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Policy Brief

Health Impact Assessment of Household Waste Management in Kerman: A Policy Brief

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Abstract
Household waste management in the city of Kerman faces significant challenges that affect the physical, mental, social, and spiritual health of residents, sanitation workers, and waste pickers. Findings indicate that issues such as scattered waste, leachate contamination, insufficient infrastructure, and lack of waste segregation contribute to infectious diseases, psychological stress, increased delinquency, and damage to natural resources. This report emphasizes that effective waste management exceeds the capacity of a single organization and requires comprehensive and active participation from citizens, institutions, and the municipality. Progress in this domain necessitates the simultaneous strengthening of public awareness, infrastructure development, and legal support.
Keywords: Humans, Waste management, Occupational stress, Refuse disposal, Recycling

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Introduction

Household waste management is a critical challenge in public health and environmental protection, as it can have both direct and indirect impacts on human health and the surrounding environment. Population growth, rapid urbanization, and changes in consumption patterns have led to an increase in waste generation and greater complexity in its management (1). Household waste consists of organic, inorganic, chemical, and even hazardous materials, which, if not properly managed, can contaminate water, soil, and air resources, leading to various health outcomes, including infections, respiratory disorders, and skin diseases (2, 3). Moreover, reports from the World Health Organization in 2023 indicate that inefficient urban waste management contributes to more than 2 million premature deaths globally each year due to pollution-related diseases and associated health problems (4).

Global evidence further underscores the importance of effective waste management. According to a World Bank report, each dollar invested in waste segregation at the source results in four dollars of savings in disposal and cleanup costs (5). Additionally, the successful implementation of the "Zero Waste" policy in San Francisco has demonstrated that up to 80% of municipal waste can be recycled or composted (6). Similarly, Japan, by leveraging advanced technologies, generates approximately 2 million kilowatts of electricity from non-recyclable waste (7). These examples highlight that waste management is not only a public health necessity but also represents an economic and environmental opportunity, emphasizing that today's waste can serve as a valuable resource for the future.

The financial burden of municipal waste management is substantial both globally and in Iran. Globally, annual expenditures exceed US$250 billion and are projected to reach US$426 billion by 2050 if current practices continue, with costs varying by collection methods, treatment technologies, labor and energy costs, community participation, and system automation. In lower-income countries, basic waste services cost around US$40–45 per tonne, while advanced systems incorporating recycling

and landfill diversion often exceed US$120 per tonne, imposing significant fiscal pressure on local authorities (8). In Iran, municipalities face similar challenges, spending approximately 48,000 billion IRR (≈US$1.1 billion) annually, primarily on landfilling. Evidence from Mazandaran Province shows that source separation programs can reduce waste generation by 33% and divert 80,000 tons per week from landfills. Scaling such initiatives nationally could substantially reduce waste volumes and alleviate management costs, highlighting the potential for strategic investment to improve efficiency and sustainability (9).

In Kerman, household waste is often discarded in a scattered and unsegregated manner throughout the city. The lack of sufficient waste bins, standardized collection vehicles, and adequate infrastructure has led to unpleasant odors, the proliferation of stray animals, and contamination of water and soil resources (Figure 1). This situation threatens the population's physical, mental, and social health and has become a pressing public health concern. Therefore, improving waste management requires comprehensive coordination among the municipality, as the primary responsible authority, other relevant institutions, and active community participation. Strengthening infrastructure, promoting public awareness, and ensuring effective monitoring are essential to managing this environmental challenge systematically and sustainably.

This policy report is derived from a Master's thesis employing a mixed-methods approach. The study was conducted in three main phases. First, a scoping review (2014–2024) was carried out across major databases (PubMed, Scopus, and Web of Science) using predefined keywords to map the existing evidence and identify research gaps. Second, in-depth qualitative interviews were conducted with 22 experts in waste management, and the data were analyzed thematically using MAXQDA software. Third, a quantitative assessment of household waste management in Kerman was performed through direct observation and structured checklists, with data analyzed using SPSS. The integration of findings from these phases constitutes the primary data sources of this report and forms the basis for the policy recommendations presented. This policy brief was prepared in both English and Persian. The Persian-language version of this policy brief is provided as Supplementary File.

Key Findings and Suggestions

Key Evidence and Findings

The following key findings summarize the health, social, and environmental implications of household waste in Kerman.

Physical Health Effects: Respiratory and gastrointestinal disorders, premature mortality, soil and water contamination, and increased prevalence of infectious diseases.

Mental Health Effects: Unpleasant odors, psychological stress caused by waste pickers, and environmental disorder.

Social Health Effects: Emergence of waste-related organized crime, increased delinquency, diminished social participation, and child scavenging.

Spiritual/Value-based Health Effects: Damage to resources for future generations, feelings of guilt, and erosion of human dignity.

Policy Options

1. Strengthening Infrastructure and Equipment: Increasing the number of waste bins across the city, mechanizing waste collection, and standardizing collection vehicles.
2. Education and Awareness: Implementing programs in schools, leveraging mass media, and providing economic incentives for waste segregation.
3. Support for Personnel and Waste Pickers: Distributing protective equipment, organizing and regulating informal waste workers, and providing insurance support.
4. Innovation and Technology: Utilizing biogas,

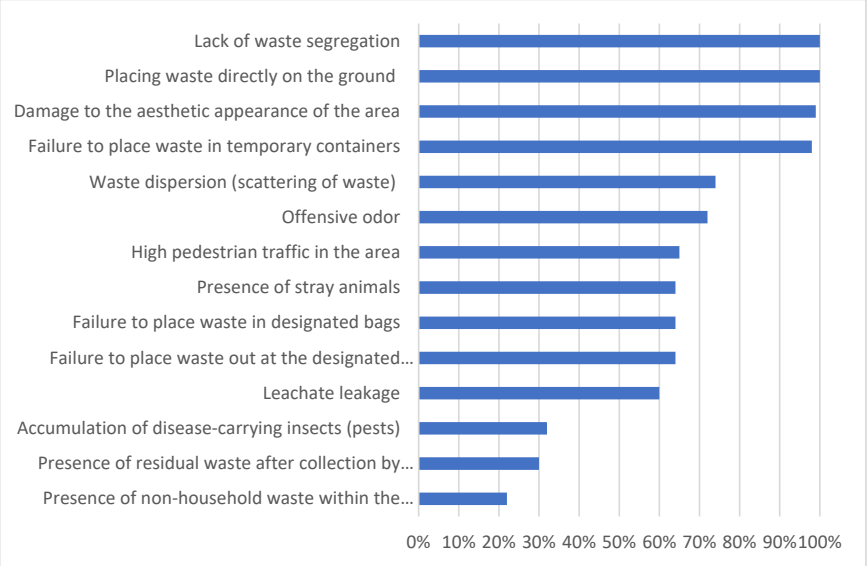

Figure 1. Analysis and Assessment of Urban Waste Management Conditions in Kerman City Based on Direct Field Observations

composting, smart reporting applications for violations, and adopting lessons from successful international experiences.

Policy Recommendations

Short-term (1–2 years): Distribution of protective equipment, increasing the number of waste bins, and organizing waste pickers.

Medium-term (3–5 years): Mechanization of waste collection, strengthening legal frameworks, and enhancing monitoring systems.

Long-term (5+years): Development and implementation of advanced and sustainable technologies for recycling and waste reduction.

Conclusion

Household waste management in the city of Kerman represents a complex, multidimensional issue with significant implications for physical, mental, social, and spiritual health, as well as environmental sustainability. Effective management is achievable only through a comprehensive, participatory approach that involves close collaboration among the municipality, citizens, and other relevant institutions. The municipality, as the primary responsible authority, should prioritize strengthening infrastructure and equipment, expanding education and awareness programs, enforcing regulations, and organizing informal actors such as waste pickers. However, these efforts will only yield the desired outcomes if citizens actively and consistently participate in source segregation of waste. Such a participatory approach will reduce negative environmental and health impacts, preserve natural resources, and improve quality of life. Therefore, waste management policies must emphasize intersectoral coordination, technical capacity-building, and public education to establish a sustainable and effective waste management system.

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Authors' Contribution

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Competing Interests

There is no conflict of interest.

Ethical Approval

The thesis mentioned in this article has been ethically reviewed at Kerman University of Medical Sciences (Ethical Code: IR.KMU.REC.1402.467). The authors confirm their consent to the publication of this article.

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Supplementary File

Supplementary file. The Persian version of this article

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