



Health Issues and Impact of Waste on Municipal Waste Handlers: A Review

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Municipal solid waste (MSW) is hazardous to human health and the environment if not properly handled throughout all management processes, beginning with collection, separation, transfer, treatment, disposal, or recycling and reuse. The World Health Organization (WHO) has raised awareness of the dangers of improper solid waste disposal in terms of soil, water, and air pollution, as well as the health consequences for the people living in the surrounding areas. MSW production is predicted to reach 3.40 billion tonnes globally by 2050. Inadequate waste management is one of the causes of the rise of infectious diseases. Most viruses, bacteria, and parasites that cause illness are found in blood, bodily fluids, and bodily secretions, which are components of bio-medical waste. This spreads through several human contacts, each of whom is a possible "receiver" of the illness. The Human Immunodeficiency Virus (HIV) and hepatitis viruses are at the forefront of a long list of illnesses and disorders that have been linked to biomedical waste. Other prevalent diseases spread owing to poor waste management include tuberculosis, pneumonia, diarrhea, tetanus, whooping cough, and others.

Keywords: *Municipal solid waste (MSW); separation; collection; transfer; treatment; disposal.*

1. INTRODUCTION

Municipal solid waste is a by-product of economic activity and consumption that comprises garbage from households, commercial premises, institutions, markets, and industries, and its management and disposal is a rising environmental and public health concern [1,2,3]. Population growth and economic development have increased the volume of solid garbage generated in cities [4]. Collection, sorting, and processing of commercial and industrial trash are all part of solid waste management [1]. Risks occur at every stage of the process, from the point of collection at households to transportation and recycling or disposal locations [4]. They face occupational health and safety concerns due to the nature of the materials handled, the emissions produced by those products, and the equipment employed [4]. In places where contagious medical wastes and toxic industrial wastes are not separated from home waste, waste collectors face a variety of hazards [4]. They have a high rate of occupational health problems as a result of their exposure to many risk factors [3,5]. The majority of infections (waterborne, airborne, and contact) have exposure pathways, while the majority of injuries have contact pathways (hepatitis B virus [HBV], human immunodeficiency virus [HIV], Tetanus) [3,4]. Risks can be reduced by making waste technology more confined, minimizing pollutant emissions, modifying working procedures to disrupt the routes, and wearing protective apparel [4].

In impoverished countries, garbage is rarely stored in closed containers and is instead deposited directly on the ground, necessitating shovelling by hand or being placed in an open carton or basket to be picked up by hand. As a result, workers in low-income nations have much more direct contact with solid garbage than their counterparts in high-income ones, who mostly handle sealed plastic bags and covered dustbins. Exposure to health risks has not yet been established as a unique occupational concern. Data on health and accident repercussions are scarce in most high-income nations and nearly non-existent in developing countries. There has been minimal research into the health and injury rates of solid waste employees in developing countries such as India. The majority of the analyzed studies have limitations due to poor exposure assessment and a lack of information on key variables. Waste work is overshadowed by social, economic, and environmental

hardships, as well as gender difficulties. Working conditions for female sweepers are frequently deplorable; they may lack appropriate clothing and equipment, although few complaints about the issue [1,2,6].

2. IMPACTS OF SOLID WASTE ON HEALTH

The population in places where there is no suitable waste disposal procedure, particularly pre-school children; garbage employees; and workers in facilities manufacturing poisonous and infectious material are among those at risk from the improper disposal of solid waste. Other high-risk populations include those who live near a trash dump and those whose water supply has become poisoned as a result of waste dumping or landfill leaks. Uncollected solid trash also raises the possibility of harm and infection [7].

Organic household waste, in particular, offers a severe concern because it ferments, generating circumstances favourable to the survival and proliferation of microbial diseases. Direct contact with solid trash can result in a variety of infectious and chronic diseases, with waste workers and rag pickers being particularly vulnerable [7].

Hazardous waste can have a negative impact on human health, and children are especially exposed to these toxins. Chemical poisoning can occur as a result of the release of chemical waste into the environment, resulting in direct exposure. Many research has been conducted in various parts of the world in order to demonstrate a link between health and hazardous waste [7].

Agriculture and industrial waste can potentially pose major health dangers. Aside from that, mixing industrial hazardous waste with municipal garbage might expose people to chemical and radioactive threats. The Control of Pollution Act 1974 was replaced by the Environmental Protection Act 1990, a UK act of parliament pertaining to regulated wastes. It provides for the management of pollution from industrial operations.

The Environmental Protection Act addresses waste on land issues by outlining all areas of trash management and imposing a requirement on local governments to collect rubbish. As a business owner, it is your responsibility to guarantee that any garbage generated by your

firm is handled securely and legally. This is your 'duty of care,' and it applies to anybody who manufactures, imports, transports, stores, treats, or disposes of controlled waste generated by businesses or industries. Uncollected solid garbage can also hinder stormwater drainage, resulting in the formation of stagnant bodies of water that can serve as a breeding ground for disease. Dumped waste near a water source also pollutes the body of water or groundwater supply. Untreated garbage dumped directly into rivers, seas, and lakes accumulate hazardous compounds in the food chain via the plants and animals that consume it [7].

Hospital and other medical waste disposal necessitate extra care because it might pose serious health risks. Discarded syringe needles, bandages, swabs, plasters, and other contagious waste from hospitals, health care centers, medical laboratories, and research institutions are frequently thrown out alongside regular non-infected waste [7].

Sites for waste treatment and disposal might potentially pose health risks to the surrounding community. Air pollution is caused by inadequately operated incineration plants and improperly managed and built landfills that attract all types of insects and rodents that spread illness. These areas should ideally be positioned at a safe distance from all human settlements. To ensure that no leakage into local groundwater sources occurs, landfill sites should be adequately lined and walled [7].

Furthermore, if proper safeguards are not implemented, recycling poses a health risk. Toxic exposure may occur for workers who handle waste containing chemicals and metals. Healthcare waste disposal requires special attention since discarded syringes can cause serious health risks, such as Hepatitis B and C, through wounds produced by discarded syringes. Rag pickers and anyone scavenging in landfills for recyclable goods may be injured or come into close touch with these infected materials [7].

3. OCCUPATIONAL HAZARDS ASSOCIATED WITH WASTE HANDLING

3.1 Infections

- Infections of the skin and blood, as well as infected wounds, are caused by direct contact with garbage.

- Infections of the eyes and lungs are caused by contaminated dust, notably during landfill operations.
- The bites of animals eating in the trash cause a variety of ailments.
- Intestinal diseases are spread by flies that feed on human waste.

3.2 Chronic Diseases

Operators of incinerators are in danger of chronic respiratory ailments, including cancer, as a result of exposure to dust and toxic substances.

3.3 Accidents

- As a result of handling big packages, you may develop bone and muscular problems.
- Infectious wounds are caused by contact with sharp objects.
- Contact with minor amounts of hazardous chemical waste mixed with normal garbage might result in poisoning and chemical burns.
- Burns and other injuries caused by workplace mishaps at waste disposal facilities or landfill methane gas explosions.

3.4 Types of Health Hazards Faced by MSWWs

- Carrying heavy loads over extended distances can result in musculoskeletal issues.
- Several studies have found that garbage workers had a lower lung capacity than non-waste workers.
- Fecal substances may pollute waste. Biological pathogens such as parasites and bacteria associated with the gastrointestinal tract may be included. This can be transmitted from the hands to the mouth, causing stomach and bowel disorders.
- Hospital garbage is hazardous due to biological and chemical contamination, including exposure to used syringes, dressings, abandoned drugs, and, in some cases, blood and organs. They are subjected to infections and microorganisms that cause sickness.
- Sharp objects can result in cuts, which can lead to tetanus or other illnesses.

- Flies, insects, and rats thrive in the garbage, making it a great environment for disease vectors.
- Waste is left out in the open in Bangalore, attracting stray animals. Workers in the waste industry are frequently bitten, which can lead to the spread of rabies.
- Burns and hazardous smoke inhalation are risks associated with garbage fires that break out.
- MSWWs are frequently required to remove animal corpses and human trash from the dumpsters from which they collect rubbish. Diseases transmitted by carcasses and feces go untreated because many people cannot afford basic medical care.
- Many workers ensure that they are inebriated before entering manholes so that they do not have to deal with the unpleasant odor. Other health issues arise as a result of this, such as their body balance being disrupted while they are under the effect of alcohol.
- Depression and other mental health issues are caused by the psycho-mental stress of the job.

3.5 Preventive Measures

Proper garbage disposal procedures must be used to guarantee that the environment around the area is not harmed and that the people living there are not exposed to health risks.

At the household level, adequate waste segregation is required, and it should be assured that all organic matter is set aside for composting, which is unquestionably the best approach for the proper disposal of this segment of trash. The organic component of garbage decomposes more quickly, attracts insects, and causes disease. Composting organic waste and using it as fertilizer are both options [8].

4. CONCLUSION

There are many health hazards encountered in waste management handling. Those risks are preventable through different approaches like the use of personal protective equipment (PPE) as a glove, goggles and boots, reflector jackets. It is mandatory to ensure compliance with legislation

and regulations that control waste management. Also, we should emphasize the importance of safety training that is offered by the organization for any of the sweepers, to make sure that all fully understand the importance of each PPE and how to mitigate the health hazards.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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