

The challenges faced by the Palestinian people in living in a safe environment amidst medical waste.

Medical waste is defined as the byproducts or materials resulting from medical and health activities, carrying distinctive characteristics that necessitate special treatment and storage. Medical waste is classified based on its characteristics and hazards, in accordance with international standards, environmental regulations, and health guidelines, into various types¹:

- 1) Sharp Waste: This category includes sharp objects like needles, posing a particular risk due to the potential for puncture injuries.
- 2) Biological Waste: Encompassing human tissues, their derivatives, and blood, this type of waste demands special treatment to prevent the spread of diseases.
- 3) Hazardous Chemicals: Encompassing toxic medications, these substances require special handling and secure storage.
- 4) Non-Hazardous Solid Waste: Covering non-hazardous medical materials such as masks and cloth gloves, proper storage and disposal are necessary, with potential for recycling in some cases.
- 5) Biohazardous Chemicals: Involving chemicals contaminated with biological substances, like serums and contaminated bottles, proper treatment and secure disposal are essential.
- 6) Expired Pharmaceuticals: Encompassing medications and serums that have surpassed their expiration date, specific disposal methods are required, adhering to regulations.

The classification of medical waste relies on its characteristics and the extent of its impact on human health and the environment. Healthcare institutions and medical facilities must handle these types of waste carefully, following local and international guidelines to ensure overall safety and environmental preservation.

Method and procedures:

- Involved the selection of several governorates, including Nablus, Qalqilya, Jenin, Tulkarm, and Jericho, to conduct the survey. Six hospitals within these chosen governorates were selected for the study.
- The selection was made to ensure representation from the majority of governorates, encompassing different types of hospitals in Palestine, spanning both governmental and private institutions.
- A combination of quantitative and qualitative methods was utilized to collect data, blending technical and social aspects to acquire a holistic set of information.

¹ The Palestinian Cabinet Decision No. (10) of 2012 on the Medical Waste Management and Trading System

- The qualitative approach included reviewing existing literature, conducting personal interviews, facilitating focused group discussions, and employing prepared models for note-taking during fieldwork

Firstly, a literature review was undertaken, encompassing all research, studies, reports, and regulations pertinent to the management of medical waste, be it electronic or informational. This included insights from ministries such as the Environmental Quality Authority, Ministry of Health, Ministry of Local Government, and the Palestinian Central Bureau of Statistics. The goal was to pinpoint gaps, challenges, and criteria grounded in both local and international regulations regarding the secure disposal of medical waste."

Secondly, a total of ten field visits were carried out to locations where medical waste is collected. These visits involved making observations and tracking activities. The targeted sites included random dumps, municipal facilities, private companies, and hospitals in the southern, central, and northern regions. Subsequently, a report was generated summarizing the observations made during these visits

Thirdly, based on the findings from literature reviews and observation reports, two tools were developed for interviews and questionnaires.

- Interview Tool: Ten interviews and two focused group discussions were conducted with the targeted sample, including individuals involved in medical waste collection, specifically women affected in the local community, and those working in medical waste collection dumps. The interviews included open-ended questions, carefully listening to individuals' opinions and experiences, along with stories of women affected by unsafe medical waste disposal. The interviews and focused group discussions were reviewed, analyzed, and documented as factual information.
- Quantitative Method Design: As part of the quantitative approach, a questionnaire was designed to assess the awareness of 150 healthcare workers regarding safe medical waste disposal practices. The questionnaire's stability and credibility were ensured by testing it on a small sample to confirm the participants' understanding. It was then distributed to 150 workers, and after collecting and analyzing the responses, the results were obtained.

All targeted samples were handled with integrity and transparency, with no mention of names or exposure of any sample to accountability

Medical Waste Collection:

- It appears that those involved in medical waste collection in healthcare institutions are primarily contracted private companies. However, these workers are often unqualified or trained in the safe management of medical waste. Their responsibilities primarily revolve around facility cleaning, and they are tasked with general waste collection without specific emphasis on medical waste. Consequently, they are exposed to infection and disease risks.
- 90.0% of medical waste collectors in healthcare institutions have not received training or awareness about the dangers of waste. They lack information about the risks associated

with various departments and the procedures to follow in case of accidents. This contradicts Article 4 of the Basel Convention, ensuring that individuals involved in the management of hazardous or other waste within its borders take necessary measures to prevent pollution. If pollution occurs, they should minimize its effects on human health and the environment to the minimum.

- 90.0% of medical waste collectors do not have insurance from licensed insurance companies operating in Palestine against potential risks that may arise from waste management operations.
- 100.0% of medical waste collectors do not undergo regular medical check-ups or vaccinations.
- 90.0% of medical waste collectors in healthcare institutions are unaware of the final disposal locations for medical waste.
- 90.0% of medical waste collectors in healthcare institutions lack awareness or commitment to occupational health and safety procedures (such as using protective tools like gloves and protective clothing).
- 70.0% of healthcare workers show no commitment to sorting and separating medical waste within healthcare institutions.

Israeli Violations Regarding Medical Waste:

The Israeli occupation poses numerous risks and challenges regarding poor medical waste management:

- There is smuggling of medical waste from Israeli settlements to dispose of it in random dumps on farmers' lands by contracting with individuals from the West Bank.
- Israeli medical waste is buried and dumped in lands without any treatment. Four Israeli medical waste dumps have been identified in the West Bank: Abu Hatab (Masuah), Al-Azariya, Zeta Jamma'in, mostly involving smuggling from settlements, and Hebron, which is apparent.
- An Israeli company specialized in collecting, transporting, and disposing of medical waste, namely Tebiab Company, collects medical waste from Palestinian healthcare institutions and disposes of it in random dumps in Palestinian lands without any treatment. This contradicts Article 4 of the Basel Convention, preventing the export of hazardous or other waste to countries that prohibit waste imports or if there are reasons to believe that this waste will not be managed environmentally and healthily according to agreed-upon standards. It also contravenes the requirement for providing information on the transboundary movement of hazardous waste, according to Annex V, to explain the impact of this movement on human health and the environment.
- Medical waste is sorted in Israeli settlements, such as cardboard and plastic, which are then recycled in a factory next to Khudary on the border of Tulkarm. The factory produces toxic waste that goes to the Zahrat al-Fanjan dump, in addition to the amount of toxic smoke resulting from recycling cardboard and plastic.

- The Israeli occupation imposes strict restrictions on movement between cities, affecting the disposal of medical waste in landfills and leading to the accumulation of medical waste at its source of production.
- The Israeli occupation's seizure of lands in the West Bank and East Jerusalem has reduced the available space for establishing facilities for the safe and healthy disposal of medical waste.
- Financial deficits, economic collapse, and limited support negatively impact the ability of the state or private companies to provide facilities and resources for the disposal of medical waste.

Legislation and International/Local Laws:

- Basel Convention: There is no commitment to the provisions of the Basel Convention regarding hazardous waste movement and measures to dispose of it across borders².
- Stockholm Convention on Persistent Organic Pollutants: This international environmental treaty, signed in 2001 and in effect since May 2004, aims to eliminate or reduce the production and use of persistent organic pollutants. It seeks to protect human health and the environment from chemicals that persist in the environment for long periods, distributing over large areas and accumulating in the fatty tissues of humans and animals. There is no commitment regarding the reduction of organic pollutants (present in medical waste or unsafe disposal methods) that lead to diseases.
- The "2012 Medical Waste Management and Trading System" was enacted but has not been implemented to date³.
- There is no application of sanctions or penalties for non-compliance with safe medical waste disposal, making this issue an environmental crime.
- Institutions and healthcare facilities are required to comply with federal medical waste management laws and Occupational Safety and Health Administration (OSHA) regulations⁴.
- Conflicts of interest and disputes between the Palestinian Ministry of Health and the Environmental Quality Authority lead to a lack of control over the medical waste management system. The conflict between these entities has resulted in the inability to regulate the medical waste management system effectively. The system itself does not grant the Environmental Quality Authority the authority to enter hospitals to control waste, but it assigns them the role of supervising waste transport, treatment units, temporary storage sites, and waste dumps. However, the Environmental Quality Authority has been unable to perform these roles due to financial constraints, staff shortages, and resource limitations.

² The Basel Convention. (2010). Waste Without Borders: General Trends in the Generation and Transboundary Movement of Hazardous and Other Wastes, Geneva

³ Palestinian Cabinet Decision No. (10) of 2012 on the Medical Waste Management and Disposal System

⁴ Occupational Safety and Health Administration (OSHA) Technical Guide for Safety and Occupational Health Management. 2017

- The diversity of authorities and responsibilities among different entities contributes to increased challenges and shortcomings in controlling the management of medical waste.

The challenges and problems facing medical waste management in Palestine from a rights perspective reflect a multifaceted approach, including:

- **Legal Violation:** There is a legal violation due to the non-implementation of international laws and agreements related to medical waste management, leading to the unsafe disposal of hazardous waste.
- **Women and Children's Rights Violation:** Environmental pollution from medical waste violates the health and environmental rights of women and children. The state must protect these rights and take necessary measures to prevent pollution.
- **Failure to Achieve Sustainable Development Goals (SDGs):** Lack of providing safe and healthy treatment for medical waste violates the implementation of Sustainable Development Goals.
- **Negative Environmental Impact:** Ignoring environmental responsibility and pollution prevention results in negative environmental impacts. Relevant authorities should bear both environmental and legal responsibilities.
- **Impediments in Justice and Accountability:** The absence of an effective sanctions system for individuals and institutions violating medical waste management laws creates obstacles in justice and accountability.
- **Violation of Health and Environmental Rights of Minors, Especially Women:** Women and minors, being vulnerable groups, face violations of their health and environmental rights, necessitating protection.
- **Access to Information Challenge:** Difficulty accessing information about medical waste management in a safe manner poses a challenge. Transparency in providing information and addressing challenges is crucial, especially for vulnerable groups such as women.

Environmental Risk:

Burying medical waste in the soil leads to the following environmental risks:

- Leakage of buried medical materials into groundwater used for drinking, rendering it unfit due to chemical substances and microbes.
- Water pollution with antibiotic-resistant bacteria, causing at least 700,000 deaths worldwide annually.
- Adverse effects of polluted water on agricultural crops, reducing their efficiency and impacting food safety.
- Toxic substances affecting wildlife, especially endangered species, disrupting the ecological balance and diminishing biodiversity.
- Water and soil pollution causing environmental sustainability disruptions, thereby affecting public health and leading to long-term consequences.

- Attracting migratory birds to medical waste, exposing them to diseases that can spread among various organisms^{5 6}.

Disposal of Medical Waste:

- The estimated quantity of hazardous medical waste generated by hospitals and clinics in the West Bank is 1543 kg/day based on the number of beds⁷.
- Medical waste is haphazardly collected in hospital yards in a frightening manner. Additionally, it accumulates in front of homes facing hospital yards. One community member reported finding severed limbs and fingers at the doorstep, along with gauze and cotton contaminated with blood.



- Medical waste is randomly collected from various departments, placed in yellow bags, and left uncovered in containers near the cafeteria. These bags contain a mixture of medical and non-medical waste and sometimes remain there for several days before being transported to the waste collection station.

⁵ Al- Assali, A., Absa, I., Abu hamad, M. (2023). identify bacterial growth originated from medical wastes in Rafedia hospital in Nablus City and their resistance to antibiotics. Alpha Journal of Humanities and Scientific Studies. Vol 6

⁶ Qusai N. Al-Shahed, Anhar Assali and Ruba Najjar. (2016). Safe Disposal of Medicines in Palestine. Journal of Pharmacy and Pharmacology, 17-22

⁷ The Palestinian Central Bureau of Statistics: Number of hospitals and hospital beds, and beds per 1000 citizens in Palestine by region, 2018.



- The percentage of hazardous waste generated by hospitals is estimated at 15%, with 85% being regular waste. However, due to the mixing of hazardous and regular waste, all of it becomes 100% hazardous⁸.
- Temporary storage facilities are insufficient: Rooms designated for temporary storage of medical waste do not meet international standards, jeopardizing the safe handling and containment of the waste.
- Inadequate size and quality of waste bags: Medical waste bags often exceed their capacity, leading to tearing and increased risks of exposure.



- Frequent presence of pets, such as dogs and cats, in containers used for medical waste collection indicates the existence of vital tissues that these animals feed on. This serves as evidence of a food source for these animals. Subsequently, these animals are observed

⁸ World Health Organization report. Health care waste. 2018

heading towards nearby dumps, providing an additional food source. This process contributes to the transmission of serious diseases to both animals and humans.



- Diseases caused by bacteria resistant to all types of antibiotics include tuberculosis, respiratory infections, urinary tract infections, and sexually transmitted diseases.
- There are no dedicated facilities for the safe disposal of medical waste.
- Medical waste is collected from healthcare institutions using non-specialized vehicles lacking health and environmental standards. Private transport companies without qualifications for health and occupational safety standards are contracted for medical waste transport.
- Contaminated liquid leaks onto the ground from vehicles transporting medical waste to the collection station, mingling with regular waste until it is transported to the final landfill.
- The presence of children in the area where mixed waste, including medical waste, is collected has been observed, as they attempt to gather containers for reuse in food-related activities.

Violations suffered by women due to unsafe disposal of medical waste⁹:

Medical waste generated from hospitals and health facilities, when not segregated safely, contains numerous infectious bacterial and viral diseases that impact women's health. These can be summarized as follows¹⁰:

- Infectious bacterial diseases threatening women's health:
- Increased urinary tract infections: Recurrent urinary tract infections in women lead to chronic kidney diseases and, consequently, kidney failure.

⁹ General Assembly (United Nations). 2011. Report of the Special Rapporteur on the adverse effects of transport and dumping of toxic and hazardous products and wastes on the human rights, Mr. Calin Georgescu

¹⁰ CENTERS FOR DISEASE CONTROL AND PREVENTION (CDC)

- Increased vaginal infections: Bacterial infections in the vagina can cause itching, redness, and inflammation.
- Increased respiratory infections: Such as throat infections, colds, and bronchitis.
- Increased skin inflammation: Bacterial skin infections include oily skin, bedsores, and dermatitis. Increased gastrointestinal diseases resulting from bacterial contamination with Salmonella and E. coli.
- Elevated mortality risks for women due to exposure to antibiotic-resistant bacteria such as tuberculosis and bacteria responsible for respiratory and urinary tract infections.

Viral diseases threatening women's health, as medical waste serves as a rapid transmission medium for various viruses¹¹:

- HIV/AIDS virus: Transmitted through sexual contact or from mother to fetus, leading to death¹².
- Hepatitis viruses (A, B, C): Causes hepatitis and liver cirrhosis, transmitted through sexual contact or from mother to fetus, leading to death¹³.
- CMV virus: Causes various issues in women, including liver inflammation, retinitis leading to vision problems, oral diseases like mouth and throat inflammation, and fetal deformities in pregnant women. Transmitted through sexual contact or from mother to fetus, leading to death.
- Increased risk of vaginal and cervical cancers with the Human Papillomavirus (HPV), diagnosed by the presence of warts.

Women are exposed to diseases due to environmental pollutants such as heavy metals like mercury, silver, lead, and other hazardous chemicals commonly used in radiology labs, research centers, and dental clinics. These arise from improper management of medical waste in a safe manner¹⁴

- Women are prone to problems in the central nervous system, digestive system, kidney, and liver issues as a result of mercury poisoning.
- Pregnant women face recurrent miscarriages, risks of premature birth, birth defects, and damage to the nervous system, kidneys, and brain due to aluminum poisoning.
- Women experience respiratory problems such as pneumonia and digestive issues like nausea, vomiting, and diarrhea due to air pollution with heavy metals.
- Women are exposed to pollutants with hormonal effects that may lead to cancer, genetic effects, fetal deformities, and irritation of mucous tissues due to exposure to hospital sewage containing dangerous compounds like chemotherapy drugs.

¹¹ Pépin J, Abou Chakra CN, Pépin E, Nault V, Valiquette L. Evolution of the global burden of viral infections from unsafe medical injections, 2000-2010. PLoS One. 2014 Jun 9;9(6)

¹² Bell DM. Occupational risk of human immunodeficiency virus infection in healthcare workers: an overview. Am J Med 1997;102

¹³ CENTERS FOR DISEASE CONTROL AND PREVENTION (CDC)

¹⁴ CENTERS FOR DISEASE CONTROL AND PREVENTION (CDC)

- Women are susceptible to various diseases, including thyroid disorders, liver and kidney failure, resulting from contamination of drinking water and groundwater with harmful doses of medications disposed of in regular waste, subsequently ground into the soil.
- Women's food sources and nutrition, especially during pregnancy, are affected by agricultural land contamination and plant pollution with medical waste.

There is a negative impact on the economic aspects for women resulting from the inadequate management of medical waste:

There is an increase in the incidence of occupational hazards among women, especially those working in healthcare, agriculture, and cooking sectors. This is due to the lack of proper guidance and awareness in managing medical waste, leading to higher healthcare costs and injuries. As a consequence, women are exposed to risks such as needle pricks and fatal diseases resulting from these occupational hazards.

- Women face financial crises due to depleting their financial resources to cover exorbitant medical costs resulting from infectious diseases contracted through improper handling of medical waste.
- Women are at risk of losing their jobs due to extended absences from work caused by infectious diseases.
- Women working in specific professions, such as healthcare, cooking, and agriculture sectors predominantly chosen by women are more likely to lose their jobs due to contracting infectious diseases.
- Women bear the full responsibility and provide complete support in case a family member falls ill due to exposure to an infectious disease resulting from unsafe handling of medical waste.
- Women suffer from accumulated debts for their families due to the expenses of treatment and healthcare.

The risks that children face due to unsafe disposal of medical waste include:

- There is significant harm in children getting injured while playing with mixed medical waste in informal landfills, leading to bacterial diseases such as tuberculosis, salmonella, and various antibiotic-resistant bacteria that can result in death.
- There is a high likelihood of children contracting viral diseases, including HIV/AIDS and Hepatitis A, B, and C, by playing with mixed medical waste in informal landfills. Among these, Hepatitis C is particularly dangerous due to its difficulty in control.
- Heavy metals from medical waste impact the growth and development of children.
- Children can act as rapid carriers of infectious and epidemic diseases within the community by being exposed to medical waste¹⁵.

¹⁵ CENTERS FOR DISEASE CONTROL AND PREVENTION (CDC)

Stories:

The first story: A heartbreaking tale underscores the importance of medical safety. A pregnant woman, on the verge of giving birth, was transferred to a hospital for delivery. After the birth of her daughter several months later, she began experiencing strange symptoms. Suddenly, she developed jaundice in her skin and eyes, accompanied by fever, abdominal pain, nausea, and vomiting. With no clear understanding of what was happening, and due to her complicated new condition, she was once again transferred to the hospital. After necessary tests and analyses, she was diagnosed with hepatitis C, a viral infection. Her case was recorded as a serious infectious infection.

Upon investigating how the infection was transmitted, it was found that she had given birth in the same hospital where another girl, suffering from the same hepatitis C, was born. Verification revealed a lack of proper preventive measures in handling medical waste to prevent infections.

The situation worsened, and the girl's condition deteriorated as the disease progressed, leading to liver cirrhosis. What was even more shocking, due to their lack of awareness of the virus risks and transmission methods, the mother unknowingly transmitted the virus to her children. Some showed symptoms of the disease, while others carried the virus, with a high likelihood of transmission. This particular virus is challenging due to the absence of specific vaccines to protect family members.

The second story:

A truly tragic tale underscores the importance of adhering to health standards in the disposal of medical waste. The harmful effects of improperly burning medical waste led to loss of lives and severe health repercussions, particularly on women's reproductive health.

An interview was conducted with residents of an area facing a serious health crisis marked by a rise in lung cancer cases, increased reproductive system issues, and hormonal disorders in women.

After an investigative interview with residents, it was revealed that there was an environmentally and health-wise unprepared site for burning medical waste. The person responsible for this activity was found to have died from lung cancer. This individual had been burning medical waste at low temperatures without understanding the safe incineration mechanisms and proper use of filters to purify smoke from toxic gases. Daily, thousands of kilograms of medical waste were burned, causing air pollution in the region with toxic gases. This pollution resulted in lung cancer for most residents, leading to their demise. Additionally, women suffered from reproductive diseases affecting their reproductive health. The incinerator was eventually shut down due to political violations, and after several years of its closure, a noticeable decline in lung cancer cases and reproductive diseases among women was observed.

The third story:

An interview was conducted with one of the affected women, a cook (her primary job), working in a restaurant near a hospital. She is the sole provider for her family. Laboratory tests confirmed

that she had contracted pulmonary tuberculosis. She was informed about losing her job due to her illness, and in addition to suffering from severe disease symptoms, it was revealed that her children also got infected with the disease from their mother.

Recommendations:

- 1) Raise awareness among healthcare workers about proper medical waste disposal methods to reduce occupational injury and infection risks, including needle injuries and associated life-threatening diseases.
- 2) Utilize media as an effective tool for raising awareness about medical waste risks. Develop radio and TV programs or targeted public awareness campaigns to deliver clear, simple, and accessible information, encouraging the adoption of safe medical waste disposal strategies in hospitals and healthcare facilities to minimize the risks of hospital-acquired infections.
- 3) Increase awareness and education about the transmission of various viruses, including HIV/AIDS, viral hepatitis, herpes, and CMV. Emphasize safe sexual practices and precautions during pregnancy.
- 4) Enhance awareness of health risks associated with mercury poisoning, including central nervous system problems, digestive system issues, kidney, and liver problems.
- 5) Implement effective management procedures and control measures for infectious waste to prevent disease transmission from animals to humans, including rodents, dogs, cats, insects, and birds.
- 6) Avoid indiscriminate burning of medical waste, as it can lead to long-term health hazards such as cancer due to the release of toxic substances.
- 7) Monitor and control environmental pollutants, such as heavy metals like mercury, silver, and lead, and other hazardous chemicals commonly used in radiology labs, laboratories, research centers, and dental clinics.
- 8) Strengthen efforts to control the spread of infectious diseases in the community, including improving surveillance, early detection, and taking appropriate measures to address them.