine and from scintillation liquids used in radio immunoassay. Research and radio-immunoassay activities may generate small radioactive gas.

Soil pollution of bio-medical waste is caused due to infectious waste, discarded medicines, chemicals used in treatment, ash and other waste generated during treatment processes. Heavy metals such as cadmium, lead, mercury etc., which are present in the waste, gets absorbed by plants and its entering into the human body through the food chain. Nitrates and phosphates present in the leachates from landfills are also pollutants. Excessive amount of trace nutrients element including heavy metals in soil are harmful to crops and are also harmful to animals and human beings. The WHO reveals that more than 50,000 people die every day from infectious diseases. HIV, hepatitis, tuberculosis, pneumonia, tetanus, and whooping cough are the diseases those spread through improper waste management.

SUMMARY

The following are the summary of environmental impacts associated with the improper care of hospitals:

- Pollutants from medical waste (e.g., heavy metals and PCBs) are persistent in the environment
- Ground water contamination, decrease in water quality
- Pathogens leads to long term accumulation of toxic substances in the soil, Specimens collected for analysis have the potential to cause diseases and illness in man, either through direct contact or indirectly by contamination of soil, ground water, surface water, and air.
- With domestic animals being allowed to graze in open dumps, there is the added risk of reintroducing pathogenic microorganisms into the food chain
- Public nuisance (e.g., odors, scenic view, block the walkway, aesthetics, etc.,)
- Improper sterilization of instruments used in labour room may cause infection both to mother and child

Inadequate hospital management thus will cause environmental pollution, unpleasant smell, growth and multiplication of vectors like insects, rodents and worms and may lead to the transmission of diseases like typhoid, cholera, hepatitis and AIDS through injuries from needles and syringes contaminated with human bloods. Various communication diseases which spread through water, sweat, blood, body fluids and contaminated organs, are important to be prevented.

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